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Developing Mathematics Teacher Resilience
Using the Growth Zone Model

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A thesis submitted in partial fulfilment of the requirement for
the degree of Doctor of Education

University of Warwick
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Declaration

I hereby declare that, except where explicit attribution is made, the work presented in this thesis is entirely my own. I confirm that no part of this thesis has been submitted for a degree at another university.

I have presented at IPDA, TEAN, Warwick’s Research in Action, and Warwick’s Teachers and Advisers conferences some of my reflections on this work, which were published in the proceedings.

Signed: _____Holly Heshmati______________________________

Date: _____July 2020_____________________________
Inclusion of Published Work

The following papers were published during the writing of this thesis and some parts of these papers appear in this thesis:


Signed: _____Holly Heshmati______________________________

Date: _____July 2020______________________________
Abstract

This thesis reports on a practitioner research project aimed at developing the resilience of pre-service teachers of mathematics. Developing teacher resilience involves the process of employing strategies to meet both daily and exceptional demands of the teaching profession in a given context through developing five aspects of resilience, namely: professional, motivational, emotional, social and physical. Relationships between teachers’ resilience and teacher retention have been well established; however, less is known about practical strategies which can strengthen teacher resilience. This research was conducted in two phases in which the first phase focused on assessing perceptions of resilience and phase two focused on implementing interventions to develop resilience among 25 pre-service teachers of mathematics attending one initial teacher education programme. Data were collected over both phases. Qualitative surveys were used in phase one to explore participants’ perception of a resilient mathematics teacher. The participants’ conceptualisations were compared with previous research and theory-based literature on teacher resilience, and directions for interventions were identified. Phase two involved implementation of the interventions. Quantitative questionnaires, semi-structured interviews and observations were carried out during phase two to assess the impact of the interventions and to modify interventions as well as to explore the strategies and processes that facilitated the development of teacher resilience. The findings reveal that, while at the start of the research some anti-resilient thinking seemed to be prevalent among the participants, more participants at the end of the research attributed their experience of resilience building to the support from the context and the community surrounding them. This research, therefore, highlights the crucial role of growth-enhancing social resilience and increased awareness of the role of recruiting support and agency in development of resilience. Implications and systematic interventions for pre-service education programmes and teachers themselves are discussed.
Chapter 1: Introduction

Teaching has one of the highest turnover rates among professions (Harris and Adams, 2007; Worth, Hillary and De Lazzari, 2017). In England, rates of early-career teachers leaving STEM subjects including mathematics have been particularly high in recent years; however, the secondary phase of STEM subjects is viewed as the phase in which retention issues are most significant (Worth and De Lazzari, 2017). Much research has been conducted on why teachers leave teaching (Borman and Dowling, 2008; Clandinin et al., 2015). While initially statistics on the high dropout rate within the first few years of teaching made teacher attrition research more dominant with research focusing on reasons and causes for high rates of teacher attrition, over the last decade, there has been a shift in focus from the reasons and causes for teacher attrition towards reasons and causes for retention (Scheopner, 2010; Peixoto et al., 2018).

Drawing on research, teacher attrition and retention are often seen as being associated with individual or contextual factors such as burnout, resilience, teacher support, salary, professional development, the nature of context, student issues, and teacher education (Clandinin et al., 2015). Resilience, among all these factors, has been shown to be central in improving retention and teacher well-being (Beltman and Mansfield, 2018). The increasing interest in teacher resilience has, in part, stemmed from increased attention to issues in educational contexts; these issues range from teacher well-being and mental health to broader concerns about teacher quality and retention. As a result, various practitioner researchers and research groups have emerged, investigating teacher resilience through theory development, evidence-based research, and empirical studies.

With recent years seeing a growing interest in teacher resilience (Beltman, Mansfield and Price, 2011; Mansfield et al., 2012; Day and Gu, 2014; Johnson et al., 2016; Gu, 2018; Fernandes et al., 2019), a more in-depth understanding of factors and strategies contributing to teacher resilience can help refine strategies for retaining talented teachers. The current research, therefore, focuses on developing resilience among pre-service mathematics teachers attending one initial teacher education (ITE) programme. That said, any research focused on teacher resilience may begin with
exploring challenges faced by teachers. There are currently challenges specific to mathematics teachers in England. The main challenges range from well-founded concerns about mathematics teacher shortages (Allen and Sims, 2018) to recent reforms in mathematics education introducing the highly demanding mathematics National Curriculum from primary through to post-sixteen with a new accountability system focused on every pupil’s attainment in mathematics (DfE, 2014).

Literature has highlighted the impact of the educational reforms and the governments’ policy decisions on teachers’ well-being, resilience and competence, in particular a shift from provisions and process to outcomes with an increased focus on accountability and performance management (Choi, 2003; Gu, 2018). Research on teacher resilience is particularly worthy of attention at this time, given the current economic, social and political context surrounding the teaching profession; most educational researchers agree that teachers’ work is more complex, challenging and demanding than at any other time (Johnson et al., 2016). This is in part due to what Clandinin, Downey and Huber (2009, p.142) have described as the “shifting social landscape” resulting from the influences of social changes such as globalisation, diverse communities, economic disparities and contextual changes on teachers’ work. While currently many developed countries such as UK, US and Australia are experiencing difficulties recruiting new teachers and retaining them once they are in the profession (Day and Gu, 2014), a desired outcome of ITE programmes is to develop graduates into high quality teachers, maintaining their motivation and commitment for many years. Nonetheless, it seems that early attrition of new teachers is currently a barrier to achieving these goals.

As a teacher educator, my focus over recent years has been on developing strategies that allow beginning teachers working in secondary schools to develop skills, knowledge, and experience to not only strive, but thrive as practising teachers. However, I am becoming increasingly aware that one of the key barriers for the beginning teachers can be lack of resilience while experiencing various daily challenges in school. The issue becomes more apparent when teacher resilience has been closely linked to teacher quality and its implications for sustaining quality in the complex and ever changing contexts of schools (Beltman and Mansfield, 2018). It concerns me that there are new teachers who are feeling so emotionally drained by the
stress that it is affecting their performance. Unfortunately, in some cases this leads to teachers developing health issues to the extent that affected teachers have to take temporary or permanent withdrawal from the pre-service programme despite the enthusiasm and the passion they have for teaching.

By conducting this research, I hope to explore daily strategies beginning teachers can use to enhance their resilience, potentially improving both teachers’ well-being and teacher retention. Developing factors that sustain teachers can potentially assist in addressing some of the issues related to teacher retention, particularly if both teacher quality and teaching quality (Kennedy, 2010) are maintained and teachers are able to meet the daily professional challenges and thrive as they move from pre-service to early career stage. It is suggested that building teacher resilience offers potential for more effective interventions (Sumsonian, 2003) to occur in both teacher education and the teaching profession.

To thrive as a teacher, and to teach at one’s best over time, has always required resilience (Gu and Day, 2013); however, as demands of the profession increase, the degree of resilience needs to increase to match the demands of this “emotionally taxing and potentially frustrating occupation” (Lambert et al., 2006, p.105). Resilient teachers are more likely to persevere and persist in face of daily challenges of the profession and, hence, may be less inclined to consider leaving the profession (Day and Gu, 2014). Additionally, resilience is important in teaching for another reason: it is only realistic to expect pupils to be resilient if their teachers exhibit resilience themselves (Henderson and Milstein, 2002). With emphasis on developing resilience of pupils through the introduction of character education (DfE, 2019a) in the schools’ curriculum, by doing this research, I aim to help teachers develop the knowledge, skills and experience of resilience before expecting pupils to develop resilience. This is specifically important as research indicates resilience is an enabling character trait which can improve academic attainment, engagement, attendance and well-being of pupils (Gutman and Schoon, 2013). The improvement of educational attainment and engagement of pupils can have broader implications through facilitating social equity and social mobility for pupils (Grenfell, 2012) which, as an emancipatory researcher, have been my goals for many years.
Another rationale for doing this research is related to the direct correlation between teacher resilience and teacher quality (Beltman and Mansfield, 2018). Teacher quality is the most critical factor in improving pupil achievement (Hill and Barth, 2004; Day and Gu, 2014). While the impact of teacher quality on pupils’ outcomes cannot be ignored, issues with teacher resilience can potentially lead to issues with teacher attrition (Flores, 2018). When teachers give up the profession entirely, a great deal of resource leaves with them. This, in turn, creates issues of sustainability for schools and for the education system as a whole. The struggle to sustain strong learning communities in high turnover schools affects the potential to implement school improvement plans, which can lead to loss of substantial investment in teacher training and school improvement implementation (Beaugez, 2012). Therefore, building capacity for teacher resilience within schools can be a way forward for teacher educators, to ensure retention of higher quality teachers in the profession.

Limited literature, however, has considered how resilience may be developed among adults; initial research in the field of resilience mainly focused on developing resilience among youth growing up in adverse and challenging conditions (Garmezy and Streitman, 1974; Kumpfer, 2002; Beltman, Mansfield and Price, 2011). Moreover, to date, little research has investigated ways in which pre-service teachers’ capacity to be resilient can be nurtured and sustained through ITE programmes. Thus, the literature in this area could hardly be described as extensive (Mansfield et al., 2015). Although ITE programmes may experience constraints for developing teacher resilience through structural factors such as extra academic workload, issues with work-life balance (Fleet et al., 2007), and teachers’ constant scrutiny through professional appraisal, they can offer support through fostering positive relationships with experienced teachers in the two different placement schools during the pre-service year (Yates, Pelphrey and Smith, 2008). Conducting this research, I hope to encourage new teachers to utilise these relationships in practice, exploring strategies they can employ to develop resilience. With recent research providing emerging evidence that resilience related skills and strategies can be enhanced during pre-service teacher education (Mansfield and Beltman, 2019) illustrating ways in which teacher resilience can be promoted in the initial year of teaching can potentially help reduce the attrition rate as well as empowering novice teachers to protect their well-being.
In order to develop teacher resilience, many researchers offer recommendations for pre-service programmes, such as developing individuals’ characteristics of resilience, building a climate of resilience at university or building professional networks of pre-service teachers (Beltman, Mansfield and Price, 2011). Limited literature, however, offers recommendations for the pre-service teachers themselves, as active agents. While there is evidence of research about how to cultivate some of the elements of resilience, to date, there has been little research which has used intervention programmes to investigate ways in which teachers’ capacity to be resilient may be nurtured and sustained. Over the past decades, pioneering research in both psychology and education has provided powerful and compelling evidence of the strong impacts interventions can have on developing resilience among individuals (Luthar and Brown, 2007; Doney, 2013; Beltman, Mansfield and Wosnitza, 2018). Carrying out this research, I wish to explore planning and implementing an intervention programme to determine the relative impact of the identified factors and strategies, and how to further enhance that impact on teacher resilience. This research, therefore, builds on the studies carried out before and may serve to improve teachers’ well-being and quality retention.

Adopting a new lens to examine strategies for developing resilience, this research aims to introduce the type of interventions and practical strategies that encourage teachers to build resilience over the course of their pre-service programme. However, identification of what interventions and practical strategies may work requires exploring teachers’ perception of resilience. To date, few studies have examined how novice teachers perceive resilience, or how they would describe resilient teachers in the context of their school. Given that teaching presents everyday challenges, and the type and extent of challenges differ based on the particular context and environment, any research on developing teacher resilience should begin with exploring teachers’ perception of resilience in their particular context. Exploring what a resilient teacher looks like from the perspective of those entering the profession or what skills or attributes a resilient teacher would need to demonstrate in a particular context was, therefore, the starting point for me carrying out this research.

Teacher resilience is an emerging field of research (Mansfield et al., 2012) with strands of research either directly dealing with teacher resilience (Gu and Day, 2007) or
examining related constructs such as motivation or self-efficacy (Klassen and Chiu, 2010). What is missing is evidence of research regarding the role of teachers as active agents in developing their own resilience through employing practical strategies rather than concentrating on the role of personal attributes or the role of external factors in developing resilience. The purpose of this research, therefore, is to contribute to the teacher resilience literature. I hope that by exploring perceptions of resilience among pre-service teachers of mathematics, the current research provides a timely and unique contribution to the field and adds to the current literature on teacher resilience. This can potentially provide insight into the practical strategies and processes that facilitate the development of this construct. Using practitioner research to identify and implement strategies for teacher resilience, I hope this research encourages new teachers to exercise agency in building their resilience. This may allow discussion of the implications for ITE programmes and teachers themselves as active agents.

1.1 Research Questions

The central research question is “How can I help pre-service teachers of mathematics develop more resilience?”

Sub questions

a) How do pre-service teachers of mathematics understand teacher resilience?

b) What challenges do teachers of mathematics face in their pre-service year? What factors and strategies do they identify as helpful for developing teacher resilience?

c) What is the impact of the interventions implemented in this research on teacher resilience?

I conducted practitioner research based around one cohort of mathematics pre-service teachers attending an ITE programme in the West Midlands, UK. The research took place over a ten-month period and consisted of six key interventions that took place alongside normal timetabled subject study sessions with twenty-five participants. Each intervention focused on resilience-building strategies and made use of literature,
empirical research, and experts’ advice to encourage participants to create their own resilience toolkit. I planned each intervention theme based on the needs of the participants, identified in the qualitative survey in phase one and the previous interventions. I collected data by making use of quantitative surveys, interviews, observations and field notes to monitor the success of the research cycle. I hoped that by developing participants’ use of the practical strategies to build resilience, the participants would increase their sense of agency and become more professionally resilient and as a result become more inclined to stay in the teaching profession.

In chapter 2, I discuss the key literature related to this research to give a deeper understanding of the rationale behind the design of the interventions. I consider the definition of resilience before conceptualising teacher resilience. I explore the theoretical framework adopted for this research, discussing suggested strategies to help develop teacher resilience. In chapter 3, I expand on my research questions and discuss the rationale behind the choice of research design and data collection methods. I discuss how I planned to analyse the data and how I ensured my research remained ethical and trustworthy while doing the research as an insider researcher. At the end of the chapter, I describe the interventions that took place in detail. In chapter 4, I use the findings of the qualitative survey in phase one. I then present my quantitative survey results and the findings of the interviews and observations in phase two to create a thick description. These chapters provide the evidence for chapter 5 where I present analysis of my findings split into different categories that emerged from my analysis before I synthesise the findings to answer my research questions. I use these findings to provide the evidence for my conclusions related to my research questions in chapter 6.
Chapter 2: Literature Review

The purpose of this chapter is to gain understanding of the existing literature and research relevant to resilience. Following a synthesis of what is already known about teacher resilience, this chapter focusses on the review of the research literature related to challenges specific to pre-service and mathematics teachers. The aim is to establish the impact of personal and contextual challenges on pre-service mathematics teachers, understanding how and why many pre-service teachers manage complex challenges by building their resilience. Research on issues related to teacher resilience in the context of ITE is analysed before exploring in more detail some of the challenges faced by teachers of mathematics in England. It is only with an understanding of these challenges that one can consider ways of addressing them. Acknowledging the significance of various aspects shaping resilient qualities in beginning teachers, the chapter continues with examining the chosen theoretical framework. The chapter concludes with summarising the key points, exploring questions yet to be resolved, identifying, and discussing gaps in the knowledge.

A comprehensive and thorough literature review is foundational for carrying out comprehensive and thorough research by not only summarising the existing literature but also synthesising it in a way which permits new perspectives (Thomas, 2009). No researcher can perform significant research without understanding and building on prior research and scholarship relevant to their field (Shulman, 1999). A high quality, comprehensive, critical and contextualised literature review is essential for selecting a relevant theoretical framework and methodology to improve the quality and usefulness of subsequent research (Wyse and Cowan, 2017). While a narrative literature review, discussing and summarising the literature without conforming to a particular search formula, was an option for conducting this literature review, a systematic review was chosen to provide a complete, exhaustive summary of current literature and to guide the review in line with my research questions. In particular, a systematic review was needed to ensure adequate coverage of the relevant literature and avoid bias in identifying and reporting studies (Aburn, Gott and Hoare, 2016), which has been noted as one of the weaknesses of the narrative method.
Thomas (2009) defines the systematic review as using particular methods to search for research on a wider range of sources with only studies of a predetermined type included in the ultimate review. For a systematic approach, Boote and Beile’s framework (2005) for literature review was used for this thesis. This framework is an adaptation of Hart’s (1999) criteria for the literature review in the field of education. It recommends five steps for literature review for a doctoral thesis:

- coverage: refers to ways of searching the literature and deciding about suitability and quality of literature;
- synthesis: synthesis of current literature to gain new perspectives through comparing various literature;
- methodology: exploring the main methodologies and research methods that have been used in the field and analysing their strengths and weaknesses;
- significance: explaining practical and scholarly significance and implications of the existing research on the field and noting limitations;
- rhetoric: clear articulation of claims through purposeful organisation of ideas; this should occur after summarising, analysing, and synthesising the literature when the researcher will want to make some claims about that literature (Boote and Beile, 2005).

Following the first step, reviewing the literature on a topic such as teacher resilience for which little has been written was challenging. As recommended by Bruce (2001), the search was broadened to examine research in other related fields including teachers’ attrition and retention, psychological resilience, resilience in children, healthcare and social workers published between 2000-2020. However, on few occasions where the literature was a seminal work making a significant contribution to the current knowledge and understanding of resilience, research published prior to 2000 (for example Werner and Smith, 1982) was included. The keywords for the search were ‘resilience’, ‘teacher resilience’, ‘pre-service teacher resilience’, ‘mathematics teacher resilience’, ‘mathematics teacher challenges’ and ‘workplace resilience’ together with ‘teacher retention’ and ‘teacher attrition. Using the sources available at the University of Warwick, the search was limited to publications in English where resilience was the main focus with full access available via the university’s library catalogue.
2.1 Conceptualisation of Resilience

Resilience has been receiving increasing interest in the academic world over the last twenty years (Luthar, 2006; Southwick et al., 2014; Forbes and Fikretoglu, 2018) and is used frequently to describe people in various professional fields such as education, military and health. Nonetheless, most of the research in this area has been completed by researchers in the field of psychology working with children and adolescents in various contexts (Aburn, Gott and Hoare, 2016). Indeed, children and adolescents surviving adversity has been attributed to resilience (Werner and Smith, 1982); however, building resilience in the workplace has received increasing attention in recent years (Jackson, Firtko and Edenborough, 2007; Gu, 2018). With emerging workplace issues such as staff turnover and well-being, it is unsurprising that resilience is increasingly being identified as an expected professional outcome of those working in challenging professions such as teaching and healthcare. Given the burgeoning interest in resilience, it is timely to examine how it is defined and conceptualised in empirical and non-empirical research before critically exploring the literature related to the teacher resilience.

Resilience has been defined as an individual’s ability to positively adjust to a new or challenging situation, and bounce back after adversities (Garmezy and Streitman, 1974; Luthar, 2006). Inherent in this definition is the existence of a challenge; an extensive body of research highlights direct correlation between experience of challenge and increase in resilience to future challenges (Seery, Holman and Silver, 2010; Crane et al., 2019). Notably, the relationship between challenge and resilience can be graphically depicted as an inverted U-shape (Seery et al., 2013), whereby moderate levels of challenge are related to less negative responses to the challenge and greater resilience (Seery, Holman and Silver, 2010; Seery et al., 2013). The exposure to challenges can potentially strengthen resilience through building three resilient capacities: (1) coping resources, (2) usage of coping strategies, and (3) resilient beliefs (Crane et al., 2019). Crane et al. (2019) propound that the resilience process begins with an initiating stimulus (stressor or challenge) and ends with an outcome, hopefully one that demonstrates or builds resilience. The initiating stressors can activate the resilience process by creating a disruption to the individual’s internal and external sense of balance (Sammons et al., 2007); however, the perceived degree of challenge
differs between individuals based on their past and lived experiences (Fleer, 2016), cognitive appraisal (Kumpfer, 2002), perception and interpretation of the challenge as manageable or threatening (Jepson and Forrest, 2006). Regardless of individual interpretations of challenges, it seems that the current discussions around resilience leave room for different conceptualisations of resilience.

Rutter (1985) in his ground-breaking research cautions against adopting strict definitions of resilience as a trait of an individual; he argues that resilience is not stable but fluctuates and individuals may exhibit resilience only in certain contexts, toward certain situations, or at certain points of their lives; resilience can be seen long after the challenging experience. While literature explores the complexity related to resilience and the range of personal and contextual factors contributing to resilience (Kumpfer, 2002; Beltman, Mansfield and Price, 2011; Galea, 2018), the complexity of resilience suggests that resilience should be examined in the context of a particular domain, encouraging researchers to study many types of resilience including resilience in educational settings. Kumpfer (2002) in his seminal study of resilient children discusses several issues which can potentially make research on resilience a daunting task. These include lack of agreement on conceptualisation of resilience due to its complex nature (Beltman, Mansfield and Price, 2011), biased definitions of the successful outcomes indicative of a resilient individual, definitions of environmental risk protection, and the characteristics of a resilient individual.

To develop resilience, the promising key point arising from extensive literature is that resilience can be learnt in a process involving individuals as active agents (Castro, Kelly and Shih, 2009; Beltman, Mansfield and Price, 2011; Day and Gu, 2014; Beltman et al., 2018). While initially many resilience factors were considered to be internal traits (Masten, Best and Garmezy, 1990), such as self-esteem, confidence and emotion regulation, later researchers also recognised the impact of external factors such as social environment and support (Werner and Smith, 1982). Hence, later conceptualisations of resilience (Luthar, Cicchetti and Becker, 2000) shifted to emphasise its dynamic nature, viewing it as a process that determines how people react to a variety of challenging situations and what coping strategies they use to respond to challenges (Luthar, 2006). In this process, individuals exhibit agency and employ strategies to develop resilience (Castro, Kelly and Shih, 2009). This view recognises
that underlying personal and contextual characteristics are components of resilience but considers resilience a capacity that grows over time, with individuals using different coping strategies to respond to challenges. Therefore, resilience allows individuals to appropriately recognise the challenging situations and access existing personal and contextual resources to cope. From this point of view, individuals are not only shaped by their context and environment but, more importantly, are capable of exercising control and shaping the context and environment that affects their life (Bandura, 1989). Hence, from this perspective, resilience is viewed as a composite construct that includes personal qualities, contextual resources, and sources of social support.

2.2 Research into Human Agency

Recent years have seen a resurgence of interest in self-referent phenomena such as human agency. One reason for this lies in emphasis on self-generated activities which potentially function as major indicators for intrinsic motivations and actions as well as contributors to the meaning and demeanour of most external influences. Bandura’s (2001) Social Cognitive Theory maintains an agentic perspective towards individuals’ development, adaptation and change. Bandura’s theory posits that individuals are not passive recipients of the environment but in fact interact with the environment deciding when to exercise agency. Bandura defines human agency as individuals’ capacity to exercise control over their thought processes, motivations, and actions (Bandura, 1989). In this agentic perspective, individuals are not only products of social systems, but also producers (Bandura, 2001). People are viewed as neither entirely independent agents of their actions nor simply mechanical conveyers of environmental influences, but rather contributors to their motivations and actions through interactions with environmental events. Individuals as agents intentionally make things happen by actions and the exercise of agency. Because thoughts and actions are partly self-determined, individuals can effect change in themselves and their situations through their efforts. The exercise of agency involves both thought processes and behavioural actions to facilitate change (Bandura, 2006) in each context rather than agency residing in that particular context. Instead of being just shaped by environments or inner forces, individuals are self-developing, self-regulating, and self-reflecting while interacting with environments.
The operationalisation of agency requires individuals’ self-efficacy beliefs and self-regulatory capabilities to ensure exercise of personal influence in a given context (Bandura, 2006). Among the mechanisms of personal agency, a central one is individuals’ beliefs about their capabilities to exercise control over events affecting their lives (Bandura, 2000). Self-efficacy beliefs function as important indicators of human motivation, affect, and action, determining the extent to which individuals exercise agency. Self-regulatory capabilities are another proximal determinant of human agency (Bandura, 2000). Having adopted an intention and an action plan, one cannot simply sit back and wait for an appropriate performance to appear. Agency involves self-efficacy and the ability to make choices and action plans, but also the ability to construct appropriate courses of action and to motivate and regulate their execution.

Defining agency and the required dispositions to exert agency, another question to address involves the media of agency. Social Cognitive Theory distinguishes among three types of agency: direct personal agency, proxy agency that relies on others to act as medium to achieve desired outcomes, and collective agency exercised through socially collaborative, interdependent effort (Bandura, 2000). While for most people human agency has been essentially limited to personal agency exercised individually, this is not the only form of agency. This is particularly relevant for pre-service teachers who may have lower self-efficacy (Day, 2008) or no direct control over social conditions and institutional practices within schools.

Although theorising research on human agency initially concentrates on direct exercise of personal agency, in many activities, individuals have little direct control over social conditions and institutional practices that affect their lives; the exercise of direct personal agency therefore may seem difficult (Bandura, 2000). For individuals who are apprentices within their workplace (considering lower institutional power of apprentices compared to more experienced, established staff), perhaps, the exercise of proxy agency is crucial for their security and well-being (Bandura, 2000). The exercise of agency through proxy involves getting others who have expertise or are in a position of influence and power to act on their behalf to achieve desired outcomes. It is reasonable to suggest that many individuals do not have full autonomy in their lives (to greater and lesser extent); additionally, there are consequences and responsibilities
for exercise of direct personal agency, conditions which can dissuade people from trying to exercise personal agency. Hence, individuals may turn to the proxies to secure what they cannot accomplish alone.

The concept of human agency extends beyond personal and proxy agency to collective agency (Grenfell, 2012). Similar to personal and proxy agency, exercise of collective agency requires self-beliefs and self-regulated competencies (Bandura, 2006); individuals’ shared belief in their collective power to produce desired outcomes is another key ingredient of collective agency. A group’s achievement is both the product of shared knowledge and skills of its different members and their successful interactions and collaboration. Indeed, unless the group members work well together as a unit, the group cannot perform successfully even if it comprises talented and capable individuals. Therefore, the group’s perceived collective efficacy is essential to the success of the collective agency. While in theory, the perceived collective efficacy resides in the minds of group members, it operates through the behaviour of its members, their contingency plans when collective efforts fail, and their vulnerability to discouragement that can beset people taking on tough social problems (Bandura, 2006).

Research distinguishes between conceptualisation of agency and autonomy (Lennert da Silva and Mølstad, 2020). In the context of teaching, teacher autonomy is defined as the capacity of teachers to make key decisions that affect the content and conditions of their work within their organisation (Wermke and Höstfält, 2014). Teacher agency, on the other hand, seems to depend on the perceptions that teachers have of their own capacity for professional action given the resources and limitations of their working conditions (Day and Gu, 2014). Teachers achieve agency through their judgments and actions, individually or as a group, considering the physical, social, and cultural conditions in which they work, in the sense that teachers shape and are shaped by their working conditions. Although some definitions of teacher autonomy and agency overlap (Lennert da Silva and Mølstad, 2020), teacher autonomy emphasises teachers’ capacity to make decisions on their own, individually or as a group, with varying degrees of external constraints (Wermke and Höstfält, 2014).
Literature recognises both teacher autonomy and teacher agency as positive indicators of teachers’ motivation and engagement in teaching (Lennert da Silva and Mølstad, 2020). Lam and Yan (2011), in their two-year longitudinal study investigating job satisfaction and career development of beginning teachers, cite professional autonomy as a significant influencing factor in job satisfaction and teaching motivation, two indicators closely related to teacher retention. The authors argue that regardless of original motivations to teach, an environment which gives new teachers professional autonomy in their teaching practice is likely to result in enjoyment of teaching and job satisfaction (Lam and Yan, 2011). In contrast, when the environment does not allow new teachers to exercise professional autonomy, even very motivated teachers feel burned out and dissatisfied with their work. A recent quantitative study in the UK conducted by Worth and Van Den Brande (2020) corroborates Lam and Yan’s findings (2011), stating a strong link between teacher autonomy and teacher job satisfaction and therefore retention.

Although policies such as implementation of standardised curriculum frameworks tend to restrain teachers’ autonomy, practices like teachers’ collective reflective responses to such policies in order to construct and legitimise practices can be seen as achievements of agency (Lennert da Silva and Mølstad, 2020). Examples of these practices include teachers working together to discuss and agree upon teaching plans, responding to policies according to their needs and those of their pupils. That said, literature makes recommendations for school leaders to foster both teacher agency and teacher autonomy by incorporating frameworks which give staff greater involvement in designing content, processes and goals (Worth and Van Den Brande, 2020). Regular reviews of school teaching and learning policies through exploring how teachers can be meaningfully involved and engaged in decision making (Worth and Van Den Brande, 2020) in terms of organisational development priorities can promote both teacher autonomy and agency.

### 2.3 Research into Resilience of Pre-Service Teachers

The first year of teaching can be highly challenging. The challenges range widely from lack of self-efficacy in teaching and classroom management (Day, 2008; Melnick and Meister, 2008; Hudson, 2013; Peixoto et al., 2018) to reluctance to seek help (Castro,
Kelly and Shih, 2009; Fantilli and McDougall, 2009), mismatch between personal beliefs and practices (Day and Gu, 2014), issues related to school structures and cultural practices of schools (McCormack, Gore and Thomas, 2006), unsupportive leadership and staff (Le-Cornu, 2013), stress and burnout (Tait, 2008) and heavy workloads (Hudson, 2013; Beutel, Crosswell and Broadley, 2019) as well as meeting complex and diverse needs of pupils (Demetriou, Wilson and Winterbottom, 2009). While continued exposure to these challenges can lead to depletion of individuals’ personal resources along with extra stress and burnout (Beltman, 2015), concerns related to teacher well-being (DfE, 2018) have made the notion of resilience an area of focus in pre-service programmes in recent years (Beltman, 2015). Increased attention to beginning teacher resilience can also be related to high proportions of teachers who resign in the first few years post-qualification (Le-Cornu, 2013; Chiong, Menzies and Parameshwaran, 2017).

While any research in the field of teacher resilience perhaps should begin with exploring challenges faced by the teachers, the context specific nature of resilience demands a distinct approach for resilience of new teachers compared to those with more experience in the profession. A review of literature reveals the similarities and differences in the types of challenges faced by beginning teachers compared to experienced teachers. Melnick and Meister (2008), in their study conducted in the US comparing pre-service and in-service teachers’ challenges, examined differences and similarities between a national sample of beginning teachers to a national cross-section of experienced teachers. Their results indicated significant differences in the areas of classroom management and parent interaction, while no significant differences were found on the teaching preparation or time management. The authors’ literature review suggested new teachers do not necessarily have the requisite knowledge of classroom procedures to understand complex interrelationships among classroom management and classroom tasks. This lack of knowledge prevents pre-service teachers from focusing on pupil learning; instead, they are preoccupied with their own learning as they try different workable procedures.

Korkut (2017) corroborates Melnick and Meister (2008) in her study investigating the differences between classroom management of pre-service and in-service teachers concluding that pre-service teachers are more self-oriented in planning and applying
lessons compared to in-service teachers. The findings from Korkut (2017), observing 29 lessons taught by 19 participants, show that in-service teachers are more flexible with their planning, taking into account pupils’ experience, asking their opinions and negotiating what to do next, whereas pre-service teachers tend to be more rigid with following and applying lesson plans. The author concludes that such flexibility allows in-service teachers to shift their focus from self to instruction more effectively compared to pre-service teachers (Korkut, 2017). Nonetheless, while approaches to planning, teaching and classroom management tend to differ between pre-service and in-service teachers, difficulties with classroom management are not unique to new teachers and have been noted as challenges for both experienced and beginning teachers in UK (Gibbs and Miller, 2014), with new teachers at more risk of stress and anxiety.

Melnick and Meister (2008) criticise ITE programmes for addressing classroom management in a confined setting placing emphasis on normal management issues rather than a broader perspective covering differences in pupils’ learning needs, catering for diverse needs of pupils and inclusion of Special Educational Needs and Disability (SEND). Melnick and Meister (2008) propose that issues regarding class management of pre-service teachers are complicated and sometimes volatile. The issues partly stem from pre-service teachers’ tendency to deal with behavioural issues more reactively rather than proactively (Korkut, 2017). Proactive strategies are preventative and involve teachers taking a positive approach to classroom management by actions they can use to reduce the likelihood of pupils demonstrating inappropriate behaviour and involve altering a situation before problems escalate; reactive actions, conversely, can result in increasing discipline problems and the experience of less orderly lessons for pupils (Korkut, 2017). Such approaches taken by pre-service teachers can be attributed to the presence of the mentor and the university tutor in the classroom which can negatively impact teachers’ sense of ownership and autonomy (Korkut, 2017) when dealing with behavioural issues.

Carter (2015), in his review evaluating effectiveness of ITE provisions in England, relates issues with behaviour management to ITE’s limited approaches to class management not fostering deeper understanding of causes of behavioural issues. Similarly, Wang, Odell and Schwille (2008) suggest that schools should view issues
with behaviour management from either a socio-economic or socio-political perspective, recognising the role of social systems and social forces, and those policies in education which reproduce inequalities in the society with power differentials between those who have access to resources and those who do not. An example of such policies can be found in the processes whereby children from affluent families have access to high-quality education in independent schools leading to their success in education and getting well-paid jobs unlike children from working class families. In addition, Carter (2015) highlights the importance of teachers understanding child and adolescent development, considering the issues from socio-economic and socio-emotional perspectives (Chaux, Molano and Podlesky, 2009; Hosokawa and Katsura, 2018), supporting pupils by developing their character through character education so pupils are introduced to characteristics such as optimism, determination and resilience (DfE, 2019a) which can impact on both pupil behaviour and well-being.

Literature suggests that behaviour management should be prioritised within ITE programmes (Carter, 2015); however, while factors such as effective planning and teaching may prevent behavioural issues, setting realistic expectations considering contextual factors influencing pupils’ behaviour can help new teachers depersonalise class management challenges (Mansfield et al., 2012). This is particularly important because, for pre-service teachers, both self-efficacy in behaviour management and emotional competence in depersonalising class management issues are among the strongest predictors of resilience (Peixoto et al., 2018). That said, it is suggested that classroom management is more important for job satisfaction of teachers with lower self-efficacy beliefs (Toropova, Myrberg and Johansson, 2020). Perhaps realising that, at times, even the most well-planned lessons cannot completely prevent issues with class management (Carter, 2015) can help with increasing self-efficacy of new teachers regarding class management. Nonetheless, new teachers often see issues and problems through a classroom-management frame, using this as one of the major standards for judging their performance through the pre-service year (Wang, Odell and Schwille, 2008). On the whole, while literature has shown that behaviour management is a significant issue for new teachers and there is evidence to suggest this is a common reason why teachers leave the profession (Barmby, 2006; Melnick and Meister, 2008; Hudson, 2013), there is currently agreement in the literature that behaviour management is not straightforward (Carter, 2015).
Another common challenge specific to pre-service teachers stems from the need for beginning teachers to re-position themselves to demands of student life and novice teaching simultaneously (Beutel, Crosswell and Broadley, 2019). This perception emerges from narratives of both graduates and career change pre-service teachers. While, for graduates, transition from student to novice teacher can be challenging, transitioning from careers where individuals have well established reputations and status to being a novice in the field can be a struggle (Beutel, Crosswell and Broadley, 2019). In addition, requirements for the new teachers to attend ITE sessions outside their placement schools involve pre-service teachers missing parts of professional practice in schools. This can, in turn, lead to new teachers’ lack of history and rapport with classes they teach (Melnick and Meister, 2008; Carter, 2015; Korkut, 2017). The juggle between two roles, and new teachers constantly redefining themselves at the transition from being a student to a teacher, can contribute to new teachers feel being inadequately prepared for their teaching.

In addition, adapting to demands of school-based professional experience placements is a challenge specific to pre-service teachers. While professional experience is described as most significant, an integral component of pre-service training and an influential induction into the teaching profession, it is also considered the most stressful component of the pre-service programme (Gray, Wright and Pascoe, 2017). As professional experience placements require pre-service teachers to attend school as a fulltime commitment for an extended period, new teachers face practicum challenges which can be fraught and stressful due to consequential lack of belonging and preparation (Gray, Wright and Pascoe, 2017). Feeling lack of belonging can lead to lack of emotional regulation, a major threat to resilience as highlighted by literature in the field of pre-service education (Peixoto et al., 2018). Recognising that emotional challenges can be debilitating and impact on teachers' ability to engage, effectively identifying ways to overcome this challenge and grow through experience can help build teacher resilience.

Despite the differences in challenges related to the classroom management and transition, both pre- and in-service teachers experience feeling overwhelmed by time constraints and workload (Melnick and Meister, 2008). These findings are similar to more recent studies suggesting the amount of time required to plan and implement
lessons, dealing with all the paperwork and the heavy workload are widespread issues pertinent to all teachers regardless of years of experience (Gu, 2018). Research has shown that heavy workload is one of the main reasons for new teachers leaving the profession (Hobson et al., 2007; Struyven and Vanthournout, 2014); the problem of heavy workload, however, has been identified as ideological co-option of experienced teachers (Greer and Daly, 2019). The authors portray issues with heavy workload as more than being resigned to workload and internalisation of workload as a proxy for expertise and worth by experienced teachers (Greer and Daly, 2019). Issues become more apparent when in-service teachers consider heavy workload as intrinsic to a teacher’s professional identity, embodying such beliefs in their own practices through associating their seniority and success with their ability to cope with excessive workload (Greer and Daly, 2019). This perception then transfers into new teachers, perpetuating the problem, in particular considering that the Core Content Framework for ITE programmes (DfE, 2019b) advises new teachers to learn how to manage workload and well-being by observing how expert teachers use and personalise systems and routines to support efficient time and task management.

The mismatch between expectations and realities of teaching can be a significant challenge to pre-service teachers (Day and Gu, 2014). Most new teachers begin ITE programmes with various images of teaching and themselves as teachers. These initial images, largely shaped by past schooling experiences, are crucial in determining attitudes towards teaching and the profession, understanding of teaching, professional values and beliefs as well as classroom practices (Flores, 2001; Flores and Day, 2006; Chong, Low and Goh, 2011). Teachers enter the profession with personal beliefs about good teaching and images of themselves as teachers; these pre-conceived beliefs and images may remain unchanged unless the new teachers reshape and develop these beliefs and images during their pre-service year (Flores, 2017). Lack of change in attitudes and beliefs can potentially translate to classroom reality that does not meet new teachers’ expectations, leading to lack of motivation, a considerable risk to teacher attrition and turnover (Mansfield et al., 2016). Nonetheless, while the experience of dissonance between personal beliefs (habitus) and realities (field practice) can be stressful to individuals, it can also create opportunities for growth of professional identity (Grenfell, 2012) through individuals’ engagement with reflexive practice.
Research shows strong correlation between teacher professional identity and teachers’ tendency to stay in the profession with the development of teachers’ professional identity in a state of flux (Chong, Low and Goh, 2011). Flores and Day (2006) argue that the extent to which new teachers reshape and develop these initial beliefs (personal identity) depends on teachers’ concepts of self as teacher (professional identity) and their interactions with the context including pupils, other teachers and their school’s practices and culture (contextual identity). Thus, recognition of new contextual roles, renegotiation of personal beliefs and images through interactions between different, and sometimes conflicting perspectives, beliefs and practices seems inevitable to ensure positive reshaping of new teachers’ personal identities. The role of ITE programmes and their impact on determining beginning teachers’ professional behaviour, especially regarding interactions with context, will be explored later in this thesis.

Differences in the type of challenges faced by pre-service and in-service teachers highlight the importance of exploring resilience pertinent to the pre-service context which can potentially help researchers identify relevant interventions and strategies for developing teacher resilience in ITE programmes. In summary, the key point in any research investigating pre-service teacher resilience is to explore the issues, challenges and risks of the school practice along with the academic side of the pre-service year before trying out possible strategies to address these challenges in order to improve new teachers’ experience and induction into teaching, building both solid foundations for practice, and commitment towards teaching as a rewarding career.

### 2.4 Research into Resilience of Mathematics Teachers

Although mathematical resilience among pupils learning mathematics has been studied by researchers (Kooken et al., 2015; Hutauruk and Priatna, 2017; Lee and Johnston-Wilder, 2017), at the time of writing this thesis, there is little research on the resilience of mathematics teachers. Whilst much can be captured from the wider resilience literature, the complex and challenging nature of teaching demands that research focus on subject-specific resilience. That said, similar to pre-service teacher resilience, any research on resilience of mathematics teachers may begin with
exploring current professional and contextual challenges faced by mathematics teachers.

As previously stated, at the time of writing this thesis, the main challenges faced by mathematics teachers in England range from teacher shortages (Allen and Sims, 2018) to issues with teaching methods used by the mathematics teachers (Watson and Dawes, 2017; Barton, 2018) and recent reforms in mathematics education (DfE, 2014). Among these, the education reforms were introduced with a variety of measures being taken to ensure all pupils study compulsory mathematics and that most, if not all, pupils leave school with a mathematics qualification to potentially facilitate economic benefits and social mobility. While within the current system the responsibility to ensure pupils’ success in formal mathematics assessments seems to be on the teachers’ shoulders, some scholars view the educational reforms as a collapse of traditional values focused on intrinsic and intellectual values of education as the current reform initiatives are largely engineered upon ‘development of human capital and social mobility’, described as over-emphasis on economic benefits of education, overly utilitarian, and losing sight of the purpose of education (Choi, 2003).

Ross and Gibson (2006) criticise neoliberal government and reform policies focusing on developing human capital through creation of curriculum standards (where policy makers define the knowledge to be taught). While specification of curriculum standards in this system is usually accompanied by accountability, it is difficult to establish expectations and planned remedies if they are not met (Ross and Gibson, 2006). That is, the dominant approach to educational accountability is outcomes-based and bureaucratic, most often mandated by high-stakes testing (Ross and Gibson, 2006). Gu (2018) argues the accountability culture embedded within the education system in England can be one factor affecting teacher resilience causing issues with attrition and quality teachers leaving the profession. Additionally, Lam and Yan (2011) cite education reform initiatives as contributors to increasing stress and workload of teachers.

The shortage of mathematics teachers and demands of the new mathematics national curriculum raise issues about teacher quality. Grasping a wider picture regarding current professional and contextual challenges specific to mathematics teachers
involves exploring issues related to teaching mathematics in schools. Nardi and Steward (2003) describe the prevailing culture of school mathematics in England as TIRED: tedious, isolated, rote learning, elitist and depersonalised. In addition, Drury (2018) regards teaching mathematics as particularly challenging compared to other subjects because mathematics can be taught using different methods; listening to pupils’ unique mathematical approaches is a very important, often ignored, part of this process. A report published by UNESCO (2012) highlights global challenges related to teaching of mathematics in schools which lead to disaffection and exclusion for many pupils. This report outlines issues with the teaching of mathematics as follows:

- it is designed as systematised teaching, centred on practising methods, memorising rules and formulas whose rationale is not evident to pupils;
- links between different concepts and to the real world are not convincing; applications are rather superficial;
- pupils do not know which needs are met by the mathematics learning and how they can benefit from mathematics in real life;
- pupils have little autonomy and agency in their mathematical work and often merely reproduce tasks modelled by teachers (UNESCO, 2012).

While literature emphasises the importance of implementing changes in teaching practices to overcome these challenges (Nardi and Steward, 2003), there are currently barriers to achieve this aim. Teachers’ past experiences as pupils have been found to have effect in shaping pre-service teachers’ beliefs about mathematics teaching (Boz, 2008). Research shows that beginning teachers’ teaching style is often inspired by the way they were taught in schools with tendency to teach mathematics using the transmission style as the most common method used in schools across England (Ofsted, 2012). The Mathematics: made to measure report (Ofsted, 2012) is based on evidence from more than 470 primary and 1200 secondary mathematics lessons in England. The report draws attention to serious inequalities in pupils’ experiences and achievements in mathematics concluding that while, in lessons observed, the best teaching of mathematics developed pupils’ conceptual understanding alongside their fluent recall of knowledge and confidence in problem solving, too much teaching focused on acquisition of discrete knowledge that enabled pupils to pass tests and examinations but did not equip them for the next stage of education, work and life.
It has been shown in increasing empirical research over years that alternative, productive approaches to teaching mathematics other than the transmission style exist, and give pupils another view of mathematics (see, for example, Schoenfeld, 2016). Such alternatives are generally based on socio-constructivist approaches to learning (see, for example, Swan, 2006), stressing the role of collaborative learning and problem-solving in teaching mathematics (Drury, 2018), whether those problems are used to motivate pupils or to enable them to make connections and apply concepts already introduced. In this view, learning mathematics is perceived as meaningful; meaning is built up by fostering pupils’ conceptual understanding of methods. The social dimension of such learning, through interactions among pupils and between teachers and pupils to develop pupils’ problem-solving skills, is heavily emphasised, as is the importance of encouraging pupils to construct knowledge by making their ideas explicit and explaining their reasoning.

Nevertheless, many studies also show that when teachers attempt to adapt their practices to predominant socio-constructivist discourse, for example by setting more open-ended problems for pupils to engage in discovery-based practices, results are not necessarily satisfactory (Barton, 2018). It has often been observed that pupils’ activity, even when suitably targeted and reasonably productive mathematically – which is not necessarily the case – is only utilised with difficulty by teachers if they have not been specifically trained for implementation of such approaches. This is particularly the case for new teachers who have difficulties developing ideas in line with socio-constructivism and implementing it (Boz, 2008). The sharing of mathematical responsibilities between teachers and pupils implied by this pedagogy is far from easy. It requires suitable tasks and guidance for pupils and suitable instructional teaching with teachers being capable of dealing with the unexpected and of identifying mathematical potential of pupils’ ideas and work that have not necessarily been anticipated. Successful implementation, thus, requires teaching expertise much greater than that required in traditional teaching practices. This can, in turn, lead to teachers’ lack of self-efficacy in teaching, a major threat to resilience (Peixoto et al., 2018) in the pre-service year.

Another issue regarding implementation of socio-constructivist approaches arises from the mismatch between recommended pedagogies in the ITE programmes and the
realities of teaching practice in schools. While university courses seem to have affected pre-service teachers’ beliefs about effective pedagogies in mathematics (Boz, 2008), teachers in pre-service training are too often presented with models of practices at university that are different from experience in schools (Hoban, 2005). Perhaps, while suitable professional trainings can assist new teachers in designing tasks likely to permit mathematically productive investigations within the constraints of the classroom, changes to practices must be considered dynamically, with care taken to ensure a smooth transition to new practices (Barton, 2018). Such professional trainings must be constantly supported by appropriate resources to initiate and support desired changes.

Although the socio-constructivist model briefly described above more or less explicitly inspires many of today’s innovations and educational activities, it can take very different forms, depending on social and cultural context. Moreover, it is not the only possible model. While successful implementation of such approaches requires teachers with at least good subject and pedagogy knowledge in mathematics, the high percentage of non-specialist teachers of mathematics in England (Allen and Sims, 2018) can make the process of implementation challenging and out of reach in the short term. Therefore, although literature establishes a direct link between teacher quality and teacher resilience (Gu, 2018), questions remain as how to address issues with teacher and teaching quality to potentiate development of teacher resilience.

Coe et al. (2014), in their review of underpinning research to identify what makes great teaching, highlight some issues with schools’ approaches in defining good teaching; they criticise schools’ frameworks for describing core elements of effective teaching. The authors argue that attributes set out in the schools’ framework, defining good teaching, are so broadly defined that they can be open to wide and different interpretation of high-quality teaching. Coe et al. (2014) assert that judgement about effectiveness of teaching must be checked against progress being made by pupils or whether the teaching leads to improvement in pupils’ learning. According to this evidence, most effective teachers have deep knowledge of the subjects they teach; they understand pupils’ thinking behind their methods, and can identify common misconceptions (Coe et al., 2014). In addition to the three factors of quality of instruction, taking CPD sessions, engagement with collaborative reflective practice,
teachers’ beliefs and quality of interactions between teachers and pupils are other elements of effective teaching in which teachers create classrooms that are constantly demanding more, but still recognising pupils’ self-worth, attributing pupils’ success to effort (Coe et al., 2014; Carter, 2015) rather than ability and valuing resilience to failure (Johnston-Wilder and Lee, 2010).

Another challenge specific to pre-service mathematics teachers arises from issues with inclusivity within ITE programmes. Inclusivity, defined as including people across differences (Wilson et al., 2015), was particularly pertinent to the context of the current research as nearly half of the participants in this research were from ethnic minority groups. There are several reasons why teacher educators in the field of STEM should work on providing more inclusive experience for students in HE. One of the most regularly cited is the gap in attrition, engagement and performance between students from ethnic minority groups and white students studying STEM subjects (Chen, 2015; Wilson et al., 2015; Estrada et al., 2016). Evidence has been mounting for some time that engagement and performance gaps can result from reduced social belonging more than preparedness to handle courses (Wilson et al., 2015).

While both social and academic connections are essential in demonstrating engagement and achievement for students in HE, a combination of students’ academic commitments and educational expectations coupled with academic and social systems within HE institutions influence the students’ outcome (Wilson et al., 2015). Integration, along with sense of belonging in academic and social systems, accepting, and achieving a sense of fit with cultural practices and norms of the institution, most directly impacts new teachers’ learning and continued engagement with courses. That said, literature suggests that lack of belonging may cause emotional exhaustion (Skaalvik and Skaalvik, 2011), a debilitating factor for teacher resilience. As HE institutions refocus efforts on improving educational outcomes for all, reflection on what inclusion really means and how to operationalise inclusion (Haug, 2017) may help with addressing issues of inclusivity within the context of HE.

While inclusivity implies intentional practice of recognising and working to mitigate biases that lead to marginalisation or exclusion of some people, contemporary critical pedagogical methods suggest a more student-focused approach to ensure inclusive
teaching. Freire (1970) criticises authoritarian teacher-student (expert-novice) models of teaching; instead he calls for building pedagogies around voices and lives of students, based on ongoing and actual experiences of students and on continual shared dialogue with students to build classes as inclusive spaces in which students, no matter how novice or inexperienced, can develop new awareness of self, and the right to be heard. In this context, inclusion is built on quality of the social relationship, which in turn relies on knowledge of its participants. Implementing such pedagogies needs consideration of contextual variations that can foster sense of belonging while considering positive relationships with student engagement, social connectedness and resilience (Le-Cornu, 2013; Wilson et al., 2015). Nonetheless, pre-service teachers’ lives go beyond ITE classrooms as represented by most time in the pre-service year being spent in practicum. While pre-service teachers’ sense of belonging has potential to contribute to engagement, depending on the culture of ITE programmes as well as their practicum, additional consideration should be given to contextual factors to ensure an inclusive approach. The sense of belonging to the ITE programme or to the practicum reflects variation between these two contexts and can be additional pathways to research teacher engagement, an indicator of individuals’ self-efficacy (Wilson et al., 2015).

2.5 Conceptualisation of Teacher Resilience

Luthar, Cicchetti and Becker (2000) argue that research on resilience will be seriously constrained if a theoretical framework for resilience remains missing in the vast majority of studies. The broad range of conceptualisations of teacher resilience (Beltman, Mansfield and Price, 2011) contributes to complexity of resilience and how to best explore this multidimensional and context-bound construct. Moreover, variety in the teacher resilience literature can potentially unveil implications for pre-service programmes, for schools and for teachers themselves. This section aims to initially review literature on resilience in the field of psychology before making links with resilience in the field of education.

Masten, Best and Garmezy (1990) refer to resilience as the process of, capacity for, or outcome of successful adaptation despite challenging or threatening circumstances. In their review of research on resilience, the authors debate that having a positive
relationship with competent adults, being a good learner and a problem-solver, engaging with other people, and having high self-efficacy valued by self or society can help children with experience of chronic adversity to recover more successfully and develop more resilience (Masten, Best and Garmezy, 1990). Based on this conceptualisation of resilience, investigating processes that facilitate adaptation, and therefore resilience, have potential to illuminate the range and self-righting properties of, constraints on, and linkages among different aspects of cognitive, emotional, and social development. Resilience is, therefore, beyond an innate trait or a fixed ability; it is rather learned behaviour which portrays an individual’s ability to overcome adversity and to develop motivational, mental, social, academic and professional competence despite the experience of challenging situations (Kumpfer, 2002). It appears this definition is much closer to the identification of resilience from an emancipatory view with emphasis on learning, development, and change of behaviour in each context.

Southwick et al. (2014) suggest that resilience “may be defined differently in the context of individuals, families, organizations, societies, and cultures” (p.1). Conceptualising teacher resilience in the context of school may involve focus on everyday resilience to meet daily demands of teaching and help teachers thrive rather than just survive (Beltman, Mansfield and Price, 2011; Gu and Day, 2013). Rather than being seen as innate (Luthar, Cicchetti and Becker, 2000) or a stable quality, or only a capacity to survive and thrive in extremely adverse circumstances, resilience is now more portrayed as relative, developmental and dynamic, manifesting itself as a fluctuating construct which is a result of dynamic processes within given contexts (Gu and Day, 2013). The notion of everyday resilience is more often perceived as being closely related to everyday capacity of teachers to sustain their well-being and professional purposes to manage uncertainties ingrained in teaching. Additionally, teachers’ resilience changes as a result of influences of personal and professional settings in which they live and work (Day and Gu, 2014) because some settings and elements of settings are resilience-building and others are resilience-depleting.

The literature strongly argues that contexts in which teachers work play a critical role in building or debilitating teacher resilience, providing both resources and threats to support or challenge resilience (Gu, 2018). Education systems are heavily influenced
by political, social and economic factors (Gu, 2018); from this ecological perspective, ‘context’ refers to multiple systems (Bronfenbrenner, 1992) surrounding individuals. Ungar (2012) argues that, while conceptualisation of resilience should focus on individuals, it should also fully explore ecologies that shape opportunities for individuals to experience positive development. From this perspective, individuals’ factors and strategies for resilience development are context dependent, interacting with social ecologies to create unique outcomes. Understanding teacher resilience from the viewpoint of relationships between individuals and social ecologies that make resilience more likely involves understanding processes associated with resilience; these processes are dependent upon how individuals navigate through challenges and negotiate resources (Ungar, 2012) associated with resilience.

Ungar (2012) highlights inadequacy of individually focused views of resilience, concentrated on personal qualities, limiting understanding of resilience to a fraction of potential factors that can explain differences within and between populations. Ungar (2012) instead defines resilience as something intrapersonal with more contextualised understanding of resilience in order to understand interactions between individuals and environment which facilitate processes of resilience building. From this view, resilience is defined as a set of behaviours over time that reflects, in particular, the opportunities for personal growth that are available and accessible (Day and Gu, 2014). The likelihood that these interactions will promote resilience under challenge depends on the meaningfulness of these opportunities and the quality of resources provided. Proponents of this pluralistic perspective of resilience assert that context counts a great deal in the resilience-building process (Ungar, 2012). Understood in this complex, multidimensional way, resilience is much dependent on capacity of the individual’s social ecology to potentiate positive development under stress than capacity of individuals to exercise personal agency during their recovery from risk exposure (Ungar, 2012). Also, rather than solely assessing the influence of environment on processes of resilience development, interactions between individuals and environment need to be the focus of studies examining resilience from the social ecological perspective.

Conceptualising ecological understanding of resilience requires that elements of temporality, opportunity, and meaning be accounted for (Bonanno, 2005; Ungar,
2012; Bonanno, Romero and Klein, 2015). Where there is potential for exposure to significant adversity, resilience is both capacity of individuals to *navigate* their way to the psychological, social, cultural, and physical resources that build resilience, and their individual and collective capacity to *negotiate* for these resources to be provided and experienced in culturally meaningful ways (Ungar, 2012). These dual processes of navigation and negotiation are important (Ungar, 2012); individuals engage in processes that demonstrate resilience when they take advantage of opportunities they have and do better when they exercise influence over what those opportunities are and how they are provided (Day and Gu, 2014). While individual agency is a component of ability to navigate to resources, it remains the role of families, communities, institutions, schools and governments to make those resources available in culturally meaningful ways that reflect the preferences of those who need them (Ungar, 2012). From this socio-ecological perspective, resilience is a shared quality of the individual and the individual’s social ecology, with the social ecology likely more important than individual factors (Ungar, 2012) to recovery and sustainable well-being for populations under stress.

Relating Unger’s (2012) social ecological framework to teaching, Lam and Yan (2011) state that teaching environments teachers find themselves in critically affect their professional development, job satisfaction and therefore willingness to stay in the teaching profession. They argue that the effect of environment overrides teachers’ initial teaching motivations, the school environment being the most determinant factor in teachers’ job satisfaction (Lam and Yan, 2011). Although teachers’ initial teaching motivations are important in maintaining teachers’ commitment, a poor working environment can extinguish enthusiasm, eventually causing teachers to experience dissatisfaction and burnout, both factors associated with teacher attrition (Lam and Yan, 2011). Hence, creating school environments that allow new teachers to exercise agency by focusing on the core business of teaching, while taking teachers’ well-being seriously, can help sustain teacher commitment irrespective of initial teaching motivations.

Conducting a study on developing children’s intrinsic resilience by seeking holistic strategies to meet the requirements of the ‘No Child Left Behind’ legislation signed into law in USA in 2002; Benard (2004) concurs with Ungar (2012) defining
resilience as complex interactions between individuals and environment. That said, Benard’s (2004) notion involves a process in which exercise of personal agency is a key factor influencing the lives and the environment surrounding individuals. Similar to Benard (2004), teacher resilience literature contends that development of resilience is a result of dynamic interactions between risk and protective factors in processes involving teachers and communities (Castro, Kelly and Shih, 2009). The resilience building process occurs in the everyday life of teachers; therefore, instead of concentrating on personal attributes, resilience needs to be explored through practical strategies to modify teachers’ environments (Castro, Kelly and Shih, 2009). Investigating resilience from this perspective allows researchers to not only identify personal factors but also social factors and processes that facilitate enhancement of resilience in the school context.

Research has examined a range of personal and social factors influencing teachers’ ability to develop resilience. A study investigating resilience of 568 primary school teachers in Greece under conditions of austerity found that teachers who maintained high self-efficacy, good relationships with family and collegial relationships at work were better able to sustain high levels of well-being and therefore resilience during the time of austerity (Botou et al., 2017). Although teacher resilience may be perceived differently in Greece, without issues of teacher attrition (Botou et al., 2017), these findings are consistent with the study of Luthar, Cicchetti and Becker (2000, p.554) that “the term resilience should always be used when referring to the process or phenomenon of competence” which rests, fundamentally, on relationships (Luthar, 2006). Thus, again, it is acknowledged that resilience is a relative, multidimensional, and developmental construct influenced by individuals’ personal and professional situations as well as their environment, involving far more complex aspects than individuals’ internal traits or assets.

The nature and extent of resilience is best understood within a social system of interrelationships (Benard, 1995). This is particularly relevant to understandings of resilience among teachers within the dynamic context of their profession. To reflect on Benard’s (1995) view on resilience, a number of researchers have adopted a socially critical orientation based on constructionist approaches to resilience that acknowledge not only psychological aspects of resilience that help to explain some
differences in human agency, but also impact of social realities constructed through the influence of those with most power controlling social discourses influencing definitions of resilience (see for example, Ungar, 2004). In this postmodern interpretation, resilience is defined as successful outcome of negotiations between individuals and environment (Ungar, 2004) in which individuals define themselves as resilient in the face of adversities using different contextually relevant definitions of resilience.

Based on constructionist approaches, resilience outcomes are not predetermined and are rather constructed through plurality of behaviours and manifestations (Ungar, 2004). The ecological model emphasises predictable relationships between risk and protective factors in a transactional process leading to development of resilience based on predetermined outcomes mainly adopted from Western middle-class norms. In contrast, the constructionist paradigm argues that the relationship between risk and protective factors is non-hierarchical, complex, relational and contextual with risk factors being contextually specific and constructed across populations (Ungar, 2004). Hence, a constructionist interpretation of resilience corroborates “the plurality of meanings individuals negotiate in their self-constructions” (Ungar, 2004, p.345) of resilience as well as diversity in the way resilience is nurtured and maintained by individuals.

Bonanno, Romero and Klein (2015) argue that the word resilience, in isolation, lacks sufficient conceptual and scientific precision. They argue that study of resilience must explicitly reference four temporal elements of pre-challenge functioning, the actual challenging situation, post-challenge resilient outcomes, and predictors of resilient outcomes. These elements cannot be understood in isolation because the process of being resilient is fully understood only when examined over time (Bonanno, Romero and Klein, 2015). Viewed through a temporal framework, ideas about individuals’ specific capacities to build resilience can be examined under more focused lenses; for example, a temporal framework can support hypothesised association between particular resilience-promoting factors and good post-challenge adjustment, or show that a particular factor had facilitated adaptation to challenge. To date, little research has defined or measured resilient outcomes in any rigorous or objectively tested sense; most research tends to illustrate individuals’ resilience by using self-report resilience
scales focused on individuals’ resilience traits. Therefore, any research on the outcome of resilience-building processes should consider resilience-promoting factors, and individuals’ adjustment that is likely to vary across time, contexts, and participant groups (Bonanno, Romero and Klein, 2015) while examining constant interactions between risk and protective factors.

To summarise the outcomes of research results across different conceptualisations of resilience, a broad framework was developed by Kumpfer (2002) for research in the field of youth resilience. This framework was preliminarily considered a starting point for organising factors and processes predictive of positive outcomes; it suggested resilience should be understood in terms of context, processes, and outcome rather than just identifying static factors. Kumpfer’s (2002) resilience framework has been used and developed by many researchers in the field of education (see, for example, Mansfield et al., 2012). The framework was initially introduced to organise findings of many resilience studies through specifying six areas influencing resilience, namely: setback or challenge, environmental risk and protective mechanisms (environmental context), individual–environmental interaction processes, individual resilience factors (spiritual, cognitive, behavioural, emotional, physical), resilience processes, and the positive outcome (Kumpfer, 2002). Organising research findings on teacher resilience by these six areas might help clarify differences between environmental aspects of resilience, interactions between teachers and environments, characteristics of resilient teachers, resilience processes, and the final developmental outcomes of resilient teachers. Research using Kumpfer’s framework on each of the six areas influencing resilience is discussed in the following sections. Presenting literature by some of the researchers in the field of education can potentially help with adjusting the framework to the context of teacher education.

2.5.1 The Setback or Threat

The resilience process begins with a stressor (Crane et al., 2019). The initiating stressor activates the resilience process and creates a disruption in the individual (Sammons et al., 2007); however, the degree of challenge differs between individuals based on perception and cognitive appraisal as well as interpretation of the challenge as threatening (Jepson and Forrest, 2006). Williams and Cumming (2012) investigated
a challenge or threat appraisal of a dart-throwing task and examined the effect on psychological responses and performance of participants. In this study, participants were randomly assigned to either a challenge or threat group. Participants’ measures of stress appraisal, anxiety intensity and direction, self-efficacy, perceived control, predicted performance, and actual performance were assessed before and after being assigned to a challenge or threat group. The results demonstrated that the threat group perceived the task to be significantly more of a threat and, therefore, more symptoms of anxiety and lack of control, and lower self-efficacy were evident among these participants compared to the challenge group. Although this research was small scale with more male participants, which is different than the teachers’ population with a more female workforce, these findings are in harmony with research asserting individuals’ different understanding, interpretation and appraisal of the same challenging situations (see for example Clara, 2017).

Lazarus and Folkman (1984), in ‘stress and coping theory’, provide a framework for formulating stress processes experienced in ordinary or major events of everyday life. Their transactional model of stress concentrates on cognitive phenomenological processes in which individuals engage with a relational and dynamic transaction with the environment when experiencing stress (Lazarus and Folkman, 1984). The framework explores stress processes through appraisal and coping, explaining ongoing interactions between individuals and their environment. Embedded within the transactional approach are bidirectional transactions between an individual and environment with neither individual nor environment alone creating stress, but a complex transaction (Lazarus and Folkman, 1984).

Transactional theory (Lazarus and Launier, 1978) posits that individuals’ perception of stress is influenced by the mediating role of appraisal, the cognitive process through which meaning is ascribed to events. The transactional theory of stress and coping emphasises that the perception that the event is stressful, rather than the event itself, determines what coping strategies should be utilised to deal with the stress. The variation in personal and environmental factors, and the complex interactions between the two, explain the great variation in appraisal individuals make in the same environmental context. This takes two forms of primary and secondary appraisal, in which primary appraisal ascribes meaning to specific individual/environmental
transactions, and determines significance of those transactions to an individual’s well-being (Lazarus and Folkman, 1984). The transaction may be deemed positive, irrelevant, or stressful. While the first two do not evoke negative emotions or need for subsequent coping actions, the third involves reappraisal as threat/harm, or challenge. In contrast with threat/harm appraisal that has the potential for provoking negative emotions, challenge appraisal is associated with positive emotions and entails potential for rewards and growth when sufficient coping resources are available (Biggs, Brough and Drummond, 2017).

Central to the transactional model of stress is individuals’ engagement with cognitive appraisal (Lazarus and Launier, 1978). This is a mental process by which individuals assess whether demands are stressful and threaten their well-being. They then appraise resources for meeting the demands of the situation by assessing resources and strategies available for coping. Coping resources can include physical, material, social, psychological or intellectual resources that can formulate possible coping strategies employed by individuals to reduce or overcome the stress (Biggs, Brough and Drummond, 2017). If perceived demands exceed perceived resources, individuals may not cope (Lazarus and Launier, 1978). Therefore, lack of ability to cope should not carry negative connotations; it simply suggests that individuals affected by the stress do not have access to sufficient resources to cope with demands of that particular time.

While primary appraisal ascribes meaning and significance of a transaction to well-being, secondary appraisal determines the actions to manage stress and its outcome through engagement in cognitive processes involving individuals identifying and evaluating their coping resources, environmental variables, and coping strategies used in previous stressful situations (Biggs, Brough and Drummond, 2017). The interaction between these factors determines coping actions enacted to shape, manage and deal with current stressful situations (Folkman, 2013). The key point in transactional theory is that appraisal of the situation greatly influences individuals’ subsequent emotions, coping strategies, and subsequent outcomes resulting in problem-focused coping, emotion-focused coping and meaning-focused coping (Folkman, 2013). Situations appraised as high in personal significance and low in personal control are usually classified as threats while situations appraised as high in personal significance and high in personal control are more likely to be classified as challenges (Folkman, 2013).
Lazarus and Launier’s (1978) transactional model views stress as involving continuous interactions and adjustments (transactions) between individual as active agent and environment. In this view, individuals can influence the impact of stressors through behavioural, cognitive, and emotional strategies. In the context of teaching, challenges can help teachers successfully face new stressors and grow from the experience (Eldridge, 2013). This is the essence of resilience; however, teachers may employ different sets of strategies to overcome challenges depending on interpretation of the circumstances. For instance, in the process of resilience building, a novice teacher trying to develop their behaviour management strategies may recruit different strategies to a more experienced teacher through constantly balancing successes and failures of challenges in an attempt to achieve positive development. Most teachers do not choose to have unanticipated negative experiences; nevertheless, with appropriate support, they can learn valuable coping strategies which can further strengthen resilience.

2.5.2 Environment and Context

Although psychological aspects of resilience have focused on internal personal traits, it is important to note that resilience has been explored using other aspects such as the role of environment and context in the process of resilience building (Day et al., 2007; Le-Cornu, 2013). Individuals may have differences in biological or early life experience of resilience, but the capacity to be resilient can be enhanced or inhibited by the nature of the setting in which individuals work and the people with whom they work. A contextual framework for study of resilience can provide means to further understand processes of developing resilience (Beltman, Mansfield and Price, 2011).

The bioecological model of human development (Bronfenbrenner and Ceci, 1994), an extension of Bronfenbrenner’s original ecological systems theory (Bronfenbrenner, 1992), explores individuals’ development from four defining properties: (1) process, (2) person, (3) context, and (4) time. The theory divides the role of environmental systems on human development over time into five layers of support and structure surrounding an individual or community and their ability to access support in challenge and crisis (Bronfenbrenner and Ceci, 1994). This model can be used to explore resilience factors; it proposes that individuals do not develop only by influence...
from close familial environments; surrounding environments are also influential on development of resilience. The five environmental systems consist of: microsystem (immediate environment like family, school, neighbourhood, and peers), mesosystem (interaction between two microsystems), exosystem (indirect but prominent influences like family’s socio-economic status), macrosystem (cultural influences like customs, beliefs, and government policies), and chronosystem (transitional influences over the lifespan, for example growing up during social changes or civil rights movement).

The environmental context within which teachers operate strongly influences risk and resilience processes. When challenges or setbacks occur, this environmental context can buffer or aggravate the negative impact on teachers (Day and Gu, 2014). The environmental context of setbacks and supports can help teachers through resilience-building processes. Gu (2018) explains the environment-centred, process-oriented nature of teacher resilience from a social-ecological perspective which places teachers in their complex worlds of work and analyses how both teacher resilience and teacher quality best influence and are influenced by their professional worlds (Gu, 2018). The social-ecological framework states that not only the process of resilience building but also the quality of teaching is determined by the environment in which teachers work (Day and Gu, 2014). It argues that teacher resilience is context-specific and is best understood by taking in not only meso-level school or classroom context such as relationships, school culture and teachers’ contextual identity, but also the broader macro-level professional work context (Gu, 2018) such as teachers’ work, policies and practices. That said, among these systems, in comparison with experienced teachers, pre-service teachers are less likely to experience policy demands and increased accountability imposed on teachers (Peixoto et al., 2018).

From the socio-ecological perspective, being resilient involves more than bouncing back effectively and efficiently from challenges and adversities. Considering the routine, context-specific challenges and uncertainties which feature in many teachers’ everyday work and lives, teacher resilience can be associated with teachers’ capacity to maintain sense of commitment and agency in everyday school life (Gu and Day, 2013). Despite various conceptualisations of resilience, there is consensus regarding the role played by professional context in development and demonstration of resilience; in the context of a teacher for example, resilience may require a very
different range of skills or characteristics and supporting factors than in other professional contexts, such as health care (Luthar, Cicchetti and Becker, 2000).

There are varying definitions of resilience in the context of teaching. For example, similar to Gu’s (2018) socio-ecological perspective, Brunetti (2006) describes teacher resilience as the quality of teachers remaining committed to teaching. In Bobek’s (2002) view, teacher resilience involves a process of developing competence that occurs over time through demonstrating ability to adapt to varied situations. According to Le-Cornu (2013), teacher resilience is a relational construct that resides not in the individual but in the capacity for building relationships and connections. Teacher resilience can be viewed as specific strategies that individuals employ when they experience a challenging situation (Castro, Kelly and Shih, 2009), or it can be related to regulation of emotions and effective interaction in an environment that is activated and nurtured in times of stress (Tait, 2008). The wide range of conceptualisation contributes to diverse definitions of resilience and how to best examine this construct through an environment and context.

2.5.3  Individuals-Environment Interaction Processes

Individual-environment interactions are another factor influencing the process of developing resilience. They comprise processes between the teacher and broader environmental factors such as school, students and their parents, other teachers, friends, family and community (Doney, 2013) as well as government policies and practices (Gu, 2018). Since different stages of teaching involve different types of interaction between individuals and contexts (Mansfield et al., 2012), exploring person-environment interactions can help with understanding the process of resilience building at each stage (Le-Cornu, 2013).

Doney (2013), in her two-year interpretive case study investigating how four novice, secondary-science teachers experienced resilience through reaction to stressors, supports the notion that better understanding of ways teachers interact with their school’s environment and modify their environment or selectively perceive their environment, holds promise for intervention and development of resilience. Doney (2013) argues that whilst teachers working in high-risk environments may actively
seek better environments for themselves by going to a different school or choosing to work in demographically better locations, seeking a positive outcome, this is not necessarily the best option for developing teacher resilience. Instead, resilient teachers working in challenging schools search for ways to reduce environmental risk factors by seeking protective factors or enhancing their coping skills by maintaining positive relationships with students, parents and other teachers (Doney, 2013). While Doney’s (2013) research benefited from data collection by interviews, classroom observations and work shadowing for each participant to explore the interactions of the participants with the environment, limitations are found in the small sampling of only four female teachers and the selection process of participants based on the observations from their university supervisors.

Gu and Day (2013) draw upon findings of a four-year national mixed-methods research project on variations in the work and lives of teachers in England. The VITAE project (Day et al., 2007) maintains that teachers’ biographies and the strength of their educational values, and the ways in which teachers perceive their capacity to be resilient, are influenced by factors embedded in socio-cultural and policy contexts of teaching and in different personal, relational and organisational conditions of work and lives. This project involved participation of 300 primary and secondary teachers in 100 schools in seven regions of England in different phases of their professional lives (Day et al., 2007). That study was designed to investigate variations in teachers’ effectiveness over their careers. Effectiveness was defined as both perceived by teachers themselves and by student progress and attainment measured over a three-year consecutive period. With most literature on teacher resilience in England being published based on the VITAE project, the study was designed to identify teachers with varying levels of effectiveness and to highlight possible causes for this variation. Data were collected using mixed methods: twice yearly interviews with teachers to measure teachers’ perceived effectiveness, document analysis and interviews with groups of pupils and with school leaders as well as examining improvements in pupil progress across the academic year. The findings highlight the complex interactions which exist between individual teachers and their surrounding environment; teachers showed different levels of competence, commitment, and resilience at different phases of their career.
2.5.4 Individual Aspects of Resilience

The idea of individual resilience when facing adversity has been around for a very long time. As evident in literature, fairy tales, and fine arts over centuries portraying legends of resilience, writers and artists have been inspired by the extraordinary capacity some individuals show in combating adversity or misery (Campbell, 1970). An example of such archetypes is Gretel from the fairy tale ‘Hansel and Gretel’.

When psychology began to develop as a systematic science in the 19th and 20th century, there was distinct interest in individual adaptation to environment, which can be seen in studies of children at risk of serious problems such as drug- and alcohol-user parents, neglectful families or poverty (Werner and Smith, 1982; Wolin and Wolin, 1993). Some researchers working in this field were struck that there were children allegedly at high risk of problems that were developing quite well (Garmezy and Streitman, 1974; Werner and Smith, 1982). Although in the early publications on resilience, successful high-risk children were referred to variously as “invulnerable,” or “stress-resistant,” eventually, resilient became the most prominent term for describing them. Notwithstanding the diverse literature in operational definitions of resilience and its conceptual framework that have been the subject of considerable debate and controversy over the years (Masten, 1999; Luthar, Cicchetti and Becker, 2000; Beltman, Mansfield and Price, 2011; Day and Gu, 2014; Arnup and Bowles, 2016), there is little dispute that there are individuals whom most people would consider “resilient” by almost any definition.

Resilient individuals demonstrate competencies in five major aspects: spiritual/motivational, cognitive (professional and academic for teachers), behavioural/social, emotional and physical competencies and strengths in different environments (Kumpfer, 2002; Mansfield et al., 2012). The literature indicates that resilient individuals possess personal strengths, including particular dispositions, attributes, assets or competencies; however, there is consensus among scholars that these characteristics are not fixed or stable but they fluctuate, can be learnt and developed (Luthar, Cicchetti and Becker, 2000; Gu and Day, 2007; Castro, Kelly and Shih, 2009; Beltman, Mansfield and Price, 2011; Day and Gu, 2014). Because using terminologies such as ‘competence’, ‘trait’ or ‘characteristic’ can imply resilience is
an innate factor, to avoid confusion in the remainder of this thesis, these terms are replaced by ‘aspects’ of resilience (Mansfield et al., 2012).

To develop a categorical framework for improving understanding of factors influencing resilience, it is crucial to note that the five major aspects outlined above involve overlapping categories; for example, teachers demonstrating a sense of humour portray both emotional and social aspects. Additionally, it should be mentioned that individuals do not necessarily demonstrate all five resilience aspects. Also, it is of interest that very few researchers in the field of teacher resilience have focused on aspects such as motivational or physical resilience which are critical to concepts of flexibility, persistence, hopefulness, optimism, well-being and ability to bounce back after challenges or failure. This may be due to the burgeoning interest among researchers to explore resilience as a social construct rather than an individual one (Goleman, 2007; Day and Gu, 2010; Le-Cornu, 2013). Moreover, with empirical research from neuroscience and psychology showing the positive role of relationships in developing resilience among teachers (Luthar, 2006; Doney, 2013; Day and Gu, 2014), focus has shifted toward developing aspects of resilience through building connections and relationships.

Each of the five aspects and related coping skills are discussed below in greater detail; they constitute the core aspects of resilience that most resilience building programmes attempt to foster in their programmes.

2.5.4.1 Spiritual/Motivational Aspects

The spiritual or motivational aspect of resilience includes primarily teachers’ personal and professional values and beliefs, and teachers’ personal and professional identity, that serve to motivate them and create a direction for effort (Beltman, 2015). Nevertheless, much educational literature recognises that broader cultural, policy and social structures and the emotional context in which teachers live and work are also integral to teachers’ personal and professional identity, shaping teachers’ contextual identity (Day and Gu, 2014). Hence, in conjunction with personal identity, these factors impact on teachers’ own professional role and organisational identities (Day and Gu, 2014). Research findings show that teacher identities are not stable or unified;
they are constantly re-constituted (Zembylas, 2003) depending on both teachers’ 
capacities to manage several influences within their work and lives as well as the 
nature of support provided at work (Day and Gu, 2014). This is particularly true for 
beginning teachers whose professional identity is informed mainly by their personal 
identity.

Personal and professional identities are interrelated, but clearly distinct. Personal 
identity relates to core features of one’s point of view in the world shaped by 
individuals’ habitus, their ingrained character, skills and dispositions, and cultural 
capital (Bourdieu, 1984). Professional identities, on the other hand, are situational 
identities presented to different everyday contexts, which for teachers are shaped by 
cultural and institutional context of schools as well as personal identities (Bullough, 
2005). The mismatch between expectations and realities of teaching creates constant 
conflicts between the habitus (teachers’ ingrained values and disposition) and the field 
(the practice of teaching); such conflicts can lead to moments of misalignments in 
which individuals try to resolve tensions by adapting their habitus to match those in 
the field (Grenfell, 2012). Such interactions assist teachers with formation of new 
professional and contextual identities through change and reshape of personal 
identities.

Pearce and Morrison (2011), in their study exploring links between teacher identity 
and early career resilience, discuss how schools tend to support formation of certain 
kinds of professional identities above others, both limiting and enabling identity 
formations through inflicting cognitive dissonance. Although experience of 
dissonance can lead in some instances to feelings of stress and lack of ability to fit in 
(Anderson et al., 2010), it can also lead to growth and development of resilience 
through teachers’ exposure to challenges and engagement with critical self-reflection 
to overcome the dissonance (Pearce and Morrison, 2011). This can potentially result 
in novice teachers constructing new professional identities, coherent with their 
personal identities, often referred to as situational or contextual identities in the 
literature (Day and Gu, 2014). Pearce and Morrison (2011) emphasise the importance 
of new teachers’ interactions with peers, teachers, pupils and their parents while 
forming their new contextual identity; these interactions can enhance teacher
resilience when the new teachers receive constructive feedback from these significant others.

While mastery of subject and effective teaching skills are important in contributing to teacher quality, a quality education cannot be achieved without teachers who are motivated, enthusiastic and committed to the profession (Day and Gu, 2014). Research indicates intrinsic and altruistic motivations along with extrinsic motivations as teachers’ main reasons to enter the profession (Manuel and Hughes, 2006; Heinz, 2015). However, unlike more experienced teachers (Chiong, Menzies and Parameshwaran, 2017), for pre-service teachers extrinsic motivations such as pay or holidays are relatively unimportant reasons for choosing teaching as a profession compared to intrinsic and altruistic motivations such as desire to make positive changes or finding teaching enjoyable and socially meaningful (Sinclair, 2008; Heinz, 2015). While literature suggests that pre-service teachers are multi-motivated to be teachers, new teachers’ motivations to enter the teaching profession offer insight into factors that can attract teachers into teaching which in turn may influence how long they stay in the profession (Sinclair, 2008; Heinz, 2015) along with their engagement and commitment to teaching.

Many new teachers enter teaching with intrinsic and altruistic motivations such as love of pupils and the subject, and social desire to help young people do well (Heinz, 2015); that said, these two types of motivations are considered interlinked with one ensuing formation of the other (Cohen, 2009). Day and Gu (2014) argues that while, at times, teachers struggle to maintain intrinsic and altruistic motivations, schools often view the rewards of the teaching profession as intrinsic and difficult to quantify. Therefore, for most schools, the expectation is that teaching generates its own rewards by engagement in a socially meaningful profession enabling young people to succeed. Nonetheless, with more experience, teachers also become more prone to losing intrinsic and altruistic motivations which detrimentally impact on teacher resilience (Day and Gu, 2014) and therefore teacher retention.

Teacher resilience can be influenced by teacher identity (the development of one’s awareness and understanding of self as a teacher) and vocational selves, being closely associated with strength and conviction of teachers’ values, beliefs and practice which
places pupils’ care and achievement central (Day and Gu, 2014; Johnson et al., 2016). Although capacity to manage uncertainties arises in interaction between individuals and practices they inhabit (Edwards, 2011), this capacity is also influenced by teachers’ vocational selves and the context of their work and lives which distinguishes teaching from many other occupations (Gu and Day, 2013). Desire to make a difference to the lives of the pupils can motivate teachers to remain vocationally and professionally committed (Day and Gu, 2014). However, the evidence is that such commitment can become eroded over time, particularly when teachers no longer experience profound connection with their school environment (Palmer, 2007). Judgement and recognition of significant others (Luthar and Brown, 2007), including pupils, teachers and leaders, are found to influence teachers’ process of developing and sustaining resilience (Day and Gu, 2014). In addition, over time, research has consistently affirmed the role of leadership support and trust as key positive contributors to teachers’ motivation and resilience (Brunetti, 2006; Day et al., 2007; Castro, Kelly and Shih, 2009; Johnson et al., 2016).

In addition, success of motivational resilience greatly depends on internal locus of control and agency (Werner and Smith, 1982). Literature distinguishes conceptualisation of agency and internal locus of control as two separate constructs. Chapman, Skinner and Baltes (1990) argue that distinction between agents, means, and ends gives rise to different types of beliefs. Control beliefs refer to individuals’ beliefs about their capacity to obtain desired goals without explicit reference to the means (Chapman, Skinner and Baltes, 1990). Agency beliefs refer to individuals' beliefs about the relative accessibility of different categories of means, either internal or external, to themselves as agents (Chapman, Skinner and Baltes, 1990). In other words, control beliefs refer to the relation between agents and ends, while agency beliefs refer to the relation between agents and means. While the locus-of-control refers to general location of control, internal locus refers to causes (such as effort and ability) that reside within individuals. Thus, internality has been understood as individuals’ access to causes that also tend to reside within individuals. Research shows that individuals with higher internal locus of control, those who believe important outcomes are contingent on their own actions or attributes, have repeatedly been found to show higher levels of motivations and performance (Kumpfer, 2002) compared with individuals with lower internal locus of control.
Overall, success of motivational aspects influences and is influenced by resilience; however, this success depends on factors such as aims and goals (Bandura, 1989), strong intrinsic and altruistic motivations (Gu and Day, 2007), teachers’ personal and professional identity (Pearce and Morrison, 2011), optimism (Le-Cornu, 2013), perseverance and persistence (Sinclair, McInerney and Liem, 2008), and internal locus of control and agency (Werner and Smith, 1982).

2.5.4.2 Professional and Academic Aspects

Professional and academic aspects of resilience involve cognitive abilities that help a teacher achieve goals through skills such as using a range of instructional practices (Bobek, 2002), ability to accept failure, learn and move on (Howard and Johnson, 2004), self and interpersonal awareness, and critical reflection (Le-Cornu, 2013), high levels of efficacy for teaching (Brunetti, 2006) and creativity (Metzl and Morrell, 2008).

Many studies have found more resilient individuals generally have higher professional mastery and academic abilities (Peixoto et al., 2018). Professional mastery is a major protective factor influenced by previous achievements and learning experiences which can increase self-efficacy (Bandura, 1997) and reduce stressors (Peixoto et al., 2018). In a study conducted by Chiong, Menzies and Parameshwaran (2017) to explore the motivations of 900 long-serving teachers to stay in the profession, the researchers found that teachers’ perceptions of their own ability to teach are among the top reasons why teachers enter and remain in the profession. The research suggests the key to teacher retention is teachers’ perceptions of their own professional mastery and their pupils’ achievements. The findings suggest that enhancing teachers’ perceptions of their ability to meet pupils’ learning needs can improve teacher motivation and teacher retention. While there are several limitations to this study, such as the data collection methods of teachers’ self-reporting questionnaires and interviews, the research highlights the link between professional mastery and teacher retention, and also indicates a higher level of resilience among teachers with better professional mastery.

Bandura’s (1997) self-efficacy theory establishes the direct relationship between subject mastery and self-efficacy (self-appraisal about competence to successfully
perform given tasks). Similarly, research on teacher resilience shows that teachers’ self-efficacy beliefs are among the most important factors influencing teacher resilience (Kitching, Morgan and O’Leary, 2009; Morgan et al., 2009; Hong, 2012). Resilient individuals are found to demonstrate higher self-efficacy associated with an accurate appraisal of their higher level of strengths and capabilities. They have resilient self-efficacy and exhibit the ability to re-establish self-esteem after failure or setbacks (Bandura, 1997). Self-efficacy influences choice of tasks or attempted challenges, degree of effort employed, and emotional reactions to threat of failure (Bandura, 1997). That said, individuals who avoid opportunities to encounter and master challenges because of lower self-efficacy and fear of failure will have greater difficulties developing resilience (Schunk, 2008). Bandura (1989) states that overcoming obstacles or taking on challenges is imperative for the development of self-efficacy, suggesting that individuals who avoid accepting challenges are hindered in developing self-efficacy and therefore resilience. Moreover, perseverance and determination are possible by-products of resilient self-efficacy that in turn lead to further increased self-efficacy when individuals are successful in getting through challenges (Bandura, 1989, 1997). Similar to resilience, self-efficacy is a complex construct, socially (rather than individually) constructed; it is not fixed and it is developed in context through interactions with the environment and others (Day and Gu, 2014).

Bandura’s (1997) self-efficacy theory propounds that individuals acquire information to judge their self-efficacy from actual performance and mastery, vicarious experiences (judgement about their self-efficacy through comparison with the performance of peers), persuasion experience (verbal persuasions from others), and physiological reactions (their somatic and emotional response to experiences such as pain, anxiety or stress). Individuals with lower academic attainment tend to have lower self-efficacy (Schunk, 2008); this is particularly relevant to teaching where lower grades in professional practice can have negative impact on new teachers’ beliefs regarding their abilities to thrive as a teacher. Building on the relationship between teacher resilience and self-efficacy, several studies have shown that, similar to resilience itself, the resilience-related constructs such as self-efficacy can be unstable over time. For example, one study found that teachers’ efficacy increased after successful completion of their pre-service programme but dropped in the first
year of teaching (Woolfolk Hoy and Burke Spero, 2005). The drop in self-efficacy was explained through novice teachers’ underestimation of the complexity of teaching and the “gap between the standards they have set for themselves and their own performance” (p.353).

Literature highlights gender difference in self-efficacy, suggesting that females hold lower self-efficacy compared to their male counterparts studying STEM subjects (Chen, 2015). This is especially the case for mathematics, in which well-established research shows that negative stereotypes can undermine women's performance in mathematics (Good, Aronson and Harder, 2008). Good, Aronson and Harder (2008), in their field experiment testing the impact of the stereotype threat on women's performance, conducted mathematics tests with men and women who were highly motivated and proficient in mathematics to the point that they were in the pipeline to becoming STEM professions. The results from this research suggest that, even among the most highly qualified and persistent women, stereotype threat suppresses test performance and academic outcome in mathematics (Good, Aronson and Harder, 2008). There is also evidence linking STEM attrition to attitudinal factors such as beliefs about one’s capacity to learn STEM subjects, showing that women are less motivated to study STEM because of their lack of confidence in their ability to study STEM programmes (Chen, 2015); this lower self-efficacy towards STEM learning leads to women’s tendency to leave STEM fields at higher rates (Chen, 2015) than their male counterparts.

In addition to mastery and self-efficacy, Doney (2013) emphasises the importance of self-awareness (the mental habit of asking penetrating questions of oneself and, subsequently, providing honest answers) and self-reflection (the process of identifying, questioning, and evaluating own beliefs, assumptions, feelings, and actions) in developing professional and academic aspects of resilience. Qualities such as early knowing and personal insight through self-awareness and self-reflection can be particularly important for pre-service teachers transitioning from novice to expert, developing themselves professionally in their own contexts, shaping and monitoring their experiences (Doney, 2013) through reflective practice. Literature emphasises the importance of critical reflection in order for teachers to solve any problems encountered in teaching (Day and Gu, 2014). While critical reflection can assist
teachers with building resilience, a study conducted by Belknap (2012) shows that collective critical reflection in collaboration with other professionals can be more effective in developing teacher resilience as independent self-reflection can lead to rumination, a threat to self-efficacy and well-being. The findings from Belknap’s study (2012) show that the most resilient teachers have a mentor or supportive colleagues, collaborating on the process of constructive critical reflection in an adequate and timely manner. Although this study was only carried out among female teachers, other research (Hirschkorn, 2009) suggests similar results for male teachers.

Although professional attainments, higher self-efficacy, self-awareness, and self-reflection can help with building resilience among new teachers, it is unclear whether the current system in England assessing new teachers’ professional performance serves this purpose or not. The Teachers’ Standards in England (DfE, 2013) identify knowledge and understanding of subject, pedagogy and social/cultural dimensions of learning that teachers should possess and point out desirable actions and behaviours to assess whether teachers are making satisfactory progress against the standards. The Teachers' Standards demand consistent quality in teaching; and provide a framework for consistent and relevant initial training. In the ITE framework, the professional standards are formally and regularly used to assess individual performance for the award of Qualified Teacher Status (QTS). In conjunction with the formal use of the standards in performance assessment, there is more general impact of the Teachers' Standards in contributing to shared expectations about minimum acceptable performance levels. The standards can serve as a reference point to help ITE and school mentors to identify what might be lacking where evidence suggests poor quality teaching.

Questions remain whether a professional framework, such as the current professional Teachers' Standards for schools in England, serves the purpose of developing shared understanding of good teaching and improving pupil learning. For example, the current mandatory framework does not highlight features such as responding to social diversity or considering the context-bound nature of teaching. Literature suggests that mandatory and generic professional standards prescribed for schools leave less room for teacher autonomy (Fletcher, Walker and Boniface, 2013); they fail to reflect the different norms of various professional cultures and, therefore, the differences to
consider in quality assurance and accreditation arrangements for pre-service qualifications to achieve QTS (Fletcher, Walker and Boniface, 2013). Perhaps a clearer approach to distinguish generic descriptions of the framework with the contextualised application can create more opportunities for teacher autonomy, a major indicator of job satisfaction and teacher retention, in different ways according to the context.

2.5.4.3 Social/Behavioural Aspects

Hernandez-Martinez and Williams (2011) discuss how definitions of resilience have been refined over time to focus on external factors and conditions. They define resilience as “a dynamic process of interaction between socio-cultural contexts and the agency of developing individuals” (Hernandez-Martinez and Williams, 2011, p.3). Very similar to professional and academic aspects, social aspects require behavioural action, not just thoughts; people may know what they need to do to achieve their goals but lack the necessary social skills to accomplish them. The behavioural actions related to social resilience include social skills such as strong interpersonal skills that enable development of social support networks (Tait, 2008), problem solving and help-seeking skills (Castro, Kelly and Shih, 2009), flexibility (Le-Cornu, 2013) and willingness to take risks (Sumsion, 2003).

Social aspects, or effective functioning within different environments, have been found to be strongly associated with resilience (Jordan, 2006a). A teacher’s world is surrounded by distinct sets of relationships: “teachers with students, teachers with other teachers, teachers with parents and with their school principal” (Bryk and Schneider, 2004, p.20). There is ample evidence from educational research which affirms that the social organisation of a school – including supportive, trusting and collegial relationships between different stakeholders – can foster teachers’ collective capacity, commitment and effectiveness and can lead to strengthening teachers’ professional identity and thus resilience (Bryk and Schneider, 2004; Sammons et al., 2007; Day and Gu, 2010). Nonetheless, literature suggests that mathematics teachers tend to show reluctance in building social networks or help-seeking because of the personality traits of mathematics teachers, who are more likely to be introvert personality types (distant, calm, shy, thoughtful, and prefer to work independently).
Per and Beyoğlu (2011) investigated the personality types of 219 pre-service teachers who studied at the departments of Mathematics, Language and Fine Arts at Marmara University in Turkey using the Myers-Briggs Type Indicator (MBTI). Their research results showed a significant relationship between the departments and introvert-extravert personality types; the introvert personality was more common among the pre-service teachers studying at Mathematics Teaching departments.

Conducting two semi-structured interviews with 60 beginning teachers and their principals, Le-Cornu (2013) found a range of behavioural skills related to social aspects of resilience. These include problem-solving skills, communication skills, and relationships with pupils, teachers, and parents. Being a part of a larger project, the study employed the theoretical framework of relational resilience, in which teacher resilience was characterised as occurring not in the separate individual but in relationships with pupils, teaching colleagues, family, teachers themselves, professional staff, leaders and parents. As such, Le-Cornu (2013) discussed resilience in relation to mutuality, empowerment and development of courage in which positive relationships provided novice teachers with passion, pleasure, enthusiasm and fuel to sustain their career and consolidate a sense of self-worth, connection and belongingness, whereas negative relationships triggered anxiety, self-doubt, confusion and uncertainty.

An important component of resilience is the presence of both personal and social protective factors that enable individuals to overcome challenges and setbacks. One of the most well-known studies on the concept of protective factors is one by Werner and Smith (1982) in which the influence of personal and social protective resources on children from Hawaii were examined by comparing resilient individuals with those exposed to similar risk who had developed behavioural problems. This longitudinal study, carried out at various ages, showed that participating children labelled as resilient exhibited the following protective factors: active, sociable, easy tempered, independent, and self-assured. Moreover, they had high levels of agency and were able to develop reliable bonds with individuals inside and outside the family as well as receive social support from adults and other caring individuals. Castro, Kelly and Shih (2009) associate personal dispositions such as problem-solving and flexibility to higher self-efficacy and development of social resilience. In addition, Benard (1995)
provides examples of problem-solving in developing social resilience through increase in ability to plan, resourcefulness in seeking help, and thinking critically, creatively and reflectively.

Developing resilience in novice teachers is reliant on formation of growth-fostering reciprocal relationships (Jordan, 2006b; Le-Cornu, 2013). Jordan (2006a) is among the scholars who maintain promotion of resilience is a social practice. Jordan’s (2006a) relational culture theory (RCT) speaks to the strengths of individuals in developing resilience through building and developing empowering relationships and growth-fostering connections. Her theoretical model of relational resilience emphasises belief that all psychological growth occurs in relationships. RCT suggests that resilience resides not in individuals but in capacity for connection. Jordan (2006a) criticises previous models of resilience for over-emphasis on separateness, particularly the separate self. She argues that individuals’ engagement in mutually empathic and responsive relationships will more likely act as a source of resilience and increase sense of belonging (Jordan, 2006a); therefore, those with less empathy need to learn more in order to grow resilience.

Smith (2006) defines three types of empathy as cognitive, affective and behavioural. Cognitive empathy refers to social functioning in which individuals show ability in understanding and predicting behaviour of others (Smith, 2006); affective empathy, on the other hand, refers to moral development (Smith, 2006) in which individuals display prosocial behaviour leading to development of social relationships (Zhu et al., 2019). The combination of both cognitive and affective empathy can lead to behavioural empathy, defined as actions taken in response to internal experience of cognitive and/or affective empathy (Zhu et al., 2019). Developing social networks and recruiting support have been linked with increasing individuals’ capacity to develop empathy skills which can potentiate development of positive professional environments (Dewsbury and Brame, 2019). This positive professional environment can, in turn, help individuals feel respected and valued in their workplace. Such positive professional environments can develop sense of belonging, a crucial element for developing individual motivation and self-efficacy (Dewsbury and Brame, 2019).
Increasingly, researchers are recognising the profoundly emotional experience of novice teaching (McNally and Blake, 2010) and the intense, conflicting, dynamic and fragile journey that new teachers experience. Because of this, emotional aspects play a significant role in building resilience (Peixoto et al., 2018). Qualities and skills of resilient individuals that could be considered within the domain of emotional aspects include happiness, recognition of feelings, emotional management and emotion regulation, ability to control anger and depression (Kumpfer, 2002), ability to restore self-esteem, and a sense of humour (Bobek, 2002). Resilient individuals are characterised as reasonably happy people, less susceptible to depression or negative appraisals of themselves (Kumpfer, 2002).

Resilient individuals are optimistic in their emotional management skills. They recognise feelings and can control undesirable feelings such as fear, anger, or depression (Kumpfer, 2002). Initially, learning to recognise feelings may be more difficult for some; nonetheless, special exercises (see Johnston-Wilder et al., 2013) can help individuals learn to recognise their feelings through, for example, role modelling and discussions of feelings with friends or family (Le-Cornu, 2013). That said, positive emotional management has been associated with capacity to recover from challenges and setbacks (Tugade and Fredrickson, 2004) by employing various coping strategies.

Being resilient involves coping outside one’s comfort zone, managing emotions successfully and recruiting support when needed (Johnston-Wilder et al., 2013), aspects which the growth zone model (Figure 2-1) supports. The model draws from a lesser-known development of Vygotsky’s zone of proximal development (Zaretskii, 2009).
In the growth zone model, the comfort zone (green zone) in the centre represents the area where individuals can perform tasks independently and without support. However, due to the unchallenging nature of this zone, minimal growth takes place. Many individuals are satisfied staying in the comfort zone as it may be a way of thinking or working, or what the individual has done for a long time (QSIR, 2018). The structure of the context and tasks are familiar and certain to the individual in the comfort zone; the outcomes are controllable and predictable. This leads to the individual feeling comfortable and competent with no threat to their self-esteem or identity (QSIR, 2018). However, in the comfort zone, while individuals have a strong sense of belonging, they generally do not need to learn new things and therefore do not need to change.

The growth zone (yellow zone) is where most growth can happen. In this zone, individuals need support, collaboration, persistence, perseverance and a sense of agency (Johnston-Wilder et al., 2013). Whilst in the growth zone, the individuals need to be encouraged to take risks, make mistakes, and recruit support; this is to avoid the experience of addressing harmful anxiety alone. Being aware of the growth zone, also known as discomfort zone or stretch zone (Johnston-Wilder et al., 2013), can help with understanding and responding to new teachers’ feelings when confronted by contextual changes (QSIR, 2018) such as change of school practicum in the pre-service year. In this zone, individuals are most likely to learn how to do things differently and experience change and improvement in their competence and identity. Being in the growth zone provides challenge to how individuals view a system and
behave within it, reshaping their professional identity by enabling them to reappraise their views and actions. However, the key to encouraging individuals into the growth zone is to make it safe enough for them to both express their anxieties and experiment doing new things (Lee and Johnston-Wilder, 2017; QSIR, 2018). While in the growth zone, individuals feel uncertain, they are most likely to change and learn if they are supported to feel safe enough (Maslow, 1962). This can be achieved by creating the right environment and culture, ensuring there is no blame but a focus on learning from mistakes. Encouraging individuals to question the current situation and engage with reflexivity, seeing things from another point of view while providing access to appropriate support and positive role models, and normalising individuals’ negative reactions to change, can help with facilitating learning and change in the growth zone.

The anxiety zone (red zone) refers to the outer zone in which individuals perceive the challenge to be beyond their capabilities, even with support (Johnston-Wilder et al., 2013). This can lead to emotional anxiety and affect individuals’ capabilities to successfully carry out normal, routine tasks. Little or no effective growth takes place within this zone, and repeated exposure to this zone can result in the development of persistent anxiety, lack of coping, and avoidance. The anxiety zone is where many individuals are forced into when confronted with situations beyond their perceived ability or changes that do not fit with their current view of the world or values, or when they are confronted with a change they do not agree with and do not understand (QSIR, 2018). The reaction is similar to the physiological ‘fight or flight’ response in which individuals’ behaviour freezes and they do not learn or change. Individuals in this zone tend to feel stressed, worried, angry, irritated, sad, hopeless, apathetic, inadequate, and frustrated. Agency is the key for keeping a task challenging (yellow) rather than threatening (red).

The growth zone model was initially introduced as a tool to assist learners to develop mathematical resilience; however, the model is now used more widely in intervention programmes to help individuals recover from stress and anxiety whilst being challenged through working in the growth zone which can lead to development of resilience. The model has potential to offer teachers support in developing resilience. Not only can engagement in the process of growth, support, and collaboration aid teachers to develop their emotional and social aspects of resilience, it also can assist
them to develop their motivational and professional resilience. Bandura (2000) contends that when motivational investment of individuals engaged in the process of support and collaboration is strong, the staying power in the face of challenges is also strong, hence enhancing mastery and, therefore, resilience.

Furthermore, the growth zone model refers to the notion that individuals’ levels of knowledge and skills are not fixed and can grow (Johnston-Wilder et al., 2013). Studies of resilience in academic and social settings affirm the importance of growth mindset paired with mastery to enable individuals to respond favourably to social and academic challenges (Yeager and Dweck, 2012; Dweck, 2017). This is similar to the theories of resilience which affirm that individuals’ resilience is not fixed and can be learned and developed. The growth zone model emphasises the importance of engagement with communities in a process involving teachers recruiting support in order to develop resilience. This is consistent with Jordan’s (2006a) model of resilience which postulates the significance of developing resilience through building connections and relationships.

Another notion that the growth zone model fosters is the role of experiencing struggle in developing resilience. The experience of struggle in teaching is not unusual; even exceptional teachers struggle with meeting demands of the job on a daily basis. Nonetheless, approaches that pre-service teachers take to deal with challenges can be different than those taken by in-service teachers (Razzouk and Shute, 2012). Contrary to experienced teachers who tend to start with solution assumptions, new teachers often start with analysing the problem when facing challenges (Razzouk and Shute, 2012). In addition to demonstrating a different approach in problem solving in multiple ways including efficiency and effectiveness, and metacognitive control (Razzouk and Shute, 2012), new teachers, at times, tend to interpret challenges as an indication of professional weakness or incapability (Castro, Kelly and Shih, 2009; Le-Cornu, 2013). Using the growth zone model, when a teacher believes that struggle is inherent to teaching and common to all other teachers, they attribute the reason for the challenges to the teaching context rather than to limitations in their professional ability.
Literature recognises emotional competence as one of the most significant predictors of pre-service teacher resilience (Peixoto et al., 2018). Mansfield et al. (2012) researched 259 graduating and early career teachers’ perceptions of teacher resilience in Western Australia. Although the participants perceived teacher resilience as a multifaceted construct, the most frequent response describing a resilient teacher in both graduating and early career teachers was the emotional aspect of resilience. Emotion management, emotion regulation and empathy were among the responses included in the qualitative survey used. While the study was limited by data collection through a qualitative questionnaire targeting only the graduating and early career teachers working in Western Australia’s schools, the findings are consistent with other research highlighting the importance of emotional management to avoid occupational stress (Gu and Day, 2013) that can potentially result in job dissatisfaction, mental health problems, and tendency to leave teaching (Vesely, Saklofske and Nordstokke, 2014).

In addition to emotion regulation and empathy skills (Jordan, 2006a), emotional intelligence (EI) including both intrapersonal and interpersonal emotional intelligence are found to significantly predict active coping strategies (Chan, 2008). EI encompasses emotional competencies that facilitate self-awareness and self-regulation of emotions, social skills, empathy and motivation which can enhance successful stress management, and augmentation of teacher well-being and classroom performance. Vesely, Saklofske and Nordstokke (2014) examined preliminary effects of five weekly emotional intelligence intervention sessions on positive and negative psychological variables in a sample of pre-service teachers; results indicated foundations of EI including awareness of emotions in oneself and others, reasoning with emotions, self-management and self-control of emotions, and management of emotions in others can be enhanced with intervention programmes. While it might be unreasonable to expect major or enduring changes in EI of participants following five weekly intervention sessions, upon completion of the programme, participants’ efficacy in management of their emotions showed an increasing trend (Vesely, Saklofske and Nordstokke, 2014).
2.5.4.5 Physical Aspects

Variables that correlate with well-being and physical aspects include good health and health maintenance skills such as exercise, good diet and sleep (Werner and Smith, 1982). Kumpfer (2002) posits that good physical status is predictive of resilience. Individuals with few physical problems, good sleep patterns, and physical strength may internalise this physical strength and consider themselves as "strong" psychologically as well. In addition, maintaining good health can increase self-efficacy and therefore resilience (Bandura, 1997). Other indicators of physical resilience include subjective well-being such as happiness, relationships, job satisfaction and school involvement (Dolan, Peasgood and White, 2008) as well as cognitive performance such as reaction time, memory and fluid intelligence (Fox, 1999) along with attendance and engagement (Brown et al., 2011) at work.

The biological structure underlying the relationship between multi-factorial and complex nature of physical fitness and resilience is beginning to become clear (Silverman and Deuster, 2014). Both regular exercise and physical activity are key buffers against stress and many chronic and stress-related problems. Possible biological mechanisms underlying the stress-buffering and health-promoting effects of physical fitness include: blunting/optimising neuroendocrine stress responses (Fragala et al., 2011) and increasing growth factor expression and neural plasticity (Cotman, Berchtold and Christie, 2007). It can be argued that physical fitness, achieved through regular exercise and/or physical activity, strengthens resilience by inducing positive psychological and physiological benefits, reducing stress reactivity, and protecting against potentially unfavourable behavioural and metabolic consequences.

Exercise has been associated with greater well-being in cross-sectional studies of healthy individuals. Recent studies have begun to unfold the relationship between regular exercise and positive emotional management during times of stress and adversity (Folkman, 2008). Childs and Wit (2014) conducted a study to compare reactivity to acute stress between healthy individuals who exercise regularly and those who do not. The researchers examined cardiovascular, cortisol and emotional responses to a standardised psychosocial stressor in comparison to a non-stressful
control task among healthy participants. Interestingly, the results showed that overall heart rate was significantly lower among regular exercisers than non-exercisers, yet overall cardiovascular reactivity to stress or levels of cortisol at baseline or after stress did not differ significantly between the groups. However, whilst subjective mood states did not differ between the groups at baseline, emotional responses to the tasks did; regular exercisers exhibited less decline in positive affect after stress than non-exercisers. These findings indicate that regular exercisers may be more resistant to acute stress, which may protect them against future poor health. They also displayed less decline in positive affect during stressful situations (Childs and Wit, 2014); it would be reasonable to infer that regular physical activity is associated with stress resilience in healthy individuals. Possible explanations for resistance to stress include individuals’ accurate appraisals of situations, self-resources, or coping strategies due to enhanced abilities in emotional management and regulation of emotions among regular exercisers (Folkman and Moskowitz, 2000, 2004). Ability to maintain greater positive emotions during stress exposure among regular exercisers may serve as a protective function, minimising the accumulation of stress burden with repeated exposures.

Strategies to promote resilience involve either direct coping strategies to change situations that are causing stress or attempts to control stress through palliative coping strategies such as relaxation techniques, trying new hobbies, mindfulness or participating in sports activities to reduce stress (Parker and Martin, 2009). These positive coping strategies have been linked to greater positive impact during stress (Folkman and Moskowitz, 2000, 2004). Such strategies, in turn, can also lead to developing emotional resilience through increased ability to manage and regulate emotions (Kumpfer, 2002). Literature suggests that healthy individuals are generally more resistant to the emotional effects of stress, which, in turn, may protect them against further sources of stress (Kumpfer, 2002). After all, Garmezy and Streitman (1974) have noted that resilient people work well and play well as happiness is related to good neurotransmitter balance (DFarhud, Malmir and Khanahmadi, 2014), good nutrition, and exercise.

The literature suggests that general self-efficacy and life satisfaction seem to be related with physical fitness and physical attractiveness (Kumpfer, 2002). Individuals who
perceive themselves physically fit and attractive tend to show a higher level of self-efficacy and life-satisfaction (Neto, 1993; Kumpfer, 2002). Sagone and Caroli (2015) conducted a study with a sample of 464 adolescents, randomly chosen from different public schools in Sicily; results show that both life satisfaction and self-efficacy represent a measure of global cognitive judgments of subjective well-being, resilience and attitudes of resistance to unexpected life events (Sagone and Caroli, 2015). To conclude, while physical fitness and physical attractiveness tend to be indicators of higher self-efficacy and life satisfaction, individuals with higher self-efficacy tend to demonstrate higher levels of both perceived well-being and resilience.

2.5.5 Resilience Processes and Positive Outcome

The final stage of any research related to resilience should address those processes that develop resilience (Rutter, 1987; Gu and Day, 2013). Critical theorists studying resilience have called for more explicit understanding of what successful adaptation means and what challenging and threatening circumstances may be (Luthar, Cicchetti and Becker, 2000). It is not enough simply to identify protective factors in the environment or resilience factors in individuals; knowing how to create these resilience factors through designing and encouraging resilience-building processes in interactions between individuals and their environment is an essential component of any research investigating resilience.

Garmezy (1991) defines resilience processes as coping strategies learned by individuals through anticipation and exposure to challenges and stressors that help individuals to bounce back. Day and Gu (2014) define the process of building teacher resilience as a social one, a product of personal and professional qualities and values. The authors probe the nature of complex relationships between internal and external factors that influence development of teacher resilience. They argue that resilience building processes are not solely associated with the capacity to ‘bounce back’ or recover from distressing experiences, rather capacity to maintain equilibrium and a sense of commitment and agency in the everyday work and life of teachers (Day and Gu, 2014). They assert that the widely used definition of resilience, based primarily on psychological perspective, as the capacity to ‘bounce back’ in adverse situations, is not sufficient to describe the process of ‘everyday resilience’ needed for teachers.
This is because, at least in part, it fails to reveal and reflect unavoidable uncertainties associated with everyday lives of teachers. Such uncertainties are an ingrained part of teaching; thus, for many teachers who have managed to sustain their commitment and motivation in teaching, the ability to maintain equilibrium in face of often unpredictable circumstances in school classrooms (Patterson and Kelleher, 2005) is a necessity. Teacher resilience is, therefore, much more than capacity to survive and thrive in adversity. It encompasses capacity to function well generally over time in normal classroom and school environments.

As well as identifying factors influencing teacher resilience, a pivotal task for all concerned with enhancing quality and standards in schools is identifying the means by which necessary resilience can be nurtured, sustained and developed in the contexts in which teachers work and live. At a time when the nature of teaching has become more complex, and recent government policy reforms have focused on the increase in teachers’ accountability, intellectual and emotional workload, empowering teachers to develop more resilience is necessary for schools and teachers to sustain capacity for improvement.

Evidence from research on relationships between teachers’ commitment, resilience and effectiveness provides a useful basis for conceptualising the dynamic nature of teacher resilience (Day et al., 2007). Understanding teacher resilience as multidimensional and dynamic, and its importance in sustaining teacher quality, has vital implications for pre-service programmes. Rather than considering teacher resilience as tightly associated with fixed psychological constructs (Luthar and Brown, 2007), teacher educators can become engaged in future thinking with pre-service teachers on processes involving resilience building to increase capacity for resilience in face of everyday demands of the job. It is perhaps time for pre-service education programmes to acknowledge the limitation of initiatives focused on outcomes of resilience but not processes involved. Rather than considering teacher resilience as fixed and personal, assessing it through diagnostic questionnaires, programmes should recognise that resilience is a social construct influenced by multidimensional factors unique to each context (Ungar, 2004). As confirmed by evidence-based research, resilience needs to be nurtured in context, through interaction between teacher and environment, and appropriate support employed.
Despite lack of consensus in conceptualisations of teacher resilience, most resilience research agrees that there is a need to better understand processes that help develop resilience in individuals in order to empower individuals to develop resilience. The primary implication of teacher resilience research is that any resilience-building programme should focus more directly on the development of primary resilient aspects. Such programmes should strive to empower teachers to enhance coping skills and strategies, creating opportunities for developing motivational, professional, academic, emotional, social, and physical aspects of resilience. The critical message from this literature review is that resilience should not be considered as a quality reserved for an extraordinary few; rather, it can be learned and achieved by the ordinary many (Neenan, 2009) through an “active process of self-righting and growth” (O’Connell Higgins, 2004, p.1).

The theoretical framework adopted for this research will be discussed in the following section.

2.6 Theoretical Framework

The evidence from this literature review clearly shows that teacher resilience has been investigated using a variety of conceptualisation and methodologies, ranging from small scale qualitative to larger scale quantitative methods. Pre-service teachers undoubtedly experience particularly high levels of individual stress and burnout, potentially leading to health issues and unacceptably high levels of attrition and teacher shortages (Howard and Johnson, 2004; Gu, 2018). One way to address this issue can be resilience building programmes within ITE which potentially have positive impact upon novice teachers’ resilience (Beltman, Mansfield and Wosnitza, 2018).

Therefore, as a starting point, this research adopted a definition of resilience as a process of employing practical strategies by teachers in collaboration with others to overcome daily challenges of teaching through developing five aspects of professional, motivational, social, emotional and physical resilience in a given context (Castro, Kelly and Shih, 2009; Day and Gu, 2014). Focusing on resilience not only as an outcome but also as a process happening over time may enable researchers to
beyond more traditional, individualistic explanations to explore interactions between pre-service teachers and professional, social, cultural, political and relational contexts of their new profession (Pearce and Morrison, 2011). Additionally, the process of developing and sustaining resilience is of interest here as greater understanding of processes which facilitate resilience can inform and sustain other intervention programmes. Therefore, the aim of this research is not to concentrate on the individuals' strengths; it is to provide focus for supporting the teachers at work to develop the five aspects of resilience previously discussed. This research can potentially provide perspective on teachers’ interactions with the environment as well as with the context (teaching mathematics for the current research) and how it impacts on development of resilience in schools.

What is already known about this topic

• pre-service mathematics teachers face challenges in the workplace, including shortages of subject specialist mathematics teachers, issues with behaviour management, issues with teaching practice, mismatch between expectations and reality, organisational change, heavy workload, and frequent restructuring;

• many pre-service teachers leave the teaching profession because of issues associated with workplace adversity and, of those who remain, some experience stress and burnout;

• other teachers remain in education and thrive within very demanding organisational situations and succeed in the face of the same challenges.

What this thesis adds

How can I help pre-service teachers of mathematics develop more resilience?

a) How do pre-service teachers of mathematics understand teacher resilience?

b) What challenges do teachers of mathematics face in their pre-service year? What factors and strategies do they identify as helpful for developing teacher resilience?
c) What is the impact of the interventions implemented in this research on teacher resilience?
Chapter 3: Methodology

In exploring different approaches that could be used for my research, I found the following description of practitioner research (PR) suited the nature of the research I wanted to undertake: Practitioner research is a name given to a particular way of looking at practice which helps practitioners understand their practice in a principled and informed way and to incorporate changes in order to improve the practice (Brooker and Macpherson, 1999; Menter et al., 2011). This description suggested that practitioner research was the most appropriate approach for my research as I intended to improve my practice by conducting my research in a systematic and organised way (Menter et al., 2011) while recognising knowledge and living theories of my research participants (Whitehead, 2019) through participatory research. Guided by an emancipatory interest (Kemmis, 1993) to generate knowledge and social benefits through getting involved in a real-life issue, I wanted to improve my practice, supporting my participants in taking increased responsibility for their well-being and resilience, encouraging them to change behaviour. However, I could not achieve my goal without engaging with critical reflection on action (McNiff, 2013). Additionally, PR seemed to match my research plan for another reason; I wanted to support my participants building resilience by implementing an intervention programme (Menter et al., 2011). In this chapter, I discuss methodological choices that I made to answer my research questions. I begin with discussion of the ontological and epistemological position for PR, and then provide an overview of the research design and discuss data collection, analysis and interpretation procedures before detailing how I addressed ethical issues and research trustworthiness. In the final section of this chapter, I describe themes introduced in my intervention sessions.

3.1 Ontological and Epistemological Position

Following the rise of anti-positivism in the early twenties, several social scientists (e.g. Kurt Lewin and Lawrence Stenhouse) responded to emergence of new knowledge-building paradigms and epistemologies with shared assumptions that there is plurality of methods and that each method has its validity determined by specific situations in which it is applied and the type of knowledge sought (Carr, 1994). PR as a study of one’s own practice with a view to improving the practice for the benefit of others
(Bartlett and Burton, 2006) has been associated with notions of promoting empowerment and action within professionals own institution (Brooker and Macpherson, 1999). Sharing the same philosophical, ontological and epistemological principles with action research (AR), some researchers (for example Kemmis, 2007 and Bartlett and Burton, 2006) use the terms AR and PR interchangeably. Nonetheless Eikeland (2012) argues that the differences between approaches taken to conduct and report AR and PR need to be clarified, better defined, and emphasised, to better understand what is being done and also to enable the reader to explore the different ramifications of AR and PR. In this thesis I use the term PR to include AR.

Discussing research methodology epistemologically to improve its applicability, and define its dimensions and borders, for the researcher investigating resilience, ontology refers to the theory of ‘being’ or ‘what kind of thing is resilience?’, epistemology refers to theory of ‘knowledge’ or ‘what do I know and how do I come to know it?’ That said, in addition to demonstration of quality and validity, the practitioner researchers’ ontological and epistemological position informs their methodological ‘how I do things’ approach (McNiff, 2013) and ‘what I hope to achieve’ (socio-political intent to create social hope).

There are traces of positivism and post-positivism in AR and PR (Tekin and Kotaman, 2013); for example, at times, practitioner researchers use positivist research techniques such as quasi-experimental design or use post-positivist research methods by gathering data from multiple sources in order to comprehensively grasp the problem. Nevertheless, objectivity is not necessary in conducting valid PR (Brooker and Macpherson, 1999). PR affirms that, while reality is neither objective nor extrinsic, there is social reality that is agreed upon and accepted as social facts to make daily lives possible; therefore, people live in accordance with social facts on which there is assumed consensus (Tekin and Kotaman, 2013). The aim of PR, therefore, is to improve social conditions, especially educational ones, through research (Campbell, 2013). That said, the purpose of PR is not to reach universal facts but to reach practical information that will help to improve effectiveness of its application (Carr and Kemmis, 2005).
Based on critical theory, the aim of PR should be to change ‘practice’ (habitual action) into ‘praxis’ (informed action) through critical and self-critical reflection (Eikeland, 2012) that can help practitioners to emancipate themselves from often unseen habits and pre-assumptions (Brooker and Macpherson, 1999). Carr and Kemmis (1986) maintain that only critical, emancipatory inquiry is true research conducted by a practitioner. The thinking behind research being conducted in the practitioner’s own organisation is that research should not only be used to gain a better understanding of real-life issues, but set out to make changes (Denscombe, 2010). However, in this process, it is important to note that creating benefit to society involves personal commitment to action while seeing things through others’ perspectives (Oliver, 2014), recognising, and suspending personal preconceptions. PR, therefore, starts with everyday problems encountered by practitioners. The practitioners do not have to develop a hypothesis about the problem because doing so can limit options and narrow perceptions of the phenomenon (Tekin and Kotaman, 2013). Rather, they gather data from different sources related to the problem. This, points towards another defining characteristic of PR for those affected in the design and implementation of the research – to encourage them to participate as collaborators in the research rather than being subjects. The rationale here is that desired social benefits cannot be achieved unless researchers and participants engage with critical reflection in which they critique practice, building on strengths and taking actions to identify and develop areas for improvement (Kemmis, 1993). Thus, the key point for practitioner researchers lies in collaborative engagement with reflection-on-action (Schon, 1990), making connections between previous and emerging knowledge to reshape existing knowledge into new forms.

While traditional social science researchers tend to see knowledge separately from people who create it, as something which has already been created, the practitioner researchers see knowledge as something they create (Campbell, 2013). Hence, in this view, knowledge is not fixed or complete, but constantly developing as new knowledge and understanding is emerging. The incompleteness of knowledge is the basis for doing PR. The practitioner researchers act on the basis of what they know and as if what they currently know is not complete. This view of practitioner research is similar to Butler (1999) stating that the aim of research is troubling fixed ways of acquiring knowledge through intentionally putting forward conflicting ideas, essential
for exploring knowledge in new ways. This position about claims on knowledge comes from pragmatism (McNiff, 2013). For pragmatic researchers, the world is not an absolute unity; knowledge claims arise out of actions, situations and objectives rather than previous conditions (Creswell, 2003). But that begs the question of whether the theory or the practice is the primary source of knowledge.

The theoretical proposition of pragmatist epistemology begins with criticism of the divorce between theory and practice in most educational research (Oquist, 1978). Theoretically and epistemologically, understanding PR based on practically acquired experience of the practitioner and participants involved, is necessary in order to overcome the deep split between theory and practice produced by a fundamentally externalised and spectator-based epistemology and institutionalisation of social science (Eikeland, 2012). The pragmatist epistemology posits that objects of knowledge are defined by active operations; Dewey (1929) proposes a view of reality that perceives no fixed objects nor fixed realities. By this definition, it no longer makes sense to ask whether theory or practice is the primary source of knowledge as the two are no longer separated. Pragmatists view knowledge as arising from human actions; therefore knowledge is eventual rather than antecedent, objects of knowledge are created rather than pre-existent (Oquist, 1978). Through a pragmatist lens, the production of knowledge begins with practical problems, and ideas for approaching the problem are converted into actions (McNiff, Lomax and Whitehead, 2003). In this view, ideas which cannot be transformed into actions are not potentially justifiable and thus lie outside the scope of scientific approaches. The end result is the consequence and justification of knowledge is judged by this consequence. If the action results in better understanding of the practical problem, it is justified as knowledge. Therefore, for the pragmatist researcher, knowledge is not an end, but rather a means to the end (Oquist, 1978).

The epistemological view on PR, in which the theory and the practice are not divorced, is unlike some widely used social scientific research approaches which explore something at fixed points in time and place without acknowledgment of outside influences or transformation through time (Eikeland, 2012). In PR, knowledge emerges from practice; hence, theory manifests itself as living practice leading to unity of theory and practice (Oquist, 1978) with practice generating theory and theory
transforming practice. Nevertheless, unity of theory and practice in PR has been criticised by followers of other paradigms including positivists who assert research should not aim to modify given reality to explore new knowledge (Tekin and Kotaman, 2013). However, from a pragmatist perspective, objective views of reality lack relevance to practical problems of social life; therefore, recognising that social problems could only be adequately resolved if theory and practice were developed together should be a core component of any research undertaken by pragmatists (Carr, 1994). Based on this view, action is seen as intentional modification of a given reality and research as production of knowledge.

PR, therefore, is relevant, useful, and contextualised to promote professional learning through critical reflection, and to achieve continuing growth, positive change, and sustainable development. In summary, research into practice is what PR is all about.

### 3.2 Research Design

Research design is the organisation of data collection, so data collected will support both discussion and conclusions about research problems (Hedges, 2017). It is essential to note that research design cannot be formulated in isolation from research problems. While sound research design proceeds from understanding research problems, different problems require different research designs. The nature of PR requires sufficient data collection to allow for triangulation and reflection on impact of interventions; therefore, for PR, it is very common to incorporate mixed methods of data collection into their research design (Berg, 2001; Munn-Giddings, 2017).

PR, as an approach to investigate and improve practice, involves systematic data collection and data analysis while building reflection into practice to see relationships between learning and action by explaining what has been learnt (Campbell, 2013). The PR model described in this thesis is based around planning, doing and reflecting stages described by Fox, Martin and Green (2007). The model can be extended into ongoing action-reflection cycles when the outcome of one cycle impacts on the next. McNiff, Lomax and Whitehead (2003) describe reconnaissance (literature review, see chapter 2) as activities that allow the practitioner researcher to clarify “where I was at, what I hoped to achieve and how I thought that I would get there” (p.35).
reconnaissance, the next step is to carefully plan the first intervention based on findings from reconnaissance. Once the intervention is implemented reflection on what had happened will inform the planning (Fox, Martin and Green, 2007) of further cycles (Figure 3-1).

Planning of each cycle involves flexible approaches and modification throughout the process as participants analyse past experiences and prior knowledge that form the basis of their action plan to accommodate and reflect on new understandings as they emerge. A fundamental aspect of practitioner researcher is critical reflection through focused attention on practitioners’ own work (Campbell, 2013). The critical reflection involves practitioner-researchers recognising preconceptions, motivations, and biases if they are to develop deep and prolonged engagement with the issue under investigation. Critical reflection is an affective-socio-cognitive process that underpins transformational learning and is central to PR (Schon, 1990) through prioritising participants’ learning needs, recognising their prior knowledge, and creating collaborative, supportive learning spaces where making sense of experience is an affective-socio-cognitive process.

### 3.3 Data Collection Procedures

For the remainder of this chapter, I use an active voice, the preferable style to report qualitative and mixed methods research as recommended by Levitt (2019), to discuss the methods I used to undertake my research. I explain what I did and how I did it by expounding my data collection and my data analysis steps. In addition, I explain the

![Figure 3-1. The Practitioner Research Cycle (Fox, Martin and Green, 2007)](image-url)
rationale for choosing my research methods, to allow readers to evaluate the reliability and validity (Melrose, 2001) of my research.

The first stage of data collection involves researchers identifying criteria for data collection (Cohen, Manion and Morrison, 2005). To decide upon most appropriate methods of data collection, I initially identified and evaluated a range of research methods and the qualities of each. Upon completion of the evaluation, I decided to use a mixed method approach for data collection as mixed methods can help practitioner researchers provide more rigorous evaluation of their action/intervention implementation through informed integration of multiple quantitative and qualitative data sources (Zohrabi, 2013). Additionally, mixed methods research can help ensure better transferability of study results to similar contexts and settings (Zohrabi, 2013). Mixed methods are most useful when researchers are confronted by complex phenomena, such as resilience, that cannot easily be understood through single forms of probing (De Lisle, 2011). I collected data through quantitative and qualitative questionnaires, semi-structured interviews, and observations. Several criteria have been identified to describe data collection using mixed methods; these include: the implementation sequence of the quantitative and qualitative data collection, the priority and the integration of data at different stages of research (Tashakkori and Teddlie, 1998). I will discuss the implementation sequence of data collection and the priority of each method in the remainder of this section.

The project took place over two key phases; in the first, I explored participants’ perception of resilience both to explore emerging findings and to plan for interventions. In the second phase, I carried out quantitative and qualitative fieldwork to explore changes in participants’ resilience after the interventions. In phase one, I collected data using a qualitative questionnaire; in phase two, I collected both quantitative (questionnaires) and qualitative data (interviews and observations). The number of participants remained the same at different stages of the research; therefore, I collected some of the data in phase two concurrently.

During phase two, I expected that over time participants would improve their resilience; therefore, in order to measure resilience changes arising from the intervention, I chose to administer pre-, mid- and post testing (Tymms, 2017) of
teacher resilience. I would then be able to suggest that any significant increase in the teachers’ perceived resilience might be a result of the interventions. Additionally, it was vital to use data from quantitative questionnaires to identify areas for improvement and plan for new interventions after each test. While I conducted observations at the final stage of the interventions for data triangulation, I used the data from the interviews to analyse and reflect on the interventions and to explore resilience-development strategies used by participants. Moreover, the observations and the interviews helped me validate my data from the questionnaires to address the challenges of ‘response bias’. Response bias is a term used for a wide range of tendencies of participants to respond inaccurately or falsely to questions (Furnham, 1986). These biases are prevalent in research involving participants’ self-report using questionnaires and can have a significant impact on validity of questionnaires (Furnham, 1986). Response bias can be induced or caused by factors including integration of multiple sources of information to generate a desirable response in a given situation (Orne, 1962). This means that aspects such as the phrasing of questions or the desire of respondents to be good experimental subjects and to provide desirable responses can potentially bias responses and, therefore, damage validity of the measure.

I invited 25 pre-service teachers of mathematics from one initial teacher education programme to participate in this research for the duration of one academic year. The participants comprised 13 female and 12 male teachers. While I was working with all participants as the Mathematics Subject Lead on a weekly basis, delivering subject studies sessions, I was also appointed as a personal tutor for 10 of these participants during their pre-service year. Throughout the research, I used the following methods of data collection: qualitative questionnaire, quantitative TRS questionnaire, interview, and observational research.

3.3.1 Qualitative Questionnaire

While each research method has benefits and drawbacks, considering alternative methods can lead to exploration of relative strengths and weaknesses of each method in comparison with other qualitative or quantitative data. For example, in comparison with quantitative questionnaires, an advantage of qualitative questionnaires is that they
allow researchers to study an issue in depth and detail because data collection is not constrained by predetermined categories of analysis and allows for a flexible range of responses (Patton, 1987). In contrast, quantitative questionnaires tend to provide rather thin descriptions of data and are characterised by a possibly restricted scope of data analysis as well as limited flexibility of responses (Xerri, 2017).

During phase one of the research, I used a qualitative questionnaire to explore the construct ‘teacher resilience’ from the perspective of participants. At the outset of phase one (October), all participants responded to the following qualitative question: ‘How would you describe a resilient mathematics teacher?’ I used phase one of the study to collect exploratory data and to assist in generating hypotheses as little was known about the research problem. Thus, the qualitative questionnaire was a base for the development of additional investigations. Exploring mathematics teachers’ perceptions of resilience allowed me to compare results from this phase with the literature regarding aspects of resilience (Mansfield et al., 2012) in order to identify areas for development, and, hence, plan for interventions. I also used these data to explore emerging findings specific to mathematics teachers and help me interpret data.

I contacted 25 students via a meeting to request their participation in this research. All 25 students gave consent to participate in the research. In total, participants completed 25 qualitative paper surveys at the start of phase one after completing four weeks of practicum in secondary schools, some with sixth forms.

I designed the survey to explore constructs regularly associated with teacher resilience in the literature, such as teacher motivational goals for teaching and self-efficacy, professional aspects, emotional, social and physical aspects, and coping skills (Beltman, Mansfield and Price, 2011; Mansfield et al., 2012; Day and Gu, 2014; Galea, 2018); however, I was also interested in how pre-service teachers perceived a resilient mathematics teacher. Since all participants were completing their teacher training with one ITE programme, this skew in the sample could have had a research effect on the findings, giving some bias. Therefore, to avoid a situation where the responses concentrated on a few factors that participants rated as very important, I conducted the qualitative survey in a way designed to obtain a broader set of responses.
I, therefore, asked participants to note down a range of factors and strategies which described a resilient mathematics teacher.

### 3.3.2 Quantitative Questionnaire

There are some very pragmatic reasons for wide use of survey-based methods and questionnaires to collect data (Wagner, 2010). Quantitative methods use standardised measures to place diverse opinions and attitudes into predetermined response categories, thus, enabling researchers to fit a diverse range of opinions and attitudes into a limited range of questions which allows comparisons and aggregation of statistical data (Patton, 1987). Questionnaires, correctly conducted, can make statements about populations based on information obtained from samples of those populations; however, questionnaire results cannot be generalised unless the quality of information, in terms of reliability and validity, is assessed in order to draw statistically based conclusions from the data (Wagner, 2010). One attraction of quantitative questionnaires is to gather data related to facts, attitudes and behaviour of respondents which they report about themselves; however, one main disadvantage with this instrument is that, at times, it may superficially assess very complex constructs (Xerri, 2017).

While the purpose for using questionnaires can be exploratory, describing a population, outcomes in studies and feedback (Tymms, 2017), for the current research, I chose quantitative questionnaires to measure the impact of interventions and to identify new areas for intervention. One way to evaluate the impact of the interventions was to use a control group with multiple pre and post measurements, allowing for change in actual response to challenges to be measured (Forbes and Fikretoglu, 2018); however, using a randomised control group raised ethical questions around depriving the control group of interventions that may impact development of quite serious psychological and physical health issues. Therefore, I decided to include all pre-service mathematics teachers attending the ITE programme in the resilience interventions.

One of the key challenges in monitoring the impact of interventions was to find a scale which would measure participants’ resilience pre and post interventions. Gutman and
Schoon (2013) discuss two challenges with defining and measuring non-cognitive attributes such as resilience. They argue that, in addition to the lack of a universal definition for non-cognitive attributes, assessing how they are measured is another challenge. The issues with defining and measuring non-cognitive attributes have implications for research results. While most studies measuring non-cognitive attributes use correlational data, questions remain regarding whether the relationship between non-cognitive attributes and later outcomes is causal. This suggests that, while interventions which encourage development of non-cognitive attributes and skills may be effective, assessing long-term impact can be a challenge. In contrast to standardised test instruments to assess cognitive and academic abilities, currently there is not one single measure of non-cognitive skills; therefore, it is important for researchers to employ rigorous experimental methods to measure non-cognitive attributes using valid and reliable instruments. In addition, many non-cognitive factors are inter-linked, yet most studies examine non-cognitive attributes in isolation (Gutman and Schoon, 2013).

To measure resilience, it is important to select an instrument which will measure other attributes such as self-efficacy and coping skills which have direct impact on resilience. For such an instrument, and in general for quantitative questionnaires, it is important to consider both reliability (consistency of a measure) and validity (ability to measure what is supposed to be measured). I found these concepts particularly valuable for my research as I used quantitative questionnaires to assess attitudes and opinions of participants. While considering reliability was easier as it involved test-retest of the instrument, considering reliability without validity was problematic because it potentially could involve reliably measuring something completely different from what I intended to measure. Therefore, finding a pre-validated instrument was of paramount importance for my research to ensure validity of my quantitative data.

In studies of resilience, different instruments have been used over the years; two most popular and validated instruments are the Connor-Davidson (2003) Resilience Scale (CD-Risc), and the Resilience Scale for Adults (RSA) by Friborg et al. (2005), both presenting satisfactory psychometric properties for measuring resilience in adults. Unlike the CD-Risc, which evaluates mainly internal factors related to resilience,
including personal competencies and persistence, spiritual influences, positive coping strategies, and stress management, the RSA assesses both internal and external factors such as family cohesion, social skills, peer support, personal strength, and personal style (Friborg et al., 2005).

In a recent study, Daniilidou and Platsidou (2018) combined both RSA and CD-Risc instruments to identify a single scale that could measure teacher resilience. The researchers carried out two studies to measure the factorial structure of CD-Risc and RSA and reliability of the total scales and their subscales in 136 secondary teachers in Greece. The aim of Daniilidou and Platsidou’s research was to use existing resilience scales to design a scale which specifically measured teacher resilience; hence, initially, the researchers tested the structure and reliability of the CD-Risc and the RSA scales separately in samples of teachers in two studies. However, the results of their initial study showed that neither measure by itself served the aim of measuring teacher resilience. This led to designing a new scale, the Teachers Resilience Scale (TRS) consisting of 26 items, of which 12 items came from the CD-Risc and 14 items from the RSA. Overall, the TRS (Daniilidou and Platsidou, 2018) assesses the most common protective internal and external factors of resilience in teachers. The new TRS comprises of professional, motivational and emotional competencies (9 items), spiritual influences (3 items), family cohesion (6 items) and social skills and peer support (8 items), factors which are all reflected in the four aspects of resilience (Kumpfer, 2002), except the physical aspect which is missing.

Although the psychometric properties of the TRS were tested in another sample of teachers and found to be satisfactory, and despite satisfactory reliability of the TRS, it should be noted that the construct and the concurrent validity of the TRS has not been tested in relation to other resilience measures and/or control variables, such as burnout and/or work stress. Moreover, the scale has been validated for Greek teachers (Daniilidou and Platsidou, 2018) who worked in a different socio-economic context particularly at a time of economic austerity, which may require different sets of competencies to develop resilience. This is particularly relevant when considering the importance of interactions between individuals and their context in the process of resilience development.
Considering the issues discussed in the previous paragraph, it may still be reasonable to use the TRS scale in the context of teacher resilience in UK for two reasons. First, the new scale takes into account both internal and external factors related to resilience, in accordance with the resilience framework adopted for this research. There is consensus among researchers (e.g. Kumpfer, 2002; Gu and Day, 2007; Mansfield et al., 2012) that evaluating both internal personal characteristics and external support systems such as family, friends and community structures is the most appropriate way of assessing resilience. Second, the sample in which the scale was validated consisted of mainly female teachers, similar to the population of teachers in England with around three-quarters of schoolteachers being women (GOV.UK, 2018).

Nevertheless, a drawback of using the TRS is that the scale has two different response scales. While the subscales derived from the CD-Risc consist of responses on a 5-point Likert scale (Connor and Davidson, 2003), the subscales derived from the RSA have the responses on a 5-point positive scale with a negative anchor (Friborg et al., 2005). To address this issue, I carried out rephrasing of the items of the RSA to ensure they are answered on the same response scale as the CD-Risc. Another drawback is that the TRS comprises of questions addressing all 5 resilience aspects aside from the physical aspect. To address this missing aspect in the questionnaire, I added one question to capture respondents’ participation in physical activities as a process of resilience building.

After trialling the instrument with a group of pre-service science teachers, the outset of phase two involved administering a 26-item anonymous questionnaire to measure teacher resilience prior to the intervention (Appendix I). I wanted to know if the participants’ perceived resilience improved as a result of my interventions; therefore, I re-administered the same questionnaire at the middle and end of the research (two weeks before the Easter half-term and at the end of June). In addition, I used results of questionnaires at each stage to evaluate and subsequently modify my interventions.

3.3.3 Semi-Structured Interviews

Qualitative methods produce a wealth of in-depth and detailed data about a small number of people or cases (Patton, 2003). Interviews and focus groups, for example,
can provide depth and detail through direct quotations and open-ended narratives as well as careful description of respondents’ opinions and attitudes (Patton, 1987). It is important to note that these methods do not offer a route to ‘the truth’ but they do offer a route to partial insights into what participants do or think (Longhurst, 2003). The main difference between one-to-one interviews and focus group lies in interviews relying on interactions between interviewee and interviewer whereas focus groups rely on interactions among interviewees (Longhurst, 2003).

While one-to-one interviews are regarded as valuable in gathering data on sensitive issues and on participants’ thinking about complex issues (Denscombe, 2010), a focus group can generate richer data through group interaction processes (Kitzinger, 1995). In focus groups, participants work together to construct meaning; this can give participants opportunities to overcome difficulties in articulating responses, therefore creating more complete understanding of issues under investigation (Ranney et al., 2015). Thus, in the current research, the opportunity to engage in interactive discussion through conducting focus groups could have enabled participants to extend and build upon initial ideas about developing teacher resilience. However, focus groups offer an additional threat to confidentiality as participants may have access to other participants’ data because it is shared in a group setting (Ranney et al., 2015). This means that focus group participants may decide not to disclose particularly private information if they are concerned about confidentiality (Longhurst, 2003).

Any interview about teacher resilience may involve participants discussing professionally challenging situations, sensitive issues, emotions, and experiences. The nature of these issues means that they need to be explored in depth and in detail; however, when the research covers issues that might be considered sensitive or rather personal, there is a case to be made for using one-to-one interviews (Denscombe, 2010). This can encourage participants to discuss personal and sensitive issues in an open, honest manner. Since participants may feel embarrassed discussing such situations in presence of others and may fear others interpreting this as weakness, it would be unethical to put the participants in such a position (Longhurst, 2003). Hence, while focus groups are useful to obtain detailed information about personal and group feelings, perceptions and opinions through providing a broader range of information, and can also be used to explore conflicting views (Halcomb et al., 2007), the use of
one-to-one interviews seemed to be more appropriate for this research due to possible ethical issues outlined above.

In order to understand the development of teacher resilience and processes that can promote this experience for teachers, I therefore explored participants’ experience of resilience through one-to-one interviews, with flexibility and opportunity for participants to provide rich and detailed responses in relation to their own beliefs, attitudes and professional knowledge (see Denscombe, 2010). One way to approach an interview involves the interviewer following the exact wording and order of each question to achieve a standardised prompt. This approach has the advantage of ensuring that all questions are asked and allows for question-by-question data analysis (Shah, 2004). However, it can feel restricting for both parties and a semi-structured approach is usually preferred.

Although large-scale surveys are likely to use structured or discrete interviews as a tool for eliciting pre-determined information, small-scale research is likely to use unstructured or semi-structured interviews as a means of constructing in-depth participative knowledge (Shah, 2004). I, therefore, decided to use semi-structured interviews where participants were encouraged to answer predetermined open-ended questions. Conducting semi-structured interviews was particularly pertinent to the current research as daily practice of pre-service teachers required their articulation of knowledge through verbal critical reflection. This is because, when devising relevant questions for interviews, Denscombe (2010) advises researchers to develop questions that invite their participants to describe situations that they perceive as important. Moreover, Drever (1995) proposes that interviewers should ask open questions that invite participants to describe their own experiences, encourage participants to explain why and how things had been achieved and include probes which provide participants with opportunity to expand upon responses. This process is also useful in assisting reflection because it can provide participants with a clear structure and guide for their articulation of beliefs, attitude, and knowledge.

Considering these suggestions to address the research questions, to design the interview questions, I adopted a positive ‘what-works’ approach recommended by Johnson et al. (2016); this required investigation of development of teacher resilience
and impact of the interventions. I also evaluated each question to consider how strongly the wording related to the research questions. After an evaluation process involving my supervisors, and a pilot interview with a non-participant pre-service mathematics-physics teacher attending the interventions, I made amendments to the interview questions to increase emphasis on factors and strategies contributing to participants’ resilience and the impact of teacher resilience on teacher retention.

Key interview topic areas (Appendix II) included:

- personal and contextual challenges during the pre-service year;
- factors contributing to teacher resilience;
- strategies to develop resilience and key strategies at the time;
- thought process and the journey to developing resilience;
- the effectiveness of the interventions;
- possible strategies that could have helped participants to further develop resilience including possible changes to the interventions;
- how likely participants felt they were to stay in teaching and reasons for this.

During the interview, I invited participants to identify specific examples of professional challenges where they had experienced challenging situations, and then explain how they had responded to these situations to articulate the process of resilience building. I invited them to recall examples of factors and strategies contributing to their resilience. I asked participants to reflect on the effectiveness of the interventions and their thought processes about modifying interventions. I also asked participants to explain their intentions with regard to staying or leaving teaching beyond the pre-service year. Structuring the questions in this way encouraged participants to identify specific, as opposed to general, ways that they had experienced teacher resilience in a clear, articulate manner. This was important because teacher resilience is an abstract concept and, as a result, can be difficult to measure. I, therefore, planned to ask participants to provide concrete examples to ensure comparison of responses and identification of shared meanings. I also invited participants to provide practical reasoning and rationale for their actions. Kvale (1996) suggests that this strategy encourages participants to give more advanced, in-depth responses by thinking more deeply and robustly about actions. Following this strategy,
I encouraged participants to further probe their responses to find out why strategies had been helpful.

I interviewed all 25 participants at the end of phase two (end of June). In accordance with BERA guidelines for educational research (BERA, 2018), I asked participants if they were happy to have their interview recorded and explained their right to withdraw if they did not feel comfortable. During the interviews, I ensured that high quality recordings were obtained by selecting quiet locations to conduct interviews and confirming that responses were clearly audible on the audio-recorder. With participants’ permission, I obtained full audio recording of each interview; the interviews ranged from 15-30 minutes in duration. Tables 3-1 provides profiles of the 25 participants, summarising key characteristics using pseudonyms for participants. In addition, I transcribed interviews verbatim for each participant (see Appendix III for an example of one full interview transcript).

3.3.4 Observational Research

“What people say is a major source of qualitative data … there are limitations, however, to how much can be learnt from what people say” (Patton, 1987, p.25). Observational research is a method of data collection in which researchers observe within a specific research field which permits an in-depth understanding of the research setting to an extent not entirely possible by using insight of other people through interview (Patton, 1987). Observation is normally associated with ethnographic methodology to better understand and capture the context within which

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<th>Alias</th>
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<td>M,F,M,F,M,F</td>
<td>30+</td>
<td>secondary-mathematics</td>
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people interact, which allows researchers to make detailed, factual records of specific behaviours, events and settings, and to discover inductively, rather than guessing, what the context is like (Denscombe, 2010).

Observational research methods are quite different from other forms of research methods. Instead of relying on self-reported accounts of what people say they do and think, observational research explores what people actually do. In this respect, what matters is observation and systematic record of behaviour rather than stated preference or stated intention (Denscombe, 2010). Observational data, specifically participant observation, permits the practitioner researcher to evaluate the impact of their interventions to an extent not entirely possible by solely relying on insight obtained from interviews with participants (Patton, 1987).

Observations can be used as part of a research design such as that used in the current research, to triangulate data through seeing things that routinely escape awareness of participants and providing opportunity to learn things that people may be unwilling to discuss in interview (Patton, 1987). Key points to consider when using observation include: compatibility of observations with research aims, questions and paradigmatic approach; adding value to research in addition to or in place of other methods; addressing any ethical issues that might make observations difficult; and how the researcher collects observational data e.g. using structured, unstructured or semi-structured templates (Denscombe, 2010). Silverman (2006) highlights different questions researchers should consider when conducting observations and writing field notes, such as ‘what is going on in the setting?’ or ‘what to include in my field notes and why?’ or ‘what I can learn from the notes or what else is happening in this site that is relevant to my research questions?’ In addition, consideration is needed of how the researcher will organise field notes and what other data methods will be used, if any, and how they will add value. Also, if the researchers are seeking to triangulate, how this process will be compatible with the epistemological stance of the project needs to be addressed in the observations. For the remaining part of this section, I briefly explain the rationale for developing and executing observational research as one of my research instruments. I then discuss methodological choices underpinning this method of data collection before exploring its execution.
I conducted observations towards the end of phase two; all observations involved joint lesson observations with participants’ school mentors as a part of my role in the ITE programme to monitor participants’ progress against Teachers’ Standards (DfE, 2013). While as a subject tutor, I had worked with the 25 participants engaged with this research during their pre-service year; a part of my role within the ITE involved me working as a university tutor for ten of these participants (7 females and 3 males). One limitation of questionnaire and interview data analysis was that the data obtained from these instruments were self-reported by the participants. Further work was needed to evaluate the process of resilience development and determine if the participants’ accounts were consistent with the mentors’ and assessors’ perceptions. I carried out school observations for the purpose of triangulation with the data from questionnaires and interviews to increase internal validity of the data. To further check interpretations of my field notes, I conducted the TRS questionnaires and interviews prior to observations, allowing the participants to directly voice their thoughts and opinions. I conducted all these ten observations in ten different secondary schools in the Midlands of England.

Each observation involved a 55-70-minute class observation of each participant teaching, followed by 60 minutes feedback and discussions with the participant and the mentor to discuss the participant’s progress. During each school visit, the expectation was to first observe a lesson taught by the participant and then meet individually with the mentor to discuss the progress against Teachers’ Standards before giving verbal feedback to the participant. At the end of each lesson observation, along with the school mentor, I met with the participant to discuss their progress and set targets according to the criteria outlined in Teachers’ Standards. I recorded my field notes during the one-hour lesson observation followed by another one-hour discussion and feedback with the participant and his/her subject mentor. Upon completion of my school visit, I asked the mentor to jointly complete the proforma (see Table 3-2) I had devised to record the indicators for each aspect of resilience.

An examination of each participant’s development of the five aspects of resilience throughout their final weeks of school practicum could provide me with additional data for analysis. The ten Mathematics classes observed comprised of lessons with pupils from Year 7 to Year 13 with all observations taking place during pupils’
timetabled lessons. During each classroom session, I recorded field notes; these observational notes included descriptions of lesson activities, interactions, and dialogues between participants, their pupils and the mentor. After each session, I took out-of-field notes highlighting points of interest, questions about participants’ actions and behaviours, and possible conclusions surrounding those actions and behaviours. I then used these field notes to, jointly with the mentor, highlight indicators for each aspect of resilience in a proforma I had designed for the observational research. The proforma comprised indicators for each aspect of resilience; the indicators were derived from my literature review and empirical research relevant to teacher resilience (see chapter 2). It also contained blank boxes for each aspect to capture possible indicators which I had not found in the literature. The analysis of data from the observations can be found in section 3.4.3.

### 3.3.5 Insider Researcher

Another issue that needed to be addressed involved my role as an insider. While there is evidence of much research about methodology of insider research in educational contexts, rather less has been published specifically about the unique and hidden ethical and methodological dilemmas of doing research in one’s own institution. Insiders are members of specified groups and/or occupants of specified social status with a familiar prior knowledge with the group being researched (Griffith, 1998). While familiarity assists insiders with initial understanding and knowledge of the social setting and context, questions remain as to what impact this familiarity has on the research.

Insider research can lead to an alleged weakness in practitioner researcher's interference with the research environment, which may bias research findings in ways that are difficult to identify, making it difficult to replicate the research elsewhere. One issue is that greater familiarity can make insiders more likely to take things for granted (Mercer, 2007) neglecting obvious questions and having pre-assumptions and/or tendency to avoid raising sensitive topics (Hockey, 1993) leading to collection of thinner data, and, hence, missing opportunity for in-depth exploration of the research topic. Additionally, participants’ tendency to tamper with the truth in order to continue
a fruitful professional relationship with the researcher after the completion of research has been noted in literature as another issue with insider research (Mercer, 2007).

During data collection, it was important for me to avoid any situations where my preconceptions, power and status could influence participants to respond in particular ways. This involved me taking a self and critical reflexive approach (Cunliffe, 2011), questioning my own assumptions underpinning my knowledge claims and how they influenced my research design, my research practice, my theory generation, and how I intended to report the research account. Being reflexive was about a way of being in relation with my participants and my research that brought with it moral and ethical considerations by engaging in critical and deeper questioning around taken-for-granted issues (Cunliffe, 2011) that had potential moral and ethical implications. Throughout my research, I constantly had to examine the nature of my relationship with participants, and how my presence influenced and/or changed participants and practices, and how I was influenced by participants.

For this research, issues with unequal power status could potentially arise during the face-to-face interviews. Since data from interviews were based on ‘what participants say rather than what they actually do’ (Denscombe, 2010), their statements could have been affected by perception of my identity and my status within the ITE organisation. However, I used several techniques to reduce the impact of the power status between me and participants. For example, I commenced the interview with a statement of how important and valuable each participant’s contribution was to the research, and used conversational language rather than formal language along with positive feedback to reduce the effect of issues related to unequal power status between me and the participants. Additionally, to refrain from imposing my own thoughts, beliefs and ideas upon participants, I employed a range of recommended careful questioning techniques including adopting the language of participants (Barbour and Schostak, 2011).

During the interview process, some participants asked for feedback on their responses to specific circumstances. Patton (2003) suggests that for interviews in which the purpose is to capture evidence and not to change behaviour, no feedback should be given to the participants on their actions. Conversely, Porter (1984) discusses the
pastoral obligation to answer questions being asked by students in interview, as long as it does not compromise the confidentiality of other participants. In Porter’s view, this approach is helpful for avoiding detachment from the participants’ interests (Porter, 1984). That said, the minimal responses used by the researcher to elicit further information could be misinterpreted as a lack of interest by the participants. Denscombe (2010) argues that a cold and rigid style of interviewing reinforces distance between researcher and interviewee, and does little to help or empower the interviewee.

Since the aim of my research was specifically to empower the participants and to change behaviour (Patton, 1990) rather than dispassionately learn from them, I was required to ‘alter my interview approach accordingly’ (Oakley, 1981). I was, therefore, inclined to show emotion, to respond with feeling and to engage in a true dialogue with my participants with experiences and with knowledge that could be shared with them (Denscombe, 2010). Literature suggests that this style of interview; however, remains unconventional, and the researcher needs to be confident and committed to ensure this style works (Denscombe, 2010). Engaging in true dialogue with my participants, I sought to ensure that I refrained from: leading questions, inserting my own opinions into the discussion, explicitly influencing what participants’ stated; these errors might have led to responses that were thin, one-sided, or socially desirable which were threats to research validity (Ranney et al., 2015). In addition, I conducted triangulation of data by seeking out statements (Ranney et al., 2015) that might have contradicted or disproved findings to avoid non-representative statements.

Taking this further, Pathak and Intratat (2012) argue that interviewers ought to build rapport with interviewees through sharing common ground and common experiences, which can help develop trust; however, working with participants for an academic year, through facilitating subject sessions and reflective practice seminars prior to the interviews increased capacity to develop mutual respect and trust. Nonetheless, having an established rapport with the participants could have potentially created issues with data contamination through expression of my own views and ideas. To avoid issues, while conducting the interviews, I sought to be interactive; I also tried to limit my own contributions to the conversation to ensure no new ideas were added to participants’ responses (Barbour and Schostak, 2011).
In this research the problem with control and power that an insider can exert over participants could have been evidenced in interviews and observations; Yin (2009) suggests that, rather than providing true responses, participants may sometimes give responses that they believe the researcher expects. This can limit the researcher’s capacity to obtain true thoughts and experiences of participants. This is particularly a challenge when the participants already know or think they know the researcher’s opinions. To minimise this kind of influence, in this study, I decided to refrain from freely expressing opinions on the research topic. Therefore, prior to the start of my research, I made a conscious decision not to make my participants aware of my own particular stance on issues with teacher resilience.

All researchers face ethical dilemmas but, for the insider researcher, one of them took on particular significance. One ethical dilemma for the insider researcher concerns the use of ‘incidental’ data (Griffith, 1998) and the compartmentalisation of two roles: a practitioner and a researcher (Humphrey, 2013). This needs to be taken into consideration for any PR as, in addition to the research, there are times when the insider researcher has access to informal conversations, things overheard by chance or other meetings with the participants and some of these could be used as data for the research. In fact, during the research period, I found myself simultaneously occupying a range of professional roles including researcher, personal and academic tutor, and lecturer. Sometimes these roles were combined – after a research interview with a participant who had explained their difficult relationship with their school mentor, I could offer advice as a personal and academic tutor additional to the research interview. Sometimes these roles clashed – occasionally I had reason to raise concerns that had arisen from the data collection about the suitability of a school mentor or students’ experience of lack of support from some schools. However, when relevant issues regarding participants were being discussed in official meetings, I was obliged to maintain confidentiality as a researcher. I also chose not to use any material from informal chats or meetings for my research because the collection of these data had not been negotiated. To use such data would be to break trust and research integrity (Mercer, 2007).

Coghlan and Brannick (2014) suggest that insider researchers have more impact on the research and are more likely to alter the research setting than an outsider, whereas
Hockey (1993) maintains that insiders are able to merge into situations, making them more natural. While this issue partly depends on the position the researcher occupies within the institution, at the time of my research, not having any direct role in the academic and/or professional appraisal of the participants being researched meant that my position as an insider had no direct impact on the academic and professional outcome of participants. Additionally, the usual personal over-involvement of researchers with client organisations in PR projects may hinder good research by introducing personal biases in the conclusions (Coghlan and Brannick, 2014). This is particularly true in situations involving a conflict of interest; however, there were not any I was aware of at the time doing this research.

3.4 Data Analysis

Data analysis is central to rigorous research (Maguire and Delahunt, 2017). While much has been written about data analysis in social science from theoretical perspectives, often social science researchers grapple with the ‘how’ of data analysis (Maguire and Delahunt, 2017). There are limited resources which cover analysis processes per se unlike many resources covering assumptions, design, and data collection in this field. While lack of focus on rigorous and relevant data analysis has implications for credibility of the research process, in the following section I will explore my data analysis for each of the research instruments used.

3.4.1 Quantitative Questionnaire

In this section, I will present the steps of data analysis of numeric values from TRS scale using IBM SPSS Statistics 24 to address research questions and to ensure systematic and rigorous analysis. Although SPSS can be used to process data, calculate statistics, and supply a summary output from analysis, the programme still requires the researcher to develop knowledge and skills of statistics to run suitable analysis and to interpret output correctly. Before conducting analysis of data from the TRS scale, I cleaned the data by inspection, sorting each variable by ascending values and then descending values to look for atypical values. At this stage, there were no issues with systematic missing values and I only identified a few missing values.
Guetterman (2019) defines statistical analysis as a method of collecting numeric data and drawing inferences about variables in which statistical procedures are mainly classified into descriptive statistics (statistics that describe data) and inferential statistics (statistics that make inferences about more general situations beyond the actual data set). “Statistical analysis requires a series of steps beginning with formulating hypotheses and selecting appropriate statistical tests” (Guetterman, 2019, p.1); these steps are carried out before reporting and interpreting results. In the first step of statistical analysis, I employed descriptive analysis to describe the data, check for errors and ensure data were ready for analysis. This was to give a general sense of trends and to illuminate errors by reviewing frequencies, minimums and maximums that could indicate values outside of the accepted range. Descriptive analysis was also an important step to check whether assumptions for statistical tests were met.

I made use of quantitative research to address aims of the research by exploring change in participants’ resilience and to examine trends, relationships among variables and comparisons of female and male participants. Rather than limiting the analyses to descriptive statistics—reporting frequencies, means and standard deviation— I also explored opportunities for more advanced analyses. Finding that the changes were different (or not) between female and male participants and that differences were statistically significant could give me even more actionable information. I addressed the latter question through inferential statistical tests. Together, descriptive statistics provided me with indicators of the distribution of data, or the frequency of values. I used inferential statistics to examine differences in the mean values of resilience scores for each aspect pre-, mid- and post-test as recommended by Beltman, Mansfield and Wosnitza (2018). The purpose was to go beyond describing data by drawing conclusions about the research questions regarding the effectiveness of the interventions by testing the null hypothesis (Guetterman, 2019) through conducting paired sample t-test.

3.4.2 Qualitative Questionnaire and Semi-Structured Interview

I made use of thematic analysis for the qualitative data. Thematic analysis involves the process of identifying patterns or themes within qualitative data (Maguire and Delahunt, 2017). Disadvantages of thematic analysis become more apparent
considering the lack of substantial literature on thematic analysis that can cause novice researchers to feel unsure how to conduct rigorous thematic analysis (Nowell et al., 2017); however, unlike many qualitative methodologies, thematic analysis is flexible and not tied to a particular epistemology or theoretical perspective (Clarke and Braun, 2013). I used thematic analysis to identify themes and patterns in the data that were significant or interesting; I used these themes to address the research questions. This was much more than simply summarising and organising the data (Clarke and Braun, 2013); thematic analysis allowed me to make sense of my data from the qualitative questionnaires and the interviews.

Braun and Clarke (2006) categorise thematic analysis into two levels of themes: semantic and latent. Semantic themes look for the explicit meanings of data; the analyst is not looking for anything beyond participants’ comments or statements; in contrast, the latent level looks beyond comments and statements, examining underlying ideas. The data I used for thematic analysis involved semantic themes for both written qualitative questionnaire and one-to-one interviews. I first retyped participants’ responses to the qualitative questionnaire in a Word document before I coded these data into my five themes (five aspects of resilience). I transcribed verbatim the audio recordings for each interview. After transcribing the interviews verbatim to become familiar with and immersed in the data, I started to organise the data in a meaningful and systematic way through coding. This involved coding every piece of text using overarching themes (my interview questions) and pre-set sub-themes (the five aspects of resilience); however, I had to develop and modify the codes working through the coding process. I worked through each transcript separately coding every piece of text that seemed to address my interview questions. I did the coding for data from both qualitative questionnaires and interviews using the analytic software NVivo 12.

Braun and Clarke (2006) distinguish between a top-down, deductive thematic analysis, driven by the specific research question(s) or the theoretical framework, and a bottom-up, inductive one more driven by the data. I initially adopted a deductive approach, whereby I developed a coding framework using pre-existing sub-themes based on the five aspects of resilience prior to reading the transcripts. I then added additional sub-themes after reading through the transcripts. This permitted the possibility of
identifying new sub-themes. The coding process was therefore part concept-driven and part data-driven. While my analysis was driven by the interview questions and was more top-down than bottom up, there was a constant tension between remaining true to the data (inductive approach) and using the five-aspect framework to inform the coding process (deductive approach); where a trade-off was necessary, I prioritised remaining true to the data. This is a useful strategy for ensuring that researchers remain attuned to their participants’ views of their reality (Ranney et al., 2015). It can also reduce the likelihood that previous theories, or the researcher’s own beliefs, are imposed on the data (Ranney et al., 2015).

To review and refine the sub-themes, I followed an iterative process for data analysis to coding. I measured the prevalence of a code by recording the number of participants who articulated that code and the number of times each individual code was mentioned across all data sets. Once I completed the coding of all datasets, to review and refine the codes, I re-read all collated data extracts to ensure that groupings had been organised to form coherent evidence of consistent patterns in the entire dataset. I then collected individual data extracts for each overarching theme and sub-theme to identify interesting features of the extracts, assess how these contributed to the overall research question and sub-questions and consider the implications of data analysis. This stage in the analysis process led me to develop additional sub-themes. When a new sub-theme was produced, I re-read each transcript to establish whether other quotes could be coded into this new sub-theme. Full details of the overarching themes and sub-themes that were identified within phase two can be found in chapter four.

The next stage in my thematic approach to data analysis involved engaging in supervision and peer-review. I discussed the overarching themes and sub-themes in meetings with my supervisors and two practitioner-researchers. The purpose of these meetings was to consider how the sub-themes related to the five aspects of resilience. As a result of these meetings, the overlapping sub-themes were placed into all related aspects of resilience. The coding process comprised three steps of applying the predetermined codes, iteratively expanding on and refining the coding and taking notes about the data during the coding process.
3.4.3 Observational Research

I coded and analysed data from the school observations. I used my field and out-of-field notes to highlight the indicators for the five aspects of resilience in the proforma (Table 3-2) I had designed for school observations. I coded the ten sets of field notes with initial core codes of professional, motivational, emotional, social, and physical resilience. I checked these codes with the school mentors for moderation purposes; this was to improve the accuracy of my observations. I collected these data with the mentors after completion of participants’ professional assessments by schools to ensure that my observations would not have had any impact on mentors’ professional judgment of participants. I later revisited all sets of field and out-of-field notes and observation proforma to draw and reassess possible conclusions and to use the gathered information for data triangulation.

3.5 Ethical Issues

Planning and undertaking any research raise ethical questions for both the researchers and other people reading the research plans. While most universities conduct a review of research proposals by scrutinising the nature of the research, participants involved, and the type of data being collected to explore if the proposals have ethical issues, PR raises its own, often sticky, ethical issues due to the role of the researcher as an insider (Zeni, 1998). The unique feature of PR, with two goals of focusing on the research topic and problem solving for the institution in which the research is performed, suggests that perhaps it is not ethical to only observe and let things happen. Instead the practitioner researcher, with their knowledge and perspective of both research topic and practice, can change the course of events at hand by careful consideration of ethical issues, addressing them in the research. This is particularly pertinent for this research as there is arguably a moral dimension to developing resilience of pre-service teachers; for example, the connection between resilience and well-being suggests that helping new teachers build resilience should be among primary concerns for teacher educators.
While the research activities in this research typically fit my daily process of teaching, called the ‘zone of accepted practice’ (Zeni, 1998), the research within the ‘zone of accepted practice’ might still involve risks to participants. Hence, for this project, like all research with live participants, I was required to conform to ethical guidelines for conduct of research, and discuss and address any issues with my supervisors, and members of the ethical board committee reviewing my proposal. The importance of identifying and addressing ethical issues in research became more noticeable with the

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<th>Table 3-2. Indicators of Five Aspects of Resilience</th>
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<td>Organised, prepared and manage time</td>
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awareness of my research process. On one hand, the fact that I was never ‘detached from the research setting’ meant that I ‘inevitably caused things to happen’ rather than merely observing change. On the other hand, I consciously tried to ‘change and improve my own practice’ (McNiff, 2013). Thus, I needed appropriate ethical behaviour as an essential foundation in creating effective and meaningful research.

Literature suggests that addressing ethical issues for an insider studying their own context may need a different set of guidelines than an outsider doing classic research of random selection or control groups with minimum personal influence on the research (Zeni, 1998). I was, therefore, mindful of Gelling and Munn-Giddings’ (2011) suggestion that good ethical behaviour is not a once-only event and that an researcher should review their ethical behaviour throughout the research. Developing the ability to perceive and describe events in context and make ethical decisions for every event independently was an area to focus on from the outset. Furthermore, I identified several ethical considerations at the beginning of the research, and I reflected upon these throughout.

One of the significant challenges for researchers using PR has been navigating the ethical review process (Gelling and Munn-Giddings, 2011). Whilst there is currently no universal agreement or code for adhering to ethics in PR, a heuristic approach rather than fixed ethical rules may provide a useful framework to support good ethical conduct to respond to the challenges with the involvement of participants so actively in all stages of the research process and the evolving nature of research methods. While the development of the work must remain visible and open to suggestions from participants, the research findings and points of view must be negotiated with those concerned before being published (Winter, 1996). To address this issue for the current research, not only was the research aspect of the practice open to participants and others within the organisation, but I also made arrangements for the participants to talk about issues that were raised in the project, outside immediate data collection contexts. For example, during interviews, when a participant showed signs of anxiety and stress discussing their professional challenges at school, in addition to halting the interview, I offered the participant a one-to-one tutorial to discuss the issue further and to contact appropriate Student Well-being Services at the university for support.
A distinct ethical problem for PR is that, although the research centres on the activity of the practitioner, the changes that the practitioner researcher seeks to make can hardly be put in place without some knock-on effect for others who operate close by in the same organisation (Denscombe, 2010). Because PR almost inevitably affects others, it is important to have a clear idea of when and where information is collected for the purpose of the research, in which case standards of research ethics must be observed, permissions obtained, confidentiality maintained, identities protected (Denscombe, 2010). Therefore, to ensure adherence to ethics standards, I followed the benchmark for educational research (BERA, 2018). I gained ethical approval from the Centre for Education Studies, University of Warwick, prior to the start of the research (Appendix IV). In addition, I developed an ethical framework which focused upon constructing principles for informed consent, confidentiality, anonymity, and the right to withdraw at any time. Because it was important to remain open to dilemmas, ambivalences, and conflicts that were bound to arise throughout the research process, I continually assessed and reflected on each ethical principle throughout the investigation. Although I obtained the initial ethical approval in August 2018, assessing and reflecting on the ethical principles for my research, I received my revised ethical approval in October 2019.

3.5.1 Informed Consent

In the present study, prior to the start of the research, participants received information on research and the related theory-based literature; this explained the overall purpose of the research project and the intended research aims. Nonetheless, the changing nature of PR meant that participants were unlikely to hold a complete understanding of the research as, in PR, the type of interventions might change on reflection and completion of each cycle (Zeni, 1998). To address this issue, I informed participants of possibilities of changes in interventions along with the process of data collection. I also obtained informed consent from schoolteachers mentoring the ten participants I observed at their practicum. In addition, I gave the participants and the schoolteachers my email contact details in case they had questions or queries related to the research. Participants and schoolteachers were also given the right to withdraw from the research at any time during the research.
Humphrey (2013) acknowledges the potential ethical issues that stem from researchers requesting their own students to participate in their research, because the request may be perceived by students as a requirement made by a figure of authority in their own institution. I, therefore, took into consideration ongoing relationships and the power dimension between me and the participants; in briefing participants, I reassured the participants that refusal to participate would not be potentially damaging to the research. I also reassured them that refusal to participate would not have any impact on their academic outcome; this was to address issues with participants being anxious in case refusal to participate could have negative consequences for them.

In addition to obtaining participants’ written consent before each data collection, after conducting the interviews, I planned to send the interview transcripts back to the participants for respondent validation (Nowell et al., 2017) before using them for my research. However, the dilemma I had faced when taking this decision was that the perspectives of individual participants may be ambivalent at any given moment or may change over time. Silverman (2000) maintains that participants’ responses are not the descriptions of the reality itself, but they are participants’ constructions of reality which could be different from the objective experience of the reality. Since individuals make different meanings from reality depending on situation and context, their understandings and articulations may be different at different times and with different people. However, to remain true to the data and adhere to the ethical code (BERA, 2018) for allowing the participants to retain their control over how their responses were presented and interpreted for the research report, after conducting the interviews, I chose to send participants a copy of their transcript for checking to ensure that informed consent was maintained after data collection. I emailed each participant a copy of their transcription to amend or delete any responses that they perceived as inaccurate representations of their views and send the revised version back.

3.5.2 Confidentiality and Anonymity

The nature of PR means that data is usually collected within the practitioner’s institution, and this can lead to difficulties around upholding confidentiality and anonymity during report writing. Additionally, the use of direct quotations for reporting interviews from participants can sometimes present ethical issues because of
potential to identify specific participants and settings (Gelling and Munn-Giddings, 2011). Often, the greatest risk for qualitative research methods such as interviews is confidentiality. UK’s Data Protection Act of 1998 classifies individuals’ voice or face on a recording as protected information. Maintaining confidentiality of recordings is therefore critical. Additionally, during data collection, participants often reveal personal, identifiable information (for instance, regarding their school, their work, or their experience in a school), which must be carefully removed from the transcript. It is particularly important to be aware of potential violations of “third-party” confidentiality (Ranney et al., 2015); this includes the confidentiality of a participant’s pupils, friends and family whose names and stories may be mentioned without their consent.

I anonymised names of the participants and their school placements. Identifying themes and looking for patterns in the content of interviews, I highlighted the difficulties in retaining full anonymity and confidentiality. In the report, I did not include any data which could cause harm to participants or any examples that could be traced to a specific individual or school. I encrypted all electronic data and locked the hard data in a secure place. These data will be destroyed after ten years in accordance with BERA guidelines (2018).

3.5.3 The Right to Withdraw

A researcher should recognise the right of all participants to withdraw from the research for any or no reason, and at any time, and they should inform participants of this right. However, the researcher can request compliance when participants are required by a contractual obligation to participate in the research (BERA, 2018). I provided the participants and the schoolteachers with the option to withdraw from the research at any time; however, prior to the data collection stage, I notified the participants that it was compulsory to attend the interventions as they were a part of timetabled sessions at the ITE. Additionally, it was not always possible to extract the data collected from those who withdraw as some data, for example, the qualitative and the quantitative questionnaires, were collected anonymously. To ensure that each participant and schoolteacher felt comfortable with the nature of the research, I made
a summary sheet of the study and a consent form available to all participants and schoolteachers involved prior to each stage of data collection.

While participants had the option to withdraw from the research at any time without explanation, I ensured that careful consideration was taken to limit the likelihood that participants would experience distress or harm. Recognising potential risks, reconsidering any actions occurring during the research process that appear to cause emotional or other harm to participants, and preparing to minimise and manage any distress or discomfort that may arise (BERA, 2018) are steps that researchers need to take in advance of their research. In this research, the process of reflection after interventions and data collection could have negatively affected the participants by leaving them with knowledge about themselves that they were possibly not fully aware of prior to the research. To mitigate this issue and to further limit the possibility of distress or harm, I ensured that there was an emphasis on the inherent nature of challenges in the teaching profession as well as individual participants’ autonomy while designing and implementing my interventions. Additionally, I structured the interventions to encourage self-esteem and self-confidence in the participants through developing resilience in collaboration with other professionals. Furthermore, during the interviews, questions such as identifying factors and strategies contributing to resilience could have potentially helped the participants with a more positive appraisal of their own resilience.

3.6 Research Trustworthiness

The fact that PR takes place in a natural setting could result in better external validity and transferability. However, the disadvantage is that it becomes harder to control external factors (Muijs, 2010). For example, in the current research, there was a possibility that a group of participants undertook some other form of related intervention such as school professional development for teacher well-being. These professional development programmes can potentially have impact on perceived resilience of participants, therefore influencing data collected to evaluate the intended interventions related to the PR. This lack of control over external factors can make natural setting research less effective compared to laboratory setting research for
establishing causality; however, PR in a natural setting is more faithful to the nature of education where laboratory conditions do not exist.

Trustworthiness refers to the way researchers ensure that their research is worthy of attention (Lincoln and Guba, 1985). This concept is mainly addressed through improving reliability and validity of research. While reliability is concerned with the replicability of scientific findings, validity is concerned with the accuracy of scientific findings (LeCompte and Goetz, 1982). Although research trustworthiness is referred to as validity and reliability of research in quantitative studies (Zohrabi, 2013), this concept is more subtle for qualitative studies (Nowell et al., 2017) because qualitative researchers do not use instruments with established metrics of validity and reliability. Green (2000) maintains that the procedures for fulfilling trustworthiness criteria in research mainly rely on methodological arguments and techniques rather than ontology and epistemology of research. In contrast, Morrow (2005) describes trustworthiness in research including qualitative data as not only methodology and research-method bound, but also paradigm-bound to a certain extent; that is, in particular, criteria for trustworthiness in qualitative research are most congruent with particular paradigms. Morrow (2005) argues that researchers using qualitative data should ground their research not only in theory and methods but also firmly in appropriate paradigms and criteria for trustworthiness of their research.

The following four criteria correspond with research trustworthiness using qualitative data:

- credibility vs internal validity in quantitative research: the congruency between respondents’ views and the researcher’s representation of them that can be addressed through prolonged research engagement, persistent observation, researcher triangulation, peer-review or member checking to test the findings and interpretations with the participants;

- transferability vs external validity in quantitative research: how the qualitative researcher demonstrates that the research study’s findings can be generalised or applied to similar contexts by providing thick descriptions to show other researchers and readers that the research study’s findings can be applicable to other contexts, circumstances or situations;
• dependability vs reliability in quantitative research: the extent to which the study could be replicated by other researchers and that the findings would be consistent by providing an audit trail, which highlights every step of data analysis that was made in order to provide a rationale for the decisions made to ensure the research process is logical, traceable, and clearly documented to facilitate the inquiry audit by external researcher;

• confirmability vs objectivity in quantitative data: that the findings are based on participants’ responses and not any potential bias or personal motivations of the researcher, confirmability is established when credibility, transferability, and dependability are all achieved (Lincoln and Guba, 1985; Tobin and Begley, 2004).

Zohrabi (2013) discusses how collecting both quantitative and qualitative data in research using mixed method can augment validity and reliability of the data and their interpretation, hence increasing the research trustworthiness. In this view, research trustworthiness is mainly addressed through methodology and research methods (Zohrabi, 2013). Similar to the concept of trustworthiness in qualitative research, Melrose (2001) examines the trustworthiness of research conducted by practitioners through exploring the process of research methodology and research methods as well as the research paradigm. Melrose (2001) argues that trustworthiness is a concept from naturalistic research as promoted by Lincoln and Guba (1985), who refer to criteria for trustworthiness as credibility, transferability, dependability, and confirmability. Similar to Melrose (2001), Brooker and Macpherson (1999) rejects the requirement that PR – like action science – needs to comply with the criteria of mainstream science research, such as generalisability of research results. Instead, they maintain that PR is located in a different research paradigm and must be justified from an epistemological perspective in which research findings are generative and open to further reconstruction.

Zuber-Skerritt (2015) defines the main criterion for quality of research conducted by practitioners as ‘authenticity’; that is, the results need not be replicable and generalisable to other groups as practitioner research is not a large-scale quantitative study, but an in-depth and mainly qualitative study to improve or change the situation of the group under the study. Zuber-Skerritt (2015) asserts that the research
methodology and methods chosen must be appropriate to elicit participants’ views, opinions and feelings and their answers to the research problems. While Zuber-Skerritt (2015) introduces research quality as ‘authenticity’, Melrose (2001) uses ‘validity’ and ‘rigour’ as synonymous to trustworthiness.

Validity and rigour in PR refers to the accuracy and trustworthiness of instruments, data, and research finding (Bernard, 2000) through internal validity (whether the change/improvement is the result of reflection and action or of something else), external validity (whether the results and conclusions can be transferred in their utility to a similar context), and construct validity (whether the method of gathering data is appropriate for the methodology/underlying paradigm of the research). Since PR is context-rich and special to participants and their situation, with the setting and constituent features being given rather than factors which can be controlled or varied, PR is therefore vulnerable to criticism that findings relate to one context and should not be transferable beyond this specific context (Denscombe, 2010). In one sense, this reservation needs to be acknowledged, that findings of PR can only be transferable to similar contexts as PR findings can hardly lend themselves to conclusions with universal application. In line with its paradigm, PR, can build on existing truths and theories rather than making ambitious claims.

Nevertheless, PR, while practice-driven and small-scale, should not lose anything by way of rigour aiming to “draw on existing theories, apply and test research propositions, use suitable methods and, importantly, offer some evaluation of existing knowledge” (Denscombe, 2010, p.134). It is, therefore, the rigour, rather than size or purpose of the project, by which the practitioner research should be judged. Rigour refers to the whole process of research including choice of methods to suit a practical problem, constitution of the research group, continuous cycle of development, research findings feeding back directly into practice, acknowledgement of disadvantages as well as advantages of insider knowledge for the research, the research being sufficiently small-scale to be combined with routine workload, ethical matters being taken into consideration and dissemination of data in appropriate ways to suit audiences (Melrose, 2001; Denscombe, 2010). In the following section, I will explore augmentation of rigour and trustworthiness in the current PR.
3.6.1 Repeating the Cycle

In line with Zohrabi’s (2013) recommendation to ensure credibility, the first step I took was prolonged research engagement and persistent observation following three cycles of exploration of the situation (a reconnaissance); an attempt to improve or change (intervention), and an evaluation of the intervention with use of critical reflection in each cycle (change, improvement or intervention). The cyclic nature of PR involved my persistent observations and collaborative critical reflections with participants over one academic year. I used findings from early cycles to help decide how to conduct later cycles. In addition to extended research engagement, the cyclical nature of this research (Melrose, 2001; Denscombe, 2010) helped with adequate rigour.

Following the research cycles, building understanding and knowledge emergence from my interventions required looking into my research question from several points of view. With repeated encounters, the repetition over time of my PR cycles sustained my learning and my growing understanding while promoting in-depth probing of my practice pertinent to this research. Melrose (2001, p.166) maintains that the repetition of cycles in research “reassures any audience that knowledge claims about these understandings will be well grounded.”

3.6.2 Collecting and Analysing Data

The rigour of different procedures of collecting data needs to be explicitly explained (Zohrabi, 2013). Research can achieve rigour through requiring a practitioner-researcher to define their procedure clearly as well as to observe the phenomena under investigation (Stringer, 1996). Additionally, rigorous research uses practical methods of data collection for emergence of new knowledge through systematic and sustained ways of data collection rather than irregular and random ways (McNiff, 2013). I used the following precautions to enhance the rigour and trustworthiness of this research.

Audit Trail: the audit trail of the research can enhance the credibility of the research (McNiff, 2013). Corey (1953) states that careful recording of actions taken and accumulation of evidence to determine the degree to which the goal has been achieved
enhances rigour of the research. In order to fulfil this procedure, throughout the research, I described in detail how I collected data, how I analysed them, and how I obtained results for each research instrument (see section 3.3, 3.4, 3.5 and 3.7). This detailed information could potentially help replicate the research and contribute to its reliability (Merriam, 1998).

**Triangulation:** the triangulation of data from multiple sources can improve rigour through challenging findings, being encouraged to explain aspects of research that may be taken for granted and improving transparency (Jones and Bugge, 2006). In addition, individual researchers’ skills and abilities are improved through discussion and reflexivity (Jones and Bugge, 2006). While gathering data through one technique can be questionable, biased and weak (Zohrabi, 2013), collecting information from a variety of sources using a variety of techniques can confirm findings; several different methods may thus converge on one interpretation which improves reliability of data (Winter, 1996). I, therefore, employed mixed-method data collection to allow for triangulation. I collected data using multiple methods from the same source, using questionnaires, individual interviews, and observations with the same population of participants to establish trends or patterns which in turn could increase research rigour to ensure that the data were valid and the findings were confirmed (see Melrose, 2001); if I obtained the same results, I could be more sure of validity of the data.

**Member Checks:** through member checks the results and interpretations are taken back to the participants in order to be confirmed and validated (Lincoln and Guba, 1985). Once transcribed, I handed over transcripts of interviews to the participants to confirm the content. In this way, plausibility and truthfulness of the information could be recognised and supported. The interview transcript checking by each participant meant that participants contributed to data by checking their draft, adding comments, or making changes. This process of data collection in collaboration with the participants can, in turn, improve the rigour of research (Melrose, 2001). Zohrabi (2013) maintains that the external validity of any research is dependent on presenting the researcher’s account back to the researched. For the research to be valid and trustworthy, the researcher’s account needs to be congruent with the experience of the researched.
**Peer Examination:** the perceived rigour of the research may be increased by asking experienced researchers to verify and confirm the data collection, analysis and interpretations to validate conclusions (Nunan, 1992). In the peer examination process for this research, in addition to my supervisors, I sent anonymised qualitative data and findings of interviews to two non-participant researcher-practitioners in the field to review and comment on the data collected and analysed using these two research instruments. These peers were familiar with the subject under study and possessed background information about it. In addition, I sent anonymised results obtained for the quantitative questionnaire to a colleague expert in quantitative data analysis to check my approach to the data analysis. I showed my school observation data to participants’ mentors to check and comment. Asking external researcher-practitioners to review and comment on my data and findings, the plausibility of data analysis and interpretations by these peers could tremendously augment the validity of the research.

**Participatory Research:** the collaborative mode of research required me to involve the participants in all phases of inquiry. The purpose was to arrive at conclusions based on consensus among participants from different perspectives (Lynch, 1996). Clearly, it was very difficult to conduct PR single-handedly; sharing ideas with participants and my colleagues during the interventions, the data collection, and the data analysis process strengthened the research findings and interpretations. I found their varied ideas and views constructive and useful. In addition, sharing and discussing the findings of each instrument with participants, my supervisors, and my colleagues to collectively reflect on the conclusions drawn, to evaluate the data analysis, helped me increase validity and rigour of the research.

**Reflexivity:** every researcher has their own values, beliefs, and worldviews. The investigator should try to collect, analyse, and interpret data as impartially as possible. The inquirer needs to be explicit, critical, and faithful at different phases of the inquiry process (McNiff, 2013). Throughout the research process, ‘reflexive writing’ (Nowell et al., 2017) helped me examine how my thoughts and ideas evolved as I engaged more deeply with collaborative critical reflection with participants during interventions. Additionally, debriefing my supervisors and the other researcher-practitioners served the added function of establishing an audit trail, keeping track of emerging ideas and how the data related to each other.
Insider knowledge should be acknowledged as having disadvantages as well as advantages for the rigour and trustworthiness of the research (Denscombe, 2010); the issues and ethical dilemmas of the insider researcher were addressed earlier in this chapter.

3.6.3 Interpreting and Reporting Data

Corey (1953) states that rigour in reporting research in a particular context can aid the reader to decide if the research is of use to their context. The relation between the actions and the desired goal could also be conceptualised as linked to usefulness and significance of the research to those outside the research group (external validity). One way to increase research rigour, through interpreting and reporting data for this research, was to involve participants, colleagues, other researchers and my supervisors in all phases of inquiry; this would enable me to arrive at evaluative conclusions as a result of consensus among all of us in order to strengthen research findings and interpretations as well as the rigour of the research (Lynch, 1996).

In addition, reporting the outcomes of my whole research process to relevant audiences, stating the procedures that I performed, and explaining in detail results and outcomes of my study (Lynch, 1996) could potentially help with improving the rigour and trustworthiness. Disseminating knowledge claims that were generated through conducting this research at four different conferences and through one journal allowed for more open discussions and further peer review.

3.6.4 Rigour in Action and Change for Improvement

According to Greenwood and Levin (2007), rigour of research knowledge depends on whether the actions that arise solve problems and increase participants’ control over their situation. The pragmatic paradigm is a major factor in establishing worth of research, and theory is useful only if it guides practice well. Appropriate changes in appropriate directions are ‘proof’ of any theory generated by research (Melrose, 2001). The role of PR in coalitions of knowledge and practice is to illuminate as many theories as possible to help interpret as broad a range of situations as possible from as many diverse perspectives as possible. Considering the symbiotic relationship
between the practical effects of the research, especially improvements and changes perceived as beneficial (Melrose, 2001), adding to the rigour of this research involved increasing participants’ agency by empowering them to contribute to building their own and others’ resilience throughout the intervention programme and research period.

3.7 Intervention Cycles

One of the defining features of resilience training is its applicability to various fields such as military and police, medical professionals and clinical populations as well as schools and education (Forbes and Fikretoglu, 2018). Building on earlier research, the resilience interventions for this study focused on specific aspects of resilience development and examined the impact of the interventions to grasp a comprehensive understanding of resilience building programmes. To decide and plan the interventions programme, I addressed five primary questions, as follows:

1. What types of interventions (face-to-face or online) should be introduced to improve responses to daily challenges of the teaching profession?
2. What type of content should be included, and what conceptual framework(s) are they derived from?
3. How can I make the resilience programme distinct from other types of programmes such as mindfulness or well-being?
4. How can I evaluate the outcomes of the interventions indicated by the theoretical framework used for the interventions?
5. How can I resolve the tensions between a prescribed intervention programme and the flexibility required for PR?

In the following section, I address these questions by initially discussing my findings from the reconnaissance stage, the preliminary information gathering before taking actions in the field of both practice and research. I then introduce six key interventions that formed the PR cycles that took place during the research phase.
3.7.1 The Reconnaissance Stage

Research regarding the design characteristics of interventions has shown direct delivery modes of intervention programmes to be more effective (Vanhove et al., 2016). This can be related to the level of engagement that direct, face-to-face sessions can create; it has been suggested that such methods better attend to participants’ unique needs, allowing them to apply the content to their specific experiences and situations while holding them more accountable compared to indirect delivery methods (Vanhove et al., 2016). On the other hand, the weak effect associated with indirect approaches implemented in previous resilience-building interventions (Vanhove et al., 2016) may suggest that they are simply not conducive to building resilience. However, it is possible that the weak effects are more indicative of the quality of the interventions rather than the format of the delivery.

Considering the rapid rise in popularity of online programmes and the flexibility of access at any time, compared to direct methods of delivery which require synchronous time and resources, I decided to use a blended mode of delivery in which both face-to-face and asynchronous online sessions were designed for the interventions with the hope that the two formats would complement each other and that all participants would have access to the programme regardless of attendance at the ITE sessions. I particularly introduced online sessions for themes such as well-being, physical and mental health to avoid creating situations when participants felt uncomfortable discussing these sensitive issues in the presence of others. Literature suggests that while making resources available online may risk low attendance, it can foster autonomy and sense of ownership (Kebritchi, Lipschuetz and Santiague, 2017), allowing students to direct their learning experiences through personalised approaches, managing pace, sequences and content of the online sessions (Hung et al., 2010). Nonetheless, the success of online learning is highly dependent on students’ motivations and skills of self-regulated learning to identify learning needs and learning goals and implement strategies to achieve those goals (Luyt, 2013). Questions remain as to whether online sessions can convey the same message as face-to-face ones; some scholars argue that online sessions tend to take away the richness of face-to-face sessions (Kebritchi, Lipschuetz and Santiague, 2017).
Forbes and Fikretoglu (2018) suggest that, in order to operationalise resilience, a clear conceptualisation of teacher resilience and instruments to measure it need to be determined prior to design of any resilience interventions. The results from literature show that, when the quality of resilience-building literature is not robust and sufficient research is not conducted prior to implementation of resilience interventions to assure their efficacy and effectiveness in given contexts, the resilience interventions are not well differentiated from other forms of intervention, and the impact of interventions on later functioning depends heavily on the type of outcome measured and the programme setting rather than the programme itself (Vanhove et al., 2016). Thus, for the current research, careful design of the intervention programme became paramount prior to the implementation stage, to reflect research and literature, modelled on successful previous interventions, and aimed at helping participants learn to use resilience skills in their relevant contexts.

For the current PR, high-quality design, grounded in research and literature, suitable for the proposed context was especially important for two reasons. First, the effectiveness of the intervention programme was highly dependent on the quality of programme design (Vanhove et al., 2016). Second, one factor contributing to diminished effect of any training programme was the non-use of learned knowledge and skills (Arthur et al., 1998). Although a universally implemented programme might have been found useful by participants, an intervention programme not suitable for the context relevant to participants would have lacked utility and become unused, leading to diminished effects over time (Arthur et al., 1998). The relevance of the programme to participants’ contexts could create greater opportunity to put learned skills to use. Moreover, the continued use of the programme could result in participants becoming more proficient in deploying knowledge and skills learned through resilience-building.

Kumpfer (2002) in his literature review, raised questions about the appropriateness of methods used to measure the outcome of resilience-building programmes, suggesting that deficiencies in defining, studying and measuring resilience could lead to difficulties showing that such programmes truly yield resilient outcomes. To address this challenge, rather than solely focusing on the outcomes, designing the intervention programme for the current research, I focused on the process of resilience-building by selecting and justifying strategies to operationalise resilience. Nonetheless, the process
of designing and implementing the interventions was challenging, owing to the complex, dynamic and distinctive nature of resilience. Participants faced different daily challenges in the context of their schools and classroom; additionally, personal and contextual resources available to participants varied from one school to another. Therefore, a prescribed programme of intervention would have not worked for all, because any intervention had to consider differences in teachers’ personal and contextual challenges and resources. While such a programme could serve as a starting point to make participants aware of the importance of agency in increasing their capacity to be resilient, I decided to design the interventions with a specific focus on empowering participants to explore the relevant strategies suitable to their particular context.

To address challenges with prescribed interventions, I designed an intervention programme that explicitly encouraged the cohort of pre-service mathematics teachers to utilise their sense of agency when exploring the strategies for themselves. Such an approach to interventions was particularly useful to assist those participants who might be reluctant to seek help or who might have a lower self-efficacy in trying out new strategies. While the intervention programme aimed at identifying and developing practical strategies that participants could use to harness their unique personal and contextual resources in their various contexts, I developed a theoretical framework to inform the interventions around developing the five resilience aspects of professional, motivational, social, emotional and physical resilience. To achieve this, I delivered the programme based on the following topics:

- what is teacher resilience and why teachers need to develop more resilience;
- practical strategies teachers could use to develop the five aspects of resilience;
- developing a support network inside and outside school through assigning participants to five relational links including university tutors, other teachers, friends and family members;
- managing and regulating emotions by help-seeking and recruiting support using the growth zone model;
- collaborative reflective practice sessions to maintain motivations as well as to share learnings, propose changes and modify interventions;
- collaborative problem-based learning by using a design thinking approach.
As discussed previously, I had been working with the research group for a half term before I started the cycles of interventions for my research. The aim of waiting a half term before starting was for participants to settle into their first school practicum and to start their teaching practice, gaining insight into professional and contextual challenges as well as personal ones. I needed to address the challenges and areas for development through interventions to support the participants. The first half term was my reconnaissance stage.

Any research on teacher resilience may begin with exploring participants’ perception of resilience (Mansfield et al., 2012). Explaining how teachers view resilience in the context of their profession at a particular career stage such as the pre-service year can raise awareness of some possible implications of these insights for any resilience-building intervention programme (Mansfield et al., 2012). Aiming to explore how teacher resilience might be perceived by those entering the profession, I gave the research group a qualitative questionnaire to describe a resilient mathematics teacher. I analysed these data to gain insight into their perception of a resilient mathematics teacher to identify areas for improvement using the five aspects of resilience to plan for the first intervention cycle. I also used participants’ feedback during the reflective practice sessions at university to identify whether participants preferred face-to-face or online sessions. While participants preferred a blended model of learning, time was allocated during the weekly reflective practice sessions at university for the participants to work in groups and suggest an intervention focus for the forthcoming weeks. The focus of each intervention theme is discussed in the following section.

Following the initial reconnaissance, through engagement with the literature and data from the initial qualitative questionnaire to explore participants’ perception of a resilient mathematics teacher, I planned, undertook, analysed and reviewed the first intervention cycle before planning the next cycle. The outcome of one research cycle affected the development of the next. For each intervention, I shared the objectives for each session with participants. The session activities and the rationale behind design of the activities was followed by a description of my observations and reflection by participants in their journals. A full summary of each intervention is discussed in the following section.
3.7.2 Building Resilience

In this introductory face-to-face intervention, I explained the concept of resilience and introduced the key themes that informed the intervention programme. Facilitating the sessions, I aimed to:

- encourage participants to reflect on what they already knew about resilience;
- inform participants about current thinking and latest developments regarding resilience;
- explain why teacher resilience was important and how it could be developed as a process through the five-aspect framework;
- encourage participants to bring problems they had in their teaching practice to the intervention sessions and discuss the problems with the other participants following design thinking steps.

‘Design thinking’ is an iterative process in which participants seek to understand problems, challenge assumptions, and redefine problems in an attempt to identify alternative strategies and solutions that might not be instantly apparent with their initial level of understanding (Li et al., 2019). The types of problems educational professionals encounter in practice are complex and varied – from designing curriculum, to motivating students in content areas, to communicating effectively with parents, and countless other issues. Such problems of practice are open-ended and challenging, with many possibilities but no single solution. By thinking like a designer – for example by examining how pupils experience aspects of school – teachers might better understand challenges and identify ways to move forward. At the same time, design thinking provides a solution-based approach to problems (Razzouk and Shute, 2012). It involves ongoing experimentation, testing, and trying out concepts and ideas by following five steps: 1) *empathising* with stakeholders to understand the problem such as by observations of pupils, or trying to put oneself in their shoes; 2) *defining* the problem by describing it comprehensively, including all of its facets and perspectives; 3) *ideation* through brainstorming, to gather as many solution ideas as
possible; 4) prototyping by choosing a solution to create and build a concrete model; 5) testing which refers to trying out the prototyped solution, to gain perspective on what works, what does not, and what needs to be done, or redone (Foster, 2019).

Design thinking helps to observe and develop empathy with stakeholders as well as engage with the process of questioning the problem, assumptions, and the implications. It is useful in tackling problems by re-framing the problems in human-centric ways, creating many ideas in brainstorming sessions. Exposure to and practice of the design thinking model allow teachers to creatively solve problems of practice relevant to their context. In particular, practitioners report three main takeaways from the experience: (1) valuing empathy, (2) becoming open to uncertainty, and (3) seeing teaching as design (Foster, 2019). It offers a framework for teachers to engage with problems of practice – and when teachers view themselves as designers, it can empower their ability to address problems, at a time when challenges abound in educational systems.

3.7.3 Reflective Practice

Reflective practice sessions were embedded in the intervention programme. I encouraged participants to engage in professional learning with peer pre-service teachers to maintain motivation by reframing their teaching philosophy and evaluating and improving their pre-service year. I started each session with a short activity in which participants were encouraged to talk about their school experience that week and then discuss what went well and what needed improvement. The aim was initially to develop participants’ personal and social capabilities of self-awareness, then to create opportunities for ongoing learning and reflective practice which could potentially help participants maintain their motivation, despite challenges, and develop their teaching practice by engaging in collaborative problem-based learning to identify and plan professional learning needs. This could help participants not only develop their knowledge and skills of teaching by thinking about and improving their practice, but also to develop skills such as setting goals and exercising agency in achieving them through self and critical reflection.
During each reflective practice session, I allocated structured well-being time using a variety of reflective models such as Gibbs (1988) and Rolfe et al (2001), creating opportunities for participants to share highlights of their week as well as to voice concerns. Additionally, I concluded each session with some participant-led presentations and group discussion of areas to focus on in the following intervention sessions. At the end of each session, I asked participants to set targets for the following week—these could then feed into the reflection/well-being time in the next session and provided continuity of learning – both looking ahead and back. The reflective practice also aimed to encourage participants to identify their own barriers to building resilience and to consider this in every session as part of reflection.

### 3.7.4 Connectedness

In this face-to-face intervention, I encouraged participants to engage with professional networks and broader communities and develop their personal and social capabilities of social awareness and social management to secure respectful and reciprocal relationships. I introduced strategies for building relationships in new environments and maintaining support networks in this intervention to help the participants to:

- understand the importance of building networks and relationships in the resilience-building process;
- identify and develop a personal and professional support network through identifying and approaching relational links;
- learn some strategies for building and maintaining positive relationships with colleagues, mentors, pupils and parents as well as friends and family members.

During this intervention, I encouraged participants to identify and approach at least five ‘relational links’ within and outside the practicum to develop their personal and professional network and to seek help while experiencing challenges. In this intervention, the strategies explored by the participants for building and maintaining positive relationships included developing relationships through getting to know colleagues and pupils, being a part of a team, inviting colleagues to a drink or a meal,
joining in with school and community activities, visiting the staff room, taking the
time to have conversations with a variety of colleagues, keeping a neutral position in
any potential disputes, providing support for others, developing emotional
intelligence, being positive and appreciating others.

3.7.5 Growth Zone Model

In this face-to-face theme, I focused on emotional resilience and thinking about the
impact of emotions in the teaching profession, using the ‘growth zone model’ to assist
participants in developing skills of emotion management. It is important to note that,
in different cultures and contexts, appropriate ways of expressing emotions and
strategies vary. Additionally, there are individual differences which can make design
and planning of interventions focused on developing emotional resilience challenging.
Rather than concentrating on a prescribed set of strategies, I wanted to raise
participants’ awareness of their emotional challenges, encouraging them to explore
their own personalised strategies. With this in mind, I focused on the following three
topics:

- enhancing emotional awareness of the participants by using the growth zone
  model;

- managing emotions using the growth zone model and recruiting support;

- increasing optimism by compartmentalising challenges and looking at each
  challenge in isolation to other concurrent or previous challenges.

3.7.6 Well-being

With the aim to give participants more control over their learning (Hung et al., 2010),
I introduced the first blended session of well-being as a part of the interventions.

With more young people than ever struggling with their mental health and well-being
(Lake and Turner, 2017) there has never been greater urgency than now to implement
and embed health and well-being in formal education settings. Informed by an
extensive review of the teacher resilience literature and empirical research, to deliver
this blended intervention, I used the online well-being module on BRiTE, Building Resilience in Teacher Education programme (Mansfield et al., 2015), along with face-to-face sessions to encourage participants to build their awareness of skills and practices that might help facilitate health and well-being. The online materials contained a self-reflection quiz, information about skills and strategies, tips, videos, scenarios, and a ‘what do the experts say’ section summarising latest research (Mansfield et al., 2015). Furthermore, the BRiTE online resources were personalised, so participants could build their own toolkit, record their learning, pin items for future reference and download personal plans. The face-to-face sessions focused on exploring strategies for maintaining physical and mental health and well-being. I covered the following topics in this intervention:

- understand the importance of taking care of physical and mental health;
- understand why positive physical and mental health was important for teachers, pupils and schools;
- identify and implement useful strategies to support own and others’ well-being in the context of school;
- build participants’ toolkit for supporting well-being at a personal and an organisational level.

3.7.7 Managing Workload

The importance of an effective work–life balance has already been highlighted in a study of resilient practitioners in the field of social work (Kinman and Grant, 2011; Grant and Kinman, 2012). It has recently been on the agenda of the Department for Education to ensure reducing the workload of beginning teachers (DfE, 2018); that said, there is an emphasis on teachers’ agency in managing workload. Literature suggests that pre-service teachers with higher self-efficacy and a strong sense of agency, along with those individuals who are more capable of compartmentalising their work and non-work activities, are more likely to resist the workload pressures that cause the expansion of work hours (Greer and Daly, 2019).
In this intervention, I focused on identifying and exploring strategies for managing workload and maintaining work-life balance. In collaboration with other participants, each participant explored strategies for reducing workload through planning lessons and marking, teaching, time to reflect on work, and interactions with colleagues, non-teaching contact with pupils and parents, administrative tasks and individual/professional development. Additionally, participants engaged with resources presented in both face-to-face and online sessions (BRiTE resources). I covered the following topics in this intervention:

- sharing resources and working collaboratively to reduce workload through collaborative planning of sequences of lessons rather than stand-alone lessons;
- understanding the importance of help-seeking to manage workload;
- using compartmentalisation to manage the workload.

Whilst in psychology, compartmentalisation is considered as a coping strategy that allows individuals to deal with internal conflicts simultaneously by inhibiting direct or explicit interaction between separate compartmentalised challenges (McWilliams, 2011), for the participants, this meant isolating work and non-work activities from each other. The process of compartmentalisation required participants to apply extreme focus on each compartment, but only for a short period of time. Once they made progress, they closed the compartment and focused on the next one. This process helped participants avoid thinking about compartments related to work activities once they left school, so they could focus on the compartments related to their life outside school.

Summary

In this chapter I reviewed my overall approach by discussing the rationale and assumptions underpinning my methodology. I gave full details of my methods to conduct the research by outlining research instruments, procedures, and materials I used to gather data before exploring my methods of data analysis in order to address my research question. By exploring the trustworthiness of my research and my teacher
resilience interventions, I add to the current literature on approaches practitioner research can take to improve rigour and provide rich insights into the processes that facilitate experience of resilience.
Chapter 4: Findings

In this chapter, I report the findings from quantitative and qualitative methods of data collection. I present the findings chronologically as the findings from each research method informed planning and design of subsequent interventions as well as data collection in the following research phase. The chapter begins with presenting data from the initial qualitative questionnaire to explore participants’ perceptions of a resilient teacher. The chapter continues with reporting the quantitative data obtained from the TRS scale. Finally, the chapter concludes with findings from semi-structured interviews and observations.

4.1 Qualitative Questionnaire Findings

In total, 25 participants completed qualitative paper surveys to describe a resilience maths teacher. It was apparent from responses that participants interpreted the questions to focus on personal aspects of teacher resilience; I also examined the data for references to the process, context, and the outcome of building resilience. I used the coded data to identify themes based on the five aspects of resilience. Initially, I coded each response in more than one theme, as participants had mentioned multiple aspects of resilience in their responses. I continued coding until 10 themes were identified to reflect the prevalence of the data, as prevalence was determined in terms of the number of different participants who articulated a code, across the entire data set (Table 4-1).

The multifaceted nature of resilience was evident in the data; many participants provided data referring to more than one aspect. The participants described a ‘resilient mathematics teacher’ using aspects that could be further coded into four of the five aspects (Kumpfer, 2002) but not the physical aspect. Participants’ definitions could mainly be categorised into three groups: professional competence, empathetic competence, and a definition that more closely matched the ones in the literature as ability to bounce back while showing commitment, persevering and remaining motivated. In defining resilience as showing empathy towards pupils who struggled with mathematics, participants perceived a resilient mathematics teacher as fostering a positive attitude towards mathematics among all pupils by showing empathy and
supporting pupils with their mathematical learning. This feature was further explored during reflective practice interventions when a group of participants discussed how they had experienced issues with their mathematics teachers’ lack of empathy as a pupil.

The findings indicated that participants had most focus on professional resilience; the teacher’s competence in teaching mathematics flexibly through introducing different methods until all pupils could access the concepts was stated by 18 participants. The descriptions suggested that most participants conceptualised resilience in the context of mathematics as a process; however, in the descriptions of 4 participants, resilience was defined as an outcome in which the teacher achieved development and progress in mathematics for their pupils. In contrast to professional competence, participants had little if any focus on social and physical aspects as dimensions related to their

<table>
<thead>
<tr>
<th>Definition</th>
<th>Aspects of Resilience</th>
<th>Number of Responses</th>
</tr>
</thead>
<tbody>
<tr>
<td>A resilient mathematics teacher is prepared to explain a concept more than once and in different ways until students understand the work.</td>
<td>professional</td>
<td>18</td>
</tr>
<tr>
<td>Someone who can enable even the most negative students to develop and enjoy the subject they are studying through determination to succeed, even when feeling beaten.</td>
<td>professional</td>
<td>8</td>
</tr>
<tr>
<td>Someone who continues to help and care about their students’ development even if their students no longer seem to care.</td>
<td>emotional social</td>
<td>8</td>
</tr>
<tr>
<td>Someone who remains positive, motivated, and persevering.</td>
<td>motivational emotional</td>
<td>8</td>
</tr>
<tr>
<td>Someone who is easy to talk to, approachable and shows empathy when students struggle with mathematics.</td>
<td>social emotional</td>
<td>4</td>
</tr>
<tr>
<td>Someone who has the ability to achieve development amongst their students despite an array of challenges.</td>
<td>professional motivational emotional</td>
<td>4</td>
</tr>
<tr>
<td>Someone who can bounce back and adapt to different situations.</td>
<td>Professional motivational emotional</td>
<td>3</td>
</tr>
<tr>
<td>Someone who helps students enjoy and learn mathematics through making connections and applying it to the real world.</td>
<td>professional</td>
<td>2</td>
</tr>
<tr>
<td>Someone who is committed to students and patient when students struggle with mathematics.</td>
<td>professional</td>
<td>2</td>
</tr>
<tr>
<td>Someone who asks for help when needed.</td>
<td>social</td>
<td>1</td>
</tr>
</tbody>
</table>
resilience. While many participants defined a resilient mathematics teacher as one who supports pupils, only 1 participant conceptualised a resilient mathematics teacher as one who sought support when needed. Additionally, there was no reference to physical resilience or well-being in participants’ descriptions. The lack of attention to social and physical resilience suggested these were potential areas for improvement in designing and planning the interventions; therefore, I initially decided to concentrate on development of these two aspects through interventions.

4.2 Quantitative Questionnaire Results

I administered the TRS scale at three points, once prior to the interventions (October) and twice post-interventions (April-June), to measure change in participants’ perceived resilience pre and post interventions. Grouping participants’ perceived resilience separately for each aspect was particularly important; it allowed more detailed evaluation of each intervention. I used the following questions from the TRS scale to measure participants’ professional resilience (Table 4-2). I used a paired sample t-test to determine whether there was a statistically significant difference between the means in pre- and post-test to assess the impact of the interventions (Table 4-3 and Table 4-4). I used the t-test to calculate the p-value, the calculated probability, to help determine the significance of the results. The two-tailed p-value in Table 4-4 is a number between 0 and 1 and interpreted in the following way: a small p-value (< 0.05) indicates statistical significance which is strong evidence against the null hypothesis (a hypothesis of no difference between pre- and post-test) and p-value of (< 0.001 ) shows that the data are highly statistically significant (less than one in a thousand chance of happening at random). The 0.088 value for t-test result of professional resilience indicated a slight, non-significant improvement (Table 4-4) in professional aspects of resilience (p > 0.05) at the end of the intervention programme.
As one of the intervention themes concentrated on developing participants’ motivational resilience, I split the TRS questions related to spiritual and motivational resilience into two separate groups for analysis in order to avoid skew in the results which could potentially make it difficult to assess actual impact of the interventions on the motivational aspects; I did not explicitly address the spiritual aspects of resilience in the interventions so analysing the results for these two aspects separately perhaps would make it easier to comment about the impact of the interventions on motivational resilience of participants. I used the following questions (Table 4-5) from the TRS scale to measure participants’ spiritual resilience pre, mid and post interventions.

Table 4-2. Questions for Professional Aspects of Resilience– TRS Scale

| Professional | I am able to adapt to change. |
| Professional | Under pressure, I am able to focus and think clearly. |
| Professional | I prefer to take the lead in problem solving. |
| Professional | I think of myself as a strong person. |

Table 4-3. TRS Scale Mean and Standard Deviation– Professional Aspects

<table>
<thead>
<tr>
<th>Group Statistics</th>
<th>Group</th>
<th>N</th>
<th>Mean</th>
<th>Std. Deviation</th>
<th>Std. Error Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean-Professional</td>
<td>pre-test</td>
<td>25</td>
<td>3.52</td>
<td>.473</td>
<td>.095</td>
</tr>
<tr>
<td></td>
<td>mid-test</td>
<td>25</td>
<td>3.70</td>
<td>.657</td>
<td>.127</td>
</tr>
<tr>
<td></td>
<td>post-test</td>
<td>25</td>
<td>3.80</td>
<td>.650</td>
<td>.130</td>
</tr>
</tbody>
</table>

Table 4-4. Paired t-test for Professional Resilience

<table>
<thead>
<tr>
<th>Paired Sample Test</th>
<th>Levene's Test for Equality of Variances</th>
<th>t-test for Equality of Means</th>
<th>95% Confidence Interval of the Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>F</td>
<td>Sig.</td>
<td>T</td>
</tr>
<tr>
<td>Mean Professional</td>
<td>Equal variances assumed</td>
<td>2.34</td>
<td>.133</td>
</tr>
<tr>
<td></td>
<td>Equal variances not assumed</td>
<td>-</td>
<td>1.74</td>
</tr>
</tbody>
</table>
The mean score and t-test results indicated a slight, non-significant improvement (Table 4-6 and Table 4-7) in spiritual aspects of resilience (p > 0.05), with the average mean score improving from 2.88 to 3.37 (3 s.f.) for the whole group of the participants. That said, the pre-test mean score for the spiritual resilience was the lowest score among all aspects of resilience.

I used the following three questions (Table 4-8) from the TRS scale to measure participants’ motivational resilience at different stages of the research. In contrast to the spiritual aspect of resilience, the t-test results indicated significant improvement (Table 4-9 and Table 4-10) in motivational aspects of resilience (p < 0.05) with the average mean score improving from 3.59 to 3.92 (3 s.f.) at the end of the research period.

<table>
<thead>
<tr>
<th>Table 4-5. Questions for Spiritual Aspects of Resilience- TRS Scale</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spiritual Sometimes fate or God can help me overcome my challenges.</td>
</tr>
<tr>
<td>Spiritual Sometimes I believe things happen for a reason.</td>
</tr>
<tr>
<td>Spiritual Sometimes I have to act on a hunch.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Group Statistics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group</td>
</tr>
<tr>
<td>Mean-Spiritual</td>
</tr>
<tr>
<td>pre-test</td>
</tr>
<tr>
<td>mid-test</td>
</tr>
<tr>
<td>Post-test</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Paired Sample Test</th>
</tr>
</thead>
<tbody>
<tr>
<td>Levene's Test for Equality of Variances</td>
</tr>
<tr>
<td>F</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>Mean-Spiritual</td>
</tr>
<tr>
<td>Equal variances assumed</td>
</tr>
<tr>
<td>Equal variances not assumed</td>
</tr>
</tbody>
</table>

The mean score and t-test results indicated a slight, non-significant improvement (Table 4-6 and Table 4-7) in spiritual aspects of resilience (p > 0.05), with the average mean score improving from 2.88 to 3.37 (3 s.f.) for the whole group of the participants. That said, the pre-test mean score for the spiritual resilience was the lowest score among all aspects of resilience.

I used the following three questions (Table 4-8) from the TRS scale to measure participants’ motivational resilience at different stages of the research. In contrast to the spiritual aspect of resilience, the t-test results indicated significant improvement (Table 4-9 and Table 4-10) in motivational aspects of resilience (p < 0.05) with the average mean score improving from 3.59 to 3.92 (3 s.f.) at the end of the research period.
Having only two questions assessing participants’ emotional resilience in the TRS scale (Table 4-11) could potentially skew the data as change in the mean score for any of these questions could have had a huge impact on the overall mean score for this aspect of resilience; however, the t-test results indicated a slight, non-significant improvement (Table 4-12 and Table 4-13) in emotional aspects of resilience ($p > 0.05$) with the average mean score improving from 3.48 (pre-test) to 3.62 with SD of 0.794 (3 s.f.) post intervention.
The final questions covered social aspects of resilience; six questions specifically focused on the family side of social resilience; similar to motivational resilience, in order to ensure that the TRS scale measured change in social aspects of resilience post-intervention, I analysed the family cohesion questions separately to avoid the effect of the mean scores for these six questions on the overall social resilience. I later, however, triangulated the two sets of data to include the family cohesion into the social aspects of resilience. Splitting the two aspects of social and family cohesion, I therefore used the following questions to measure participants’ social resilience (Table 4-14). The t-test results indicated that social aspects of resilience improved (Table 4-15 and Table 4-16) with a significance (two-tailed) of 0.007 (p < 0.05). The average mean score for participants improved from 3.23 to 4.30.

<table>
<thead>
<tr>
<th>Table 4-11. Questions for Emotional Aspects of Resilience- TRS Scale</th>
</tr>
</thead>
<tbody>
<tr>
<td>Emotional</td>
</tr>
<tr>
<td>Emotional</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Table 4-12. TRS Scale Mean and Standard Deviation- Emotional Aspects</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group Statistics</td>
</tr>
<tr>
<td>Group</td>
</tr>
<tr>
<td>Mean- Emotional pre-test</td>
</tr>
<tr>
<td>Mean- Emotional mid-test</td>
</tr>
<tr>
<td>Mean- Emotional Post-test</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Table 4-13. Paired t-test for Emotional Resilience</th>
</tr>
</thead>
<tbody>
<tr>
<td>Paired Sample Test</td>
</tr>
<tr>
<td>Levene's Test for Equality of Variances</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>Mean Emotional Equal variances assumed</td>
</tr>
<tr>
<td>Mean Emotional Equal variances not assumed</td>
</tr>
</tbody>
</table>

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The following questions from TRS scale measured participants’ family cohesion (Table 4-17). Similar to social aspects, the t-test results indicated significant improvement (Table 4-18 and Table 4-19) in family cohesion aspects of resilience ($p < 0.05$) with the mean score improving from 3.63 to 4.15.
I calculated the overall mean score from the TRS scale at pre-, mid-, and post-intervention stages of research for all participants. The t-test results indicated that the mean score of overall resilience (Table 4-20 and Table 4-21) improved significantly (p < 0.05) with the overall mean score increasing from 3.45 to 3.99.
Analysing the data further, in the following table, I summarised the results of TRS scale at pre-, mid- and post-test to measure the change in resilience score of participants at different points prior to and after the interventions (Table 4-22). In summary, the post-test results indicated slight, non-significant improvement in professional, spiritual, and emotional aspects of resilience (p>0.05), whereas motivational, social and family cohesion aspects of resilience improved with significance (p<0.05). Additionally, the mean score of overall resilience improved significantly (p<0.05). With the TRS scale lacking any question related to physical resilience, I added the following indicators (Table 4-23) to the TRS scale to assess participants’ physical resilience pre-, mid- and post-test. The results showed that participants’ indicators of physical resilience at post-test improved in comparison with pre-test; however, 60% of participants stated that they had little or no time for exercise at the post-test stage.

### Table 4-20. TRS Scale Mean and Standard Deviation

<table>
<thead>
<tr>
<th>Group Statistics</th>
<th>Group</th>
<th>N</th>
<th>Mean</th>
<th>Std. Deviation</th>
<th>Std. Error of Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean- Resilience</td>
<td>pre-test</td>
<td>25</td>
<td>3.4</td>
<td>.318</td>
<td>.064</td>
</tr>
<tr>
<td></td>
<td>mid-test</td>
<td>25</td>
<td>3.80</td>
<td>.420</td>
<td>.084</td>
</tr>
<tr>
<td></td>
<td>Post-test</td>
<td>25</td>
<td>3.99</td>
<td>.707</td>
<td>.141</td>
</tr>
</tbody>
</table>

### Table 4-21. Paired t-test for Resilience Score

<table>
<thead>
<tr>
<th>Paired Sample Test</th>
<th>Levene's Test for Equality of Variances</th>
<th>t-test for Equality of Means</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>F</td>
<td>Sig.</td>
</tr>
<tr>
<td>Mean Resilience</td>
<td>Equal variances assumed</td>
<td>6.07</td>
</tr>
<tr>
<td></td>
<td>Equal variances not assumed</td>
<td>-3.45</td>
</tr>
</tbody>
</table>

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The following two figures illustrated participants’ sleeping patterns pre-, mid- and post-test. While the number of participants who stated that they could sleep well increased at mid-test, this number decreased at post-test showing fluctuation in this indicator of the physical resilience at different stages (Figure 4-1). Each participant’s sleeping pattern was assessed using two indicators of sleeping well and having good sleeping patterns versus lack of sleep and disturbed patterns of sleeping. Figure 4-2 showed participants’ either good or disturbed sleeping pattern at pre-, mid- and post-test. The results suggested that there was a steady increase in the number of participants with good sleeping patterns with 14 participants stating a good sleeping pattern at the post-test; however, 11 participants stated disturbed sleeping pattern for this indicator of physical resilience at the end of the research.

Figure 4-3 shows participants’ statements regarding diet pre-, mid- and post-test. The results suggested that there was increase in good diet; 16 participants stated good diet.
post-test compared with 9 participants stating having a poor diet for this indicator of physical resilience at the end of the research. Figure 4-4 showed fluctuation in engagement with regular exercise with less than half of participants (10 out of 25 participants) engaging in regular exercise at the end. While this result might suggest that the interventions had less success in developing this aspect of resilience among participants, these data are discussed further in the next chapter.

Figure 4-1. The First Statement Describing Participants’ Sleeping Patterns

Figure 4-2. The Second Statement Describing Participants’ Sleeping Patterns
Figure 4-3. The Statement Describing Participants’ Eating Patterns

Figure 4-4. The Statement Describing Participants’ Exercise Patterns
I carried out further data analysis to capture the differences in the TRS scores between the female and male participants. Table 4-24 showed that the mean score for the female participants was lower than the male participants at all stages including pre and post intervention.

<table>
<thead>
<tr>
<th>Gender</th>
<th>pre-mid-post test</th>
<th>Mean</th>
<th>N</th>
<th>Std. Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Female</td>
<td>Pre-test</td>
<td>3.41</td>
<td>13</td>
<td>.317</td>
</tr>
<tr>
<td></td>
<td>Mid-test</td>
<td>3.69</td>
<td>13</td>
<td>.351</td>
</tr>
<tr>
<td></td>
<td>Post-test</td>
<td>3.73</td>
<td>13</td>
<td>.218</td>
</tr>
<tr>
<td>Male</td>
<td>Pre-test</td>
<td>3.49</td>
<td>12</td>
<td>.328</td>
</tr>
<tr>
<td></td>
<td>Mid-test</td>
<td>3.90*</td>
<td>12</td>
<td>.467</td>
</tr>
<tr>
<td></td>
<td>Post-test</td>
<td>4.22*</td>
<td>12</td>
<td>.912</td>
</tr>
</tbody>
</table>

It also showed that, although difference in mean score of resilience between female and male participants was narrow between pre- and mid-test, this gap became wider at post-test. That said, the difference between standard deviations for these two groups widened at the post-test indicating more spread of score among male participants. This concludes the presentation and analysis of the quantitative data obtained from the TRS scale to evaluate the impact of the interventions on the participants’ perceived resilience. The next section considers the triangulation of the quantitative data through analysing findings from interviews with participants.

4.3 Semi-Structured Interview Findings

This section aims to employ participants’ active voice for presenting and organising data from one-to-one semi-structured interviews, in a way that relates to the research questions and sub-questions. To present the findings, I divide the results according to the themes emerging from coding. I provide specific quotations representing rich descriptions of themes that have emerged; this includes quotations from a wide variety of participants, to allow independent verification of credibility of the data. I also use tables to present higher-level themes and quotations. It is generally not appropriate to solely present qualitative findings using descriptive analysis, as this implies statistical validity that cannot be claimed by qualitative methods (Ranney et al., 2015). Therefore, in this section, as well as using tables to present the frequency of each code,
where there was consensus among participants, I highlight the description of the data with words such as ‘many’, ‘most’, ‘some’, etc. and, where there are important outlier opinions, I use words such as ‘a few’, ‘one participant’, etc.

Using NVivo12, I grouped the data from transcripts 1-25 into the five overarching themes below:

- challenges faced during the pre-service year as well as challenges specific to mathematics teachers;
- strategies used to overcome the challenges;
- factors and strategies contributing to the development of resilience;
- evaluation of the intervention programme and possible changes to improve the intervention programme;
- intentions to stay or leave teaching and reasons for deciding to stay or leave.

I grouped the collection of data extracts that related to the first three overarching themes into separate sub-themes related to the five aspects of resilience; I used these sub-themes to create codes relevant to each sub-theme. In addition, I created six sub-themes to capture participants’ views on each individual intervention session; these were composed of sub-themes for building resilience, connectedness, the growth zone model, reflective practice, well-being and managing workload. I added another sub-theme later to evaluate participants’ engagement with the online sessions. I captured participants’ quotations in relation to each sub-theme; I then recorded these quotations in different codes related to these sub-themes. I measured the prevalence of each code by recording the number of participants whose articulation matched a code. Refining and reviewing the codes led to the development of additional codes. When a new code emerged, I re-read each transcript to establish whether other quotations could be coded into this new code. For example, for overarching theme four, I initially started with ‘Possible changes to improve the intervention programme’ and identified that many participants had made comments about possible changes to the ITE programme. For this reason, I created a new code for all 25 transcripts to reflect the comments participants had made about the changes to the ITE programme.
The next sub-section describes the main challenges participants faced during their pre-service year along with strategies they used to overcome these challenges. Throughout this sub-section, participants’ responses have been included to help illuminate research findings and provide the reader with rich and thick data related to the research question and sub-questions.

4.3.1 Overarching Theme One: Challenges

While it was useful to organise the data from the challenges and the strategies into the five sub-themes of professional, motivational, emotional, social and physical resilience, at times the overlap between these aspects made it challenging to distinguish between them; for example, seeking help to overcome challenges related to teacher-pupil relationship could fall into both emotional and social aspects of resilience. Therefore, for such examples, I decided to place them into both emotional and social aspects using codes of ‘relationship’ in the social sub-theme and ‘emotional responses to challenges’ in the emotional sub-theme. This was particularly important as it allowed the analysis to both remain true to data and accurately reflect participants’ views in the sub-themes.

Participants’ responses regarding the main challenges they faced during the pre-service year, mainly included descriptions of professional challenges experienced regarding behaviour management, teaching practice and heavy workload. Table 4-25 shows a visual thematic representation of this analysis, including the main variations that were discovered within each sub-theme.

It is noteworthy that while there were a variety of responses describing participants’ professional and mathematics-specific challenges, there was a limited range of responses for challenges related to motivational and physical resilience. In contrast to the qualitative data obtained prior to the interventions, there was more reference to social challenges in the one-to-one interviews. In addition, one challenge, related to emotional resilience, mentors’ lack of positive feedback, overlapped with social aspects of resilience indicating increase in participants’ self-awareness of social aspects of resilience post-intervention. The following section delves into the 6
behaviour management as time consuming and stressful at the start of the year, something that to her had not appeared surprising at the start. Similarly, Dana explained that she had expected challenges with behaviour management prior to the start of her training year; however, pupils’ low-level disruptions were the main issue throughout:

Table 4-25. Sub-Themes and Corresponding Responses Exploring Challenges Faced by Participants in Pre-service Year

<table>
<thead>
<tr>
<th>Sub-Themes: Challenges Faced by the Participants in the Pre-service Year</th>
<th>Codes and Number of Responses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Professional</td>
<td>behaviour management (18), workload (17), teaching practice (15), academic skills (10), low self-efficacy (4), organisation skills and time management (3)</td>
</tr>
<tr>
<td>Motivational</td>
<td>losing motivations (3), mismatch between personal beliefs and practice (3), perfectionism (1)</td>
</tr>
<tr>
<td>Emotional</td>
<td>emotional responses to challenges (8), mentors’ lack of positive feedback (7), too critical of own practice (4), taking challenges as a personal and professional weakness (3)</td>
</tr>
<tr>
<td>Social</td>
<td>relationship (9), reluctance to seek help (8), family related challenges (6), lack of school support (5), feeling of isolation at school (3), building professional network (2), communications (1)</td>
</tr>
<tr>
<td>Physical</td>
<td>lack of time for relaxation and rejuvenating activities (2), lack of sleep (1), poor diet (1)</td>
</tr>
<tr>
<td>mathematics specific challenges</td>
<td>making the content relevant to all pupils (1), differentiate for different abilities (2), teaching SEND and lower attaining groups (4), learners’ negative attitude towards mathematics (3), challenges with planning lessons relevant to real-life context (1), lack of subject knowledge (2), learners’ disengagement (3), learners’ mathematics anxiety (2), learners’ low mathematical self-efficacy (1), teaching methods based on rote learning and teaching techniques (1)</td>
</tr>
</tbody>
</table>

professional challenges participants faced during the pre-service year.

4.3.1.1 Behaviour Management

The findings suggest that most participants found professional challenges their main challenge during the pre-service year with behaviour management (18 responses) and workload (17 responses) being mentioned by many. The overall sentiment is best exemplified in the words of Ava (21-25 years old) describing behaviour management
I think with the first school, everybody kept telling me, going into teaching, "Oh, how are you going to manage behaviour?" So, in the first school, the behaviour was really challenging, my second placement, I found it really challenging because it was low-level disruption. So, I found that more challenging than actually having people swear at me or curse at me. I actually could manage that better than handling the low-level disruption. (Dana, 30+ years old)

This differs from Jack’s comment; he explained that the behaviour of pupils was worse than he had expected:

The behaviour of the children was a million times worse than anything I could have imagined. For example, if you remember when we did our mathematics training and you asked me to go outside and come back inside and the class was not behaving whatsoever. I almost started laughing when they weren’t behaving because I thought this is a joke, seriously. Right? And that was my experience when I walked into school. Because what everyone glosses over – because obviously there’s a massive behavioural issue in schools – and for me it’s the behaviour more than anything else at this moment in time that perhaps could cause a teacher’s resilience to dissipate. (Jack, 26-30 years old)

Findings suggest participants had experienced low-level disruptions daily; for example, Joseph commented that behaviour management was a real challenge throughout the year, and he never got confident with dealing with it effectively. However, for some participants this was perceived as normal in school; Kim stated:

Probably the biggest challenge is managing low-level disruption, not because the school is particularly bad, but it’s just what you would expect as a teacher. It’s just making sure that all the students are on task. (Kim, 30+ years old)

4.3.1.2 Teaching Practice

The challenges related to teaching practice involved lack of experience, issues with subject knowledge and knowledge of pedagogy and curriculum, lack of contextual
resources and teaching SEND and lower attaining pupils. Participants’ responses indicated consistent patterns regarding challenges related to catering for different needs of pupils from a wide range of backgrounds and abilities. Most participants attributed this challenge to pressure and expectations that they had for themselves and what mentors expected from them. Alex’s response captured this pressure:

*Catering to such a diverse group of students, in the sense that some of my classes have very specific needs. So, I feel like the range of my teaching and strategies that I have in my tool belt, so to speak, need to be diverse. So, I need to be prepared for those challenges.* (Alex, 26-30 years old)

Similarly, Megan reported that meeting mentors’ expectations and making sure that all pupils made academic progress was professionally challenging.

*Being good enough that students make enough progress that they would with a normal teacher. Trying to meet the standards of different teachers, who have different styles of teaching, and they might not give any regard to your style of teaching.* (Megan, 21-25 years old)

Furthermore, James (21-25 years old) stated that the fact that pupils knew that they would be taught by a student teacher made teaching practice more challenging. Some participants felt that professional challenges stemmed from their lack of experience leading to lower self-efficacy compared with more experienced teachers:

*To be honest, if you’re fresh out of university and you’re going to a place where effectively you’re responsible for 32 children at any one point, making split second decisions; that impact on what’s going to happen in your classroom, that only happens in an A&E triage place. Nowhere else does that happen in work. So, to come straight out of university and go into that situation, I can see why people find it really stressful.* (Jack, 26-30 years old)

In addition, for some participants, issues with lack of subject knowledge were a barrier to effective teaching practice. This was captured in Adam and Dana’s narratives; they noted issues with lack of subject knowledge as a challenge in their teaching practice:
it was the mathematics as well, I found that quite hard, because I didn’t get asked to do a Subject Knowledge Enhancement course so I’m rusty, so that’s the hardest part, having to teach myself mathematics again because there’s an awful lot I’ve forgot. (Adam, 30+ years old)

So, coming into the topic and having not seen the mathematics curriculum for 18 years, it was quite challenging to see how much topic I had to undertake or just, it felt at some point like I was learning all over again. So, I thought that was my main concern throughout, and actually sometimes is still my main concern, more than anything. (Dana, 30+ years old)

4.3.1.3 Academic Skills

For Joseph and Levi, their master’s level assignments were a major challenge, a threat to work-life balance and their successful completion of the pre-service year.

As soon as I started the teacher training, the essays and essay writing, coming from a mathematics background, yes, I found that a bit of a challenge and definitely a threat to completing the course. Essay writing has never really been one of my strong points. I’ve always been very good at mathematics, dealing with numbers, but generally, kind of, writing coherent arguments has not really been something I’ve ever done. I never took English as an ‘A’ Level, and as part of my degree, there was very limited essay writing as well. (Levi, 26-30 years old)

Not only was the university work mentioned as a barrier to successful completion of the pre-service year, but it also was regarded as an issue related to work-life balance:

I found the university work more difficult to manage because I felt that schoolwork was a priority and ended up doing this mostly in school holidays which meant that I didn't get much of a break. (Ava, 21-25 years old)

I feel like the structure of the course is so rigid which doesn’t allow for any flexibility and it looks like we have to do too many things at the same time. No
time is allocated to the university assignments and we have to fit them into our weekends or holidays. (Joseph, 30+ years old)

4.3.1.4 Workload

Participants reported that workload, created by combinations of school practice and university work, was difficult to manage at times. Ava felt that this impacted on her work-life balance: “I didn't get much of a break. I have also been in a long-distance relationship this year which has made work-life balance difficult to manage.” (Ava, 21-25 years old)

Hannah and Kim stated that they struggled with the workload despite having good organisation and time-management skills. This issue for Hannah was portrayed as lack of time for family and friends; meanwhile for Kim the issue was more related to juggling university work and school practice.

I really struggled with the workload, although I feel like I am an organised person, just being organised with, like, the workload, and making sure I've got time for my family and friends. (Hannah, 21-25 years old)

Yes, so although I’m quite organised and disciplined there has been conflict in terms of work-life balance, particularly this year. Although previously I’ve done uni work as well alongside teaching this year in particular has been tough in terms of work-life balance, that’s probably the main challenge. It has become an issue at times, particularly when it’s assessment points. I’ve found this year in particular there has been more of an issue, I’m not really sure why because I’ve been used to doing uni as well as working for quite some time, but I have found this year quite intense in terms of non-stop. (Kim, 30+ years old)

James also commented on issues with heavy workload; he stated that the high demands of the combination of university and schoolwork were unexpected, leaving him unprepared to respond to such high demand progressing through the pre-service year.
I think one thing is that we’re not really prepared for, going into the year, is how much work we have to do. I think, over the course of the year, we get exposed to a lot of planning and a lot of work, particularly, as well, with university work. I think that makes it challenging for us, to make sure that we keep that balance and make sure we put everything we can into our work, but also ensure that it is all done and that we don’t miss anything out, at all. (James, 21-25 years old)

In addition, the following two statements report challenges related to heavy workload. Joseph attributed his heavy workload to taking work home. For Shirley workload was taking time from her holidays, making it difficult to maintain a good work-life balance:

In terms of the personal challenges, having kids and finding the balance between work and life was an issue. There were days that I had to be in school very early in the morning and also to stay in school for long hours after I finished my teaching. As long as I got the work done and that I wasn’t in trouble for falling behind with the work, I was fine. (Joseph, 30+ years old)

So the holidays have taken a bit of a hit this year, I’ve worked pretty much through them, and I do tend to spend a lot of time at home in the evenings doing work and if I don’t then I feel guilty that I haven’t done enough in preparation. So, sharing personal time with work time has been a bit of an issue this year. (Shirley, 21-25 years old)

Another aspect of the challenges stated by participants in interviews was related to motivational resilience; however, in participants’ narratives, compared to the professional and social aspects, it seemed that there were fewer comments regarding this aspect of resilience. The following sub-section covers participants’ experience of mismatch between personal beliefs and practice; the other challenges such as losing motivation and perfectionism are discussed in emotional challenges because of overlap between these two aspects.
4.3.1.5 Mismatch Between Expectations and Reality

Motivational challenges included losing motivation and conflict between participants’ perception of profession and reality; however, narratives suggest that losing motivation was a temporary feeling experienced by some participants, as stated by Dana, Naomi, and Sofia. Jack stated that the difference was more than he had expected: “I knew the school I was going to, and I knew that things were perhaps different there. I just wasn’t prepared for how much different.” (Jack, 26-30 years old). Furthermore, Alex discussed how he had felt this challenge needed to be addressed from the outset:

> I think that's something that might need to be addressed prior to the course starting. I think coming in, people were just expecting it to be very uni-led and not having to have a full-time job as well and then other commitments, planning, outside of it. So, some people weren't fully aware of what was waiting for them when they started at school. (Alex, 26-30 years old)

Emotional responses to challenges and mentors’ lack of positive feedback were the most stated emotional challenge, followed by being too critical of own practice and taking challenges as weaknesses experienced by participants.

4.3.1.6 Emotional Responses to Challenges

In the following vignette, Levi and Sarah spoke about how they were emotionally affected by their relationship with pupils:

> In my second placement, I found it quite difficult with particularly one child – one student, sorry – and I found myself getting quite anxious coming into the lessons because I knew there was always going to be conflict. (Levi, 26-30 years old)

> The students can be quite outspoken or very vocal about their opinions. And, sometimes, I feel like it does grate on me a bit when they say something like, “Oh, why is there not an actual teacher teaching us?” or something like that.
Sometimes, it hits confidence, but then you just have to act like it doesn’t really affect you. (Sarah, 21-25 years old)

In addition, Shirley discussed feeling there was more pressure in the pre-service year compared to the last year of her undergraduate course because her desire to do well in teaching practice had impact on her emotional responses to challenges:

I think I maybe coped better last year because I felt like there wasn’t so much pressure because I’m obviously in a room with kids and it’s an important job and I want to do right by them. So, I feel like that expectation has weighed on me heavier this year whereas I didn’t really have that expectation last year. (Shirley, 21-25 years old)

Stephen explained this challenge by comparing it to mathematics anxiety and the impact on his performance as a teacher:

I feel like when you're very stressed about how much you’ve got and very busy, even if you do plan a lesson really effectively, it’s harder to deliver that lesson. Reading about things like mathematics anxiety, it brings up when you're anxious, you have a smaller cognitive load that you can use. When you're in a classroom, and you know how much you’ve got to do later, and you're not completely certain of your plan, it’s much harder to deliver it, even if you have brought it forward. (Stephen, 21-25 years old)

4.3.1.7 Negative Feedback

Participants’ comments within this sub-theme were categorised into both motivational and emotional challenges. While negative feedback from school mentors had impact on participants’ motivation, participants were significantly more likely to rate this challenge as ‘very important in losing their motivation.’

I think, with the teaching, the challenge is just having a teacher observe and then giving you feedback. I went through a period where it was just negative feedback in my first placement, and it was very demoralising, I didn’t have any
motives and just wanted to withdraw from the course at that time. (Fran, 21-25 years old)

This is similar to Joseph’s view on the challenges related to rumination after receiving negative feedback:

_I know they always say that it is good to reflect on the practice; however, when I had weeks of bad days the reflection wasn’t helpful really, I needed to forget about the issues and move on._ (Joseph, 30+ years old)

The following section reports the main social challenges participants faced. Building and managing relationships, reluctance to seek help, family-related challenges, lack of school support, feelings of isolation at school and building professional networks were the most frequent social challenges stated by participants.

### 4.3.1.8 Building and Managing Relationships

Some participants stated building and managing relationships was their main challenge. Experiences within this category involved situations where participants struggled with building or managing relationships with other professionals including their school mentors, other teachers, peer pre-service teachers and pupils. Daniel discussed a personal example of this challenge:

_Also, mixing with more crowds, like, especially in university was a challenge at the start. Because I’m used to hanging around with people who are of similar backgrounds to myself, whereas, when coming into university, at first, I did struggle._ (Daniel, 21-25 years old)

The issue with building and managing relationships also adversely affected participants’ inclination to ask for help; some participants identified negative previous experiences with building relationships as a barrier to willingness to seek help. This encompassed negative experiences asking for help while in their first school placement. Daniel discussed this challenge: “Sometimes, I did feel that they were, like, dishonest with me. They’d say one thing, and then they’d say something else to someone else about me.” (Daniel, 21-25 years old)
Additionally, participants reported experiencing difficulties building class relationships when moving to a new school. Some participants spoke about difficulties building class relationships in the presence of the classroom teacher:

*I had challenge building relationship with students. It was because it’s not my class. So, I had, like, class teachers sitting with me, and then I feel like these students know that their class teacher’s sitting at the back. They don’t feel like they need to respect you.* (Hannah, 21-25 years old)

Participants were concerned about the impact of their effort to build positive class relationships on their class management; for example, James noted that some pupils would try to take advantage of the positive relationship: “So, I think that’s one of the big challenges, trying to build that relationship, and deal with, particularly, students who will try and abuse the situation that you’re in.” (James, 21-25 years old)

**4.3.1.9 Reluctance to Seek Help**

Another social aspect of challenges was identified as reluctance to seek help. This was stated by some participants whilst reflecting on challenges they had experienced. The explanations suggest that participants’ perceptions of help-seeking as a personal and professional weakness had a deterrent effect on their willingness to seek help. For most of these participants, efforts to overcome professional challenges independently were considered as a strength and part of professionalism. Adam and Stephen referred to this challenge, giving detailed insight into their rationale:

*I don’t know, it’s just this personality trait. Yes, it’s a weakness as well because there are times when it would have been a whole lot easier if I did ask for help and did go for help so it’s probably a bit I want to be seen as a strong person and have a go myself rather than asking for help. That might be a male thing, I don’t know, it’s like asking for directions.* (Adam, 30+ years old)

*I think the big challenge was just I didn’t want to bother her [the school mentor] and ask for help. I just worked harder at it. If I had a problem, I would*
just overcome it independently. I think it’s just, as a person, I like to present the image that I’m very capable of doing things. (Stephen, 21-25 years old)

Similar to issues with building relationships, negative experiences with help-seeking were the reason some participants showed reluctance in asking for help; not only perceiving help-seeking as professional weakness, but also experiences regarding ineffectiveness of help-seeking made some participants reluctant to ask for help. Negative experiences regarding help-seeking were particularly important because they could operate in synthesis with reasons why pre-service teachers feel that they need to overcome professional challenges independently. Participants were perhaps best placed to appreciate this synthesis, having witnessed it first-hand over time. Sofia and Shirley explained their rationale for not asking for help in the following comments:

“It’s just no-one can help. You can only- and you have to deal with it yourself. Because I’m the only person that’s going to take the class. So, how can anyone help, in that sense? Unless they’re going to be in the class with me, and help me, but that’s not what’s going to happen. (Sofia, 21-25 years old)

Yes, from past experiences, I have realised that people at work show sympathy to start with and then they get busy with work and they’re not interested anymore; and I think a part of being professional means keeping those struggles to yourself at work. (Shirley, 21-25 years old)

Another reason for reluctance to seek help lies in some participants describing themselves as introverts. Fran argued that this factor hindered her from approaching others to seek help:

Personally, I am a reserved person, so I really struggle to go and approach people, or ask for help. I can get things done on my own without having to turn to people for help. (Fran, 21-25 years old)

4.3.1.10 Family Related Challenges

In total, six participants stated experiencing family-related challenges. All experiences within this category involved situations where participants felt conflict between family
and professional responsibilities. Dana, for example, discussed the pull between family needs and career:

That's why I made the decision to leave [my town], because I didn't want that to interfere. Because I have a big family and there are always, always issues with my family. So, I decided to remove myself from [my town] and be outside there in a course where I can fully focus. I feel the reason why I had to take myself out of [it] is because you can get involved with other people's lives. (Dana, 30+ years old)

Participants also identified family responsibilities such as having children as challenging; Helen and Joseph discussed this challenge in their response: “In terms of the personal challenges; having kids and finding the balance between work and life was an issue.” (Joseph, 30+ years old)

Juggling the responsibilities of family life and full-time job was one major factor- I had to find childcare during the holidays and before and after school. It was costly and my child did not take it all very well. (Helen, 30+ years old)

4.3.1.11 Being Isolated

Lack of support and feelings of isolation in school were indicated as challenging by some participants; Daniel’s response typified participants’ comments on this:

In the previous school, they wouldn’t allow me to be me. So, they were trying to cage me up. They’d tell me that I’d have to hang around with, like, maths staff, even though I was working with another department for extra-curricular activities. Or they wouldn’t let me even go to the interventions for the year 11s, where this school would. They wouldn’t let me actually help others out, so I did feel a bit restricted in that sense. (Daniel, 21-25 years old)

Being isolated was, for some participants, related to the issue of not being a permanent member of staff and staff attitudes towards them as a result; Fran stated:
I think, I felt isolated in my first placement and sometimes I felt people in the department looked down on me as I wasn’t a permanent teacher. They didn’t take me serious or even consider me as their colleague as I was only a student teacher, and this was irritating. (Fran, 21-25 years old)

Participants also stated that not having another peer pre-service teacher in their department increased feelings of isolation. This was captured in Naomi’s comment:

But with my new placement, it’s just me in my mathematics department, and you feel- because you don’t know what’s going around with other students, you feel like- “What am I doing wrong?” You feel like you’re behind and isolated; you feel like everything is going wrong. (Naomi, 21-25 years old)

The following two sections report challenges related to physical aspects of resilience and mathematics-specific challenges faced by participants.

4.3.1.12 Lack of Time to Engage with Physical Activities

Contrary to the professional challenges, articulation of challenges related to physical resilience received minimal attention from participants. This is in line with findings of the qualitative data carried out in phase one to elicit participants’ perception of a resilient mathematics teacher. Lack of sleep and poor diet along with lack of time for relaxation and rejuvenating activities were the main challenges stated by four participants who made brief references to these challenges. In the quantitative data obtained from the TRS, while challenges related to engagement with physical activities, lack of sleep and poor diet were stated by a large group of participants, challenges with well-being and physical resilience still remained taken for granted, not receiving much attention by participants at the end. Although most participants commented about issues with work-life balance and workload, they did not explicitly refer to lack of time for physical activities, lack of sleep or poor diet as significant challenges.
Some participants referred to challenges specific to mathematics teachers in their interviews; these encompassed two types of issue: pupils’ cognitive learning and pupils’ affective learning. Cognitive learning challenges mainly consisted of teaching lower attaining pupils, differentiating teaching to cater for needs of pupils from a wide range of abilities, making taught topics relevant to all pupils and teaching methods focused on learning techniques. On the other hand, affective learning challenges involved pupils’ negative attitude towards mathematics, pupils’ disengagement and issues with pupils’ mathematics anxiety and low mathematical self-efficacy. Synthesising these two types of challenge, participants viewed the issue of mathematical engagement and attainment from a perspective that suggested lack of effective subject-specific pedagogies that would cater for the needs of all pupils. In the absence of such pedagogies, or perhaps of knowledge, skills, or experience of utilising such pedagogies, participants experienced consequential affective barriers to pupils’ learning. However, interestingly, while participants frequently used the terminology ‘lower ability pupils’ in articulation of mathematics-specific challenges, there was no evidence in the narratives that participants associated mathematics-specific challenges to pupils’ lack of ability in mathematics, their SEND status or their socio-economic backgrounds suggesting that in participants’ narratives there was more focus on teaching methods rather than pupils’ mathematical abilities.

4.3.2 Overarching Theme One: Strategies

During interviews, participants described and reflected upon personal experiences and strategies to overcome their challenges. Table 4-26 reports the strategies used by participants to overcome challenges. All participants were able to recall strategies they had used to overcome personal and professional challenges. Many stated that dealing
with daily challenges involved experience of teacher resilience; these participants identified personal and professional challenges as the ones which required most resilience.

Within the professional sub-theme, most participants commented on developing strategies for behaviour management and adapting teaching strategies. Moreover, some participants spoke about strategies for maintaining work-life balance along with improving organisational and time management skills, developing academic skills and critical reflection on practice in order to develop professional resilience. The following list reports strategies employed by participants to overcome professional challenges.

### 4.3.2.1 Strategies for Behaviour Management

The responses from twelve participants suggested that gaining experience, trying many different strategies, recruiting support, and attending CPD sessions were helpful in developing strategies for behaviour management. Ava and Hannah summarised this when reflecting on their experiences: “Gaining more experience, I have now got used
to them and they have become a lot easier. At the time, I dealt with these by getting advice from other teachers.” (Ava, 21-25 years old)

One thing which I learnt from my current placement at school is the CPD sessions we go through. So, my professional mentor, she talked about how to manage behaviour, but actual strategies I could use. So, for example, having a to-do list in your lesson. (Hannah, 21-25 years old)

Other examples encompassed situations where participants developed their strategies for behaviour management through empathising and building relationships with pupils, considering issues with poor behaviour from a socio-economic perspective; for example, Jack stated:

Yes, I think, for example when you’ve got a child who’s suffered - like some of the children in my classroom – if you’re just going to tell children off all the time, are they ever going to speak to you when they need you? And I think being a parent really helped me; I don’t shout at my own kids. I wouldn’t want anyone shouting at my kids unless there was a real reason. (Jack, 26-30 years old)

Some participants spoke about applying different strategies for behaviour management; this included consistently implementing their own strategies and assertiveness along with following school behaviour policy:

Being consistent, being firm and making sure that my expectations were explicit at the start of every lesson, particularly with new groups that I’d taken on this year, and then sticking to them. (Kim, 30+ years old)

Many participants frequently referred to the context when articulating their responses to issues with behaviour management. For example, while participants, for example Dana, James, Kim, Kye and Sofia, made comments about the importance of consistency with implementing their school behaviour policy, building positive class relationships or having a good support mechanism for behaviour management, they emphasised that these strategies would not work in all cases and that behaviour
management was not a straightforward issue which could be taught in a one year pre-service programme. As Kim (30+ years old) indicated, despite consistently implementing all existing behaviour management strategies, there would still be some pupils who would not comply with behaviour policy no matter what teachers did. Kim thought poor behaviour needed to be viewed from a wider perspective, taking into consideration pupils’ backgrounds and the context of their life outside school. For Kim, depersonalising behaviour management challenges through seeing them as interactions between pupils and teacher rather than pupils’ disregard of teacher expectations could help the teacher to establish their true position regarding their abilities to manage class behaviour effectively.

4.3.2.2 Developing Teaching Practice

Similar to the strategies for developing behaviour management, participants used a variety of approaches including subject knowledge enhancement courses, peer observations, co-planning, team-teaching, simplified planning, gaining more experience with different teaching groups, small group teaching and adapting teaching strategies to cater for the needs of pupils from a wide range of backgrounds. Megan noted lesson observation, adapting teaching and sharing resources as three strategies helping her improve her teaching practice:

After observing the class teachers, I got an idea of what each of them would want to see. So, each lesson is a bit tailored about what they would want to see. Sharing resources around with other trainees in the department also helped. Megan (21-25 years old)

When asked what strategies he had used to overcome challenges with teaching practice, James reported:

I think it worked well, particularly with classes that I didn’t take over straightaway. When I went to start off with observing and then moved on to sort of team-teaching, it helped me get to know students a bit more, before I would take them over, as their class teacher. I think that made it easier, compared to other classes which I’ve taken straight from the get-go, where I
haven't had time to get to know people and understand each person and be able to work my lessons around to each and every person. James (21-25 years old)

Both Megan and James thought lesson observations gave them better understanding of school expectations; Jack stated that observations helped him build and develop class relationships too.

4.3.2.3 Work-Life Balance

Despite participants’ awareness regarding the importance of work-life balance, it was not always possible for participants to maintain good work-life balance considering heavy workload and deadlines to meet. The following comment made by Stacey (26-30 years old) underpinned the notion of necessity for work-life balance:

So, at the start, I used to come home, eat, and then go straight to work, but now I’ve made sure I’ve got that hour where I’m having my own time, and that’s helped. I feel like the quality of my lessons hasn’t decreased. I’ve just made that hour for myself and, like, I’ve now got a cut-off point. Like, I don’t do any work past midnight anymore, which I was doing at the beginning, which wasn’t good. I think just realising how important it is to have the work-life balance because, otherwise, it’s just too much. And I think a conversation with my university personal tutor helped with that; she said, “Good enough is good enough.” Stacey (26-30 years old)

Similarly, Hannah described how her increased self-awareness about the importance of work-life balance and taking time off to rejuvenate helped her:

Before, I would want to do everything after the Friday sessions, on Saturday and Sundays. And then I’d be so overwhelmed, I wouldn’t even have rested in the weekend. And then, I wouldn’t look forward to going on Monday. But now, I feel less stressed and then I’m ready for new challenges throughout the week. (Hannah, 21-25 years old)
Adam explained how using school time to complete his work helped him maintain better work-life balance:

_I suppose I make time work effectively, so if I have a free at school I will either be doing my next lesson plan or I’ll be doing my uni stuff so I don’t have to take it home with me._ Adam (30+ years old)

In addition, other responses suggest organisational skills and developing teaching practice had impact on reducing workload. Tim discussed this aspect in his response:

_To combat the challenges with planning, I worked with my mentor to implement a different method of planning lessons and topics that reduced the overall time needed to sort each. I started using resources available rather than making resources from scratch._ (Tim, 26-30 years old)

The following section reports on strategies used by participants to develop motivational resilience.

4.3.2.4 Maintain Motivations

The responses from six participants who discussed strategies and situations to maintain motivation suggest that altruistic motivations, mentors’ positive feedback, pupils' positive feedback, family support, a positive and supportive working environment, self and critical reflection, and trying to stay positive, helped participants persist and persevere despite daily challenges. Sofia summarised this aspect when reflecting on her experience:

_Then when I went to my new school, and I had three different teachers watching me, I was doing better, or getting better feedback. So, then I was getting more confident, and I was feeling like I was able to be successful. So, it just gave me a boost._ (Sofia, 21-25 years old)
4.3.2.5 **Realistic Expectations**

Two participants stated having realistic expectations assisted them with maintaining motivation. All the experiences within this code involved situations where the participant had anticipated challenges within teaching before entering the profession. Jack discussed a personal example:

*I think I’m very balanced and my experience that I’ve gone through both personally and professionally, and the fact that I can think about the bigger picture. I went into teaching with my eyes open, I knew it was not going to be easy. I knew the work-life balance would be difficult. I knew this year and next year would be even more difficult, so I was prepared for that.* (Jack, 26-30 years old)

The following section reports strategies used by participants to experience emotional resilience. Depersonalising challenges, being able to switch off from work and seeking help were the strategies most frequently stated by participants, while showing empathy with challenging pupils, focusing on positives and looking at challenges as learning opportunities were the least stated.

4.3.2.6 **Depersonalising Challenges**

Ten participants reported that their ability to depersonalise challenges was essential for developing resilience. Dana felt it was important for teachers to realise every day is a new start and that teachers should see challenges as learning opportunities rather than threats:

*It helped just going home, going to sleep, coming back. Literally it was like they were completely different students, and that's what I realised, that with kids- this is why I like working with kids. Unlike other people, they don't hold grudges. It's like every day is a new start, so that's how I take it. It makes me feel like okay, today's- even if I have a bad lesson, tomorrow they're going to be different.* (Dana, 30+ years old)
Some interview accounts suggested that speaking to other pre-service teachers and realising that others went through similar challenges helped participants manage emotions more effectively. Hannah described her reasons for depersonalising challenges, after witnessing other peers discussing their everyday challenges:

*I think what also helped me is just coming every Friday, knowing that I’m going to come to university and, like, sharing my experience with others- so, it’s really helped me sometimes, when I feel like, “Oh, maybe it’s just me not being able to deal with all these things and not getting past them.” Just knowing that everyone else has got challenges with lesson planning and stuff like that, really helped me.* (Hannah, 21-25 years old)

The responses from participants discussing emotionally challenging situations involving teacher-pupil relationships suggest that depersonalising challenges helped with managing and regulating emotions. Levi (26-30 years old) summarised the importance of taking a step back when reflecting on his experiences: “Just to try not to take things as personally as it may come across. So, yes. I take a step back and come back to the green zone first before asking for help.”

4.3.2.7  *Seeking Help*

Participants also identified seeking help and advice as a strategy to handle emotional challenges. This included conversations with family and peers. Dave and Shirley discussed this strategy in their response

*Then I decided to speak to people at uni and that helped a lot as I heard other people experienced the same too and that was kind of reassuring; I know it’s not good to get reassured by others’ struggles but at that time it helped me with my confidence.* (Dave, 26-30 years old)

*Vent at home! Because I don’t find a better place to stress! The school life is so hectic that I don’t even find time to stress at work! As I said, I vent a lot at home. My family are my personal network to develop resilience; they have*
been very supportive. I feel like our relationship has grown even stronger since I have started this course. (Shirley, 21-25 years old)

4.3.2.8 **Switch off from Work**

Two participants reported taking time off from work in response to difficulties with emotionally challenging situations. All experiences within this code involved situations where the participant felt their relationships with schoolteachers and mentors were exhausting them with stress and burnout. Stephen discussed a strategy he used to deal with this challenge:

*I took a few days off, sick days, because of stress. Eventually, it got to the point in that placement where I had to take several weeks off and ask the university for help reintegrating back with a new placement.* (Stephen, 21-25 years old)

The following section reports on strategies employed by participants to experience social resilience. Whilst comparing participants’ practical strategies, which fall under social aspects of resilience and reflections, three key thought processes of social support, seeking help and building and managing relationships were identified as facilitating teacher resilience.

4.3.2.9 **Support Network and Help Seeking**

Responses indicated that building relationships and help-seeking were strategies employed by a vast majority of participants. Mentor and family support were seen as helping participants with emotional challenges as well as developing social resilience. Descriptions of strategies and experiences also emphasised the importance of being able to seek help and take advice from peer pre-service teachers: “Sharing resources around with other trainees in the department; getting support from other trainees as well, and the people that I lived with, because they’re also trainee teachers.” (Megan, 21-25 years old)

Responses revealed that participants viewed mentors’ support and advice as important in dealing with daily challenges:
I remember I had one lesson and I was being observed by my school professional mentor. And it was- every student from every angle, they were just being naughty, full stop, and in my head, I had just given up at that point. I just wanted to walk out, but I just stayed until the end. As soon as the class was over, she just said, "Just go home, don't worry about it. Tomorrow they will be different, you will see". She said, "I don't even want you to plan anything. I don't want you to look at anything. I don't want you to think about the school. Just go home straight after", and it was the last period as well, so she said, "Just take your stuff, just go home, don't think about it, and come back tomorrow and start again." (Dana, 30+ years old)

The key message from participants’ responses regarding this code was having someone as a mentor in their setting that they could go to when they struggled and having confidence that the mentor would support them while struggling. Similar to Dana, Stacey discussed how the empathetic relationship she had developed with her mentors helped her get through one of her professional challenges.

Both subject mentors at school have been really good. Whenever I’ve had any issues, it’s been them that I’ve spoken to. They’ve been really supportive, both of them. There was one morning this week where I was quite stressed about the assignments that are due in and she said, “Just take that period off. Just chill.” So, I did. (Stacey, 21-25 years old)

While help-seeking and professional support played key roles in developing participants’ strategies to overcome challenges, support went beyond professional networks and, for a group of participants, family support was key. Laura described this, reflecting on her experience:

A lot of my family are also teachers so they’re quite good at giving advice on being a teacher as well if I need it and also managing the balance. My mum is quite good at it because she knows she doesn’t have a work-life balance so she’s very keen for me to make sure I don’t go the same way as her. So, she’s quite good to talk to about making sure I keep a good balance. (Laura, 21-25 years old)
4.3.2.10  Building and Managing Relationships

Building relationships was noted as a quality and strategy to persevere through problems or situations. Participants were seen to appreciate the importance of having strong networks along with building and developing professional relationships within and beyond their workplace. In her narrative, Helen described how building positive relationships with other professionals helped her successfully complete the pre-service year. In her thought process, however, Helen maintained the idea that developing professional networks involved her investing extra time and effort rather than taking place naturally or automatically.

*Building relationship with the mentors and the teachers helped towards the end when I was struggling. I think when I started building relationships at work, then the mentors and the teachers became more positive and I could cope better.* (Helen, 30+ years old)

The following section reports strategies used by the participants to develop physical resilience. Comments from participants suggested engagement with physical and social activities, healthy eating, sleeping well and taking a lunch break at school as practical strategies employed for developing physical resilience.

4.3.2.11  Engagement with Relaxation Activities

Participants stated that an important aspect of teacher resilience involved engagement with physical activities and relaxation exercises to recover from stress. The responses indicated that this could take different forms including doing sports, taking new hobbies, and relaxation activities with the family and/or friends. Hannah’s response illuminated how, for some participants, this also meant being able to develop professional networks:

*In my previous placement school, me and other trainees organised an after-school club. So, it’s, like, playing just random games with students from the school and just getting to know what their interests are like, and just having a chat with them after school. I think that helped a lot. Because they can see a different side of you, other than how you are as a classroom teacher, just what*
your interests are. And students tend to find that really interesting about teachers. (Hannah, 21-25 years old)

In her narrative, Hannah explained her thought process regarding engagement with social activities after school. Hannah thought these activities helped her to maintain well-being and build relationships with pupils which in turn helped with developing strategies for class management and professional resilience. Dave also described how, while reflecting on his experience of the day, he found it useful to engage with physical activities:

*I find walking a very good stress reducer; it helps me to stay focused and clear my head off. I had quite few difficult weeks in school and the walking helped me reflect on the incidents and just to clear my head off by looking at things from a different perspective rather than just being overwhelmed by the negative feelings.* (Dave, 26-30 years old)

While Dave found walking helpful in reducing stress and critically reflecting on his practice, Stephen explained his challenges in terms of workload being a barrier to engagement with physical activities:

*I took up taekwondo as just exercise to try and reduce stress, and also just a hobby-type thing, and that helped when I found the time to do it. Often, I found myself knowing I need to plan these lessons, so I can’t go to taekwondo.* (Stephen 21-25 years old)

For some participants, sleeping well, trying to eat healthily and relaxation activities such as meditation helped with the experience of resilience:

*I do find a little bit of meditation helps, I try and use that on an evening to wind down before I go to sleep to help me sleep properly. If I’ve still got everything going through my head from the day, it’s difficult to just switch off and relax but I don’t particularly practise any other techniques. I think that’s important, and sleep. So, I will, at 10 o’clock at night, regardless of what I have done or haven’t done, switch off and that’s bed.* (Kim, 30+ years old)
Similar to Stephen, for Kim it was not always easy to switch off from work and enjoy rejuvenation activities. Participants’ comments indicated they considered this aspect non-essential and a bolt-on element of developing resilience.

The following section reports on strategies used by the participants to overcome mathematics-specific challenges: adapting teaching to cater for pupils’ different needs, addressing issues of mathematics anxiety and taking a mathematics subject knowledge enhancement (SKE) course were strategies participants recalled using.

4.3.2.12 Mathematics Specific Strategies

As previously stated, a mathematics specific challenge was mainly related to teaching lower attaining pupils and those who did not have a strong mathematics foundation. This challenge was stated by some participants whilst they reflected on professional challenges; they felt teaching lower attaining pupils was specifically challenging for mathematics teachers due to the nature of the subject as a series of interlinked topics rather than sets of discrete topics taught in isolation from each other. The explanations suggested that participants perceived strategies for adapting teaching to meet the learning needs of this group of pupils as less effective; some participants thought that a more bespoke mathematics curriculum or no compulsory mathematics perhaps would be a better option for these pupils.

Additionally, some participants felt developing their subject knowledge through taking a SKE course could help them with developing pedagogy and curriculum knowledge. Moreover, strategies such as one-to-one teacher support or showing empathy with pupils who struggled with mathematics or strategies to address mathematics anxiety were found useful by some participants to address mathematics-specific challenges such as pupils’ lack of engagement or avoidant behaviour in mathematics. That said, no participants favoured collaborative learning as a strategy for addressing issues with disengagement or mathematics anxiety. Participants’ narratives suggested there was inclination among participants that the onus should be on teachers to address mathematics-specific challenges and there was less focus on what pupils could or should do to help with resolving or addressing subject-specific challenges. Kye referred to mathematics-specific challenge, giving detailed insight
into his own thought process and his quest for pedagogy to help him with mathematics-specific challenges:

*With teaching lower ability groups; if I’m being honest I still don’t know what the best methods are; I have seen very experienced teachers struggling with teaching the lower abilities; one thing which I have found useful with these groups is breaking the tasks into very small steps and then giving lots of support when students are working on each task.* (Kye, 21-25 years old)

4.3.3 Overarching Theme Two: Factors and Strategies Contributing to Teacher Resilience

When asked to reflect on factors and strategies helping develop teacher resilience in response to challenges, all participants felt they experienced high levels of resilience at times. However, when asked to consider whether their level of teacher resilience had changed since the start of their pre-service year, responses offered no consistent pattern. Alex, Levi, Adam, Jack, Daniel, Dana and Helen stated that their ability to be a resilient teacher had been high and remained constant throughout the course; they considered themselves as having the traits of resilient individuals regardless of context. Laura, Shirley, Fran, Naomi, James, Sarah, Hannah, Dave, Kye, Kim and Stacey stated that they felt higher levels of teacher resilience at the end of the year compared with other times in their life. Joseph, Sofia, Tim, Rory, Ava, Megan and Stephen stated that their level of teacher resilience depended on the context and phase in the pre-service year; they were not sure if they would consider themselves more resilient at the end. Stephen, for example, commented that whilst his level of teacher resilience in response to academic demands of the course such as essay writing had remained constantly high throughout, his ability to be resilient in response to negative experiences with little mentor support had changed throughout the pre-service year. By contrast, Adam stated that his level of teacher resilience during negative experiences with little mentor support had remained constantly high throughout the year but felt his level of teacher resilience facing professional challenges such as behaviour management had been higher than at other times in the year.
4.3.4 Overarching Theme Three: Intervention Programme

All participants were able to recall strategies introduced in the interventions; however, there were variations in the use of the strategies to overcome daily challenges. The responses relating to the impact of the interventions on participants provided further insights into subtle nuances that exist within the responses and sub-themes related to the intervention sessions; for this reason, they are reported in detail in this section. Table 4-27 summarises the sub-themes, and the number of participants that mentioned each sub-theme whilst reflecting on the impact of the intervention programme on their resilience.

Table 4-27. Sub-themes and Corresponding Transcript Numbers Exploring Impact of Interventions

<table>
<thead>
<tr>
<th>Sub-themes for Intervention Sessions</th>
<th>Number of Responses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Building Resilience</td>
<td>17</td>
</tr>
<tr>
<td>Reflective Practice</td>
<td>16</td>
</tr>
<tr>
<td>Connectedness</td>
<td>19</td>
</tr>
<tr>
<td>Growth Zone Model</td>
<td>18</td>
</tr>
<tr>
<td>Well-being</td>
<td>12</td>
</tr>
<tr>
<td>Managing Workload</td>
<td>13</td>
</tr>
<tr>
<td>Online Sessions</td>
<td>5</td>
</tr>
</tbody>
</table>

Participants’ responses suggest that blended interventions were received positively; however, while all participants engaged with the interventions, not all actively employed the strategies introduced. For example, at times, participants preferred working beyond expected working hours to avoid pressure and consequences rather than following the strategies used in the interventions to ensure work-life balance. The following section contains participants’ responses regarding each intervention theme.

4.3.4.1 Building Resilience

Participants’ responses indicated that understanding the theoretical framework and the importance of exercising agency in developing teacher resilience was a starting point to developing knowledge and understanding of teacher resilience. It provided the rationale for why participants should engage with the interventions. Most responses tended to articulate the practicality of each intervention and whether the intervention
had immediate relevance to participants’ practice or would fit into tips and strategies participants could use in practice. Participants used similar words to describe the impact of each intervention on their ability to build capacity for resilience. Responses that involved this face-to-face session provided an inconsistent pattern on whether this intervention had a positive impact on participants’ development of resilience or not. Some participants described experiencing more resilience after this intervention; however, other participants stated that learning about the theory does not necessarily lead to developing resilience unless individuals use their agency to implement theory into practice and make changes. Dana explained this in her comment regarding the first intervention theme:

_I really struggled with this theme, they were very informative, but it's more practical for me to be in the environment, the teaching environment, where I can build resilience. You can tell them, "This is going to happen", but it's up to the individual to do it, yes. I think you need to use your agency, so you have to actively go and develop resilience._ (Dana, 30+ years old)

In contrast with Dana, who had experience of working in a different sector before joining teaching, James, who was within his first post-qualification year, had a different perspective on this intervention theme:

_I think, particularly in this line of work, I'm being exposed to this sort of teaching without as much experience as others have, I think we need having that exposure to resilience, and having been taught it and being shown the specific examples within our subjects, I think that allows us to prepare for those sorts of situations, to be more resilient. And I think, if we never got prepared for that at uni, it would have been a lot harder for us, to get through those difficult situations. I think, coming into this year, it was sort of the first time I've heard about teacher resilience and all that. I think, as an intervention, it was really new to me, coming into it. I think, it was really helpful._ (James, 21-25 years old)

Furthermore, some participants thought that any ITE programme should raise awareness about teacher resilience as it can be reassuring in terms of the temporary
nature of challenges and stressors rather than portraying them as perpetual elements of teaching:

For theme one I liked just bringing to the forefront about resilience because I think it is the primary thing that teachers need to be honest with you. Although I’ve had stress points throughout the year I know that it comes in waves, it goes up and down and that it will subside and I think it’s being able to be resilient and know that actually this is how I feel at the minute but it’s not going to be like that forever. So, I think developing the resilience is essential. So, to understand more about what it is and why we need it, I totally agreed with that, it was good. (Kim, 30+ years old)

4.3.4.2 Reflective Practice

Participants’ responses indicated that engaging in ‘reflective practice sessions’ and being able to “reflect collaboratively” facilitated their teacher resilience:

It was interesting to hear other people’s take on what they thought were the most important things and they all kind of had slightly different definitions. So it was interesting to see it from other people’s point of view and think, “actually maybe I am more resilient than I thought if you think that is resilience,” and it was quite good as an ego boost in making yourself feel better and think, “actually I can do this.” (Shirley, 21-25 years old)

In her response, Dana viewed reflective practice as essential and crucial to teaching not only from the teacher resilience perspective, but as a strong tool to enable teachers to develop personally and professionally:

So just stopping and just analysing what you're doing, what you can constantly do to improve, there is that idea of you need to constantly look at yourself and see areas of where you can improve or even just to say, "oh, I've done this well so I can continue doing it again." I think that has really helped, and it's something that I should definitely continue in the future, just to stop and just reflect on what I'm doing. (Dana, 30+ years old)
The findings also indicated that the reflective practice interventions facilitated teacher resilience when participants were reassured about their teaching practice. The most commonly reported learning from these sessions encompassed group discussion of challenges, reassurance that they were not alone struggling, and sharing useful strategies related to each challenge. Naomi, for example, found it helpful hearing other participants’ stories when she was experiencing difficulties managing her teaching responsibilities:

Because, if you feel like you're the only one going through it, then you feel isolated. But you're hearing other people’s stories and knowing that it’s just not you. And, also, hearing how they have coped. I think it has helped me to just realise, “okay, I’m not doing so bad, we are all in this, we are still learning, all of us.” (Naomi, 21-25 years old)

In her narrative, Sarah perceived the reflective practice sessions as useful in boosting her self-efficacy, challenging her pre-assumptions and developing her professional network, learning about other participants’ strategies working in the same context which she found relevant and applicable to her practice. Sarah particularly thought that collaborative reflection with other novice teachers made the practice more meaningful.

Speaking to other students going through the same challenges, has definitely helped me. It makes me feel like I can relate to others, I’m not alone in this. And, actually, talking to the trainees at my old school as well, because we do share some of the same classes, it’s quite relieving that the same students that we have problems with have the same problems with the other trainee teachers as well. So, it’s not only me, and it helps me with behaviour management sometimes. Maybe I’m a bit biased in my thinking when I’m by myself, reflecting. But with other people, you get different kinds of viewpoints, and that’s where you can act upon it. (Sarah, 21-25 years old)

Furthermore, participants explained how the reflective practice sessions helped them destress as it was not always easy to discuss challenges and struggles openly at school:
The reflective sessions helped, talking to everyone else. So, when we come in on the Fridays. I guess at school I now have two other students with me, but you can’t really talk openly. So, when we come to uni, we talk about struggles, and what we find difficult, and then you find out everyone has got the same kind of struggles, it helps you, you’re not by yourself. (Sofia, 21-25 years old)

In addition, during the reflective practice sessions, practical strategies were sought to manage situations associated with professional challenges. Levi, for example, found “being able to talk to other people about the challenges and coming up with practical solutions” helpful in developing teacher resilience. In contrast, some participants felt that although it was good to destress from the week, they could have taken more from the sessions to develop resilience:

I think it was nice to reflect on what resilience was, and to have conversations with the other trainees about how they were trying to engage with resilience. I think communicating with the other trainees was really useful for developing resilience, but I think that there is a lot more that I could have done, that I didn’t really do. As I said, the main part is very much being with the other trainees, and discussing practice with them, and how we work through resilience, and de-stressing from the week. (Stephen, 21-25 years old)

4.3.4.3 Connectedness

This subsection reports on the aspects of connectedness that were mentioned during participants’ reflections on the intervention sessions for building relationships and help-seeking. The responses indicated that this intervention contributed to raising participants’ awareness with regard to the importance of having strong connections with mentors, schoolteachers, pupils, and their parents, as well as peer pre-service teachers. Participants discussed a range of strategies they employed after this intervention to further engage with their school community. Positive relationships with the school community were an important element that increased likelihood of participants experiencing teacher resilience; Kim thought that having strong professional networks could facilitate teacher resilience across all types of professionally challenging situations:
I liked the sessions about building networks, that has been a crux of my experience to be honest, without certain colleagues I probably wouldn’t have made it through the year, it honestly has helped at specific points. Then in return I try to be there for them when they’re experiencing difficulties. (Kim, 30+ years old)

Some participants discussed how the connectedness sessions helped them realise that developing resilience did not take place in isolation and it involved a social setting; these participants stated that an important and linked element was having the mindset that asking for help was essential for building resilience, in contrast, struggling and pretending everything was ok contributed to their resilience depletion:

I think I really liked how you talked about being connected and having a strong social network. So, I tried to ask, other than my mentor, which is the easiest way to just get help from, I asked other teachers in my department for what they would do if they had challenging students, or the same challenging students. You can’t always just expect people to understand what struggles you go through. You have to, ask for it. And once I started doing that, I felt more relaxed and they were, like, “yes, we went through that as well,” so then just reassuring me that “everyone goes through it and you’ll get past it.” (Hannah, 21-25 years old)

Responses suggested that another factor which made the connectedness sessions more successful was emphasis on help-seeking not only from mentors and schoolteachers, but also peer pre-service teachers. Participants experienced teacher resilience when they received support from peer pre-service teachers; taking advice from people who had experienced similar situations was helpful because it helped them to reframe pre-existing thoughts, reflect and adapt practice more effectively:

I think seeking advice from other trainees; it’s helpful just to know that other people are in the same situation as you. Sometimes they have really good advice, so like what we did, last week, writing a problem that we had with teaching and getting advice. (Stephen, 21-25 years old)
While the interventions did not aim to encourage participants to use any technology or media, other than the certified ones introduced by the ITE, to engage with their professional network, some participants decided to use social media to share resources, tips and strategies. Through this medium, they learned about practical strategies employed by other participants to improve their practice; they developed their skills to manage professional challenges, and gained insights into ways they could develop their academic skills:

*I think the group of us, the subject group of us, has been that network for me. So, seeing everyone, on the Fridays that we see them, is enough of a network for me. Also, because we have the WhatsApp group as well, that’s enough for me. Knowing that, if there’s anything that I need, I can ask them. When it comes to assignments, we tend to ask each other things, like, tips to do with references and stuff. And if someone’s off on what seems like an important day, some people asked for any handouts to be saved for them. I think maybe just the fact that there are a lot of people on it.* (Stacey, 26-30 years old)

Building relationships in school helped some participants with management of personal and professional challenges. This was particularly important as participants felt that working in a school where they received confirmation they were valued and appreciated by their mentors, the classroom teachers, pupils and their parents, and by peer pre-service teachers could facilitate experience of teacher resilience. Rory, for example, discussed the impact of the connectedness session:

*I liked the part about building networks, without my mentor, other teachers and the PGCE trainees in my department I probably wouldn’t have made it through this year, it has helped at specific points; especially people empathising with you when you’re facing multiple challenges.* (Rory, 30+ years old)

For some participants, however, building networks required effort from them, and it was a challenge on its own. Sarah’s response typified participants’ comments on this:
What you’ve discussed in your resilience lectures and seminars, that it can be quite helpful to build relationships with the staff. I do feel like you can sometimes buy people’s affection. Especially with people that you work with, they do feel like you care a little more if you make them a tea or coffee or pay them compliments. It really does have a positive impact. (Sarah, 21-25 years old)

4.3.4.4 Growth Zone Model

Participants’ responses indicated that, while all participants engaged with the sessions on the use of growth zone model, not all participants took the same approach using the model. Few participants felt that they had already been adept at managing their emotions without using the model; this was more often the case with the male participants:

There have been lots of orange, yes, don’t get me wrong, there have been times when I’ve been sort of out of my depth but at no point did I get panicky about it, it was, “Okay, you can sort it,” I’ve always been quite confident that I can get on with it. I wouldn’t say there is a change, I don’t think I’ve been put in a situation that’s put me into that red zone, so I think my resilience is stable. (Adam, 30+ years old)

Participants used words such as green, red or orange zone to describe their feelings at the time of challenge; however, some participants still felt reluctant to discuss their emotional challenges at work and preferred to deal with them outside school:

I don’t know because when I’m in the moment I kind of tend to just live directly in the moment, everything and anything comes out. So when I have been in those red or amber zones I’ve been so focused on what I’ve got to do that I haven’t really taken a step back and thought about it, it’s only been really afterwards that I realise that I was in that zone and that could have helped me. At work, I tend to just suppress it and just stress at home. (Shirley, 21-25 years old)
Similar to Shirley, Kim noted that instead of taking a step back and stopping, she would prefer to work harder to overcome challenges:

*I would probably get my head down and work harder. Yes, and I kind of like to get the job done and then the anxiety releases. So, although I don’t like doing it and I’d rather be doing something else my way to deal with it is to basically work harder and get the job done.* (Kim, 30+ years old)

Examining interview data indicated that for some participants depersonalising challenges and going back to the green zone was the first step in implementing the growth zone model. When he found himself in the red zone, Levi’s confidence in the support system was captured in his narrative:

*The teacher who took the class originally, he gave me great support and great advice on what I was dealing with and he said that the way I dealt with it was great, anyway, and just to try not to take things as personally as it may come across. So, yes. I take a step back and come back to the green zone first before asking for help. Yes, I was challenged by this student, but it was a challenge that I could overcome with the support of other teachers in the school so really didn’t find myself in the red zone dealing with it.* (Levi, 26-30 years old)

Similarly, Stacey explained her need to go back to the green zone after experiencing anxiety writing her academic essay:

*I can think of situations where I find myself into the red one. I see myself getting into the red zone quite often. Yes. When I was doing the last assignment, there was a point where I’d got to that stage and then I decided to take a day off doing the assignment. I had a day of chilling, and then I was in a much-like, I would be in yellow. I was there when I started back on the assignment, and it went much better then. I, kind of, got to the stage where I was trying to do too much, so I took a step back.* (Stacey, 26-30 years old)

Participants discussed experiences where they had engaged with the model after developing self-awareness about the importance of taking a step back when
experiencing emotional difficulties; however, while these participants acknowledged
the importance of recognising their feelings and developing ability to self-regulate
emotions, they did not explicitly make reference to the model. This was particularly
the case with participants who had the experience of working in a different profession
before starting their pre-service year:

At times, yes, it's a useful model to be aware of, and although I didn't
necessarily explicitly use it within my practice; for me, it was more of a taking
a step back and reflect. I find that whilst I was at work or during the placement,
that I was looking back at previous experiences, high-pressure scenarios, and
found myself drawing on experiences from that rather than solely following
the theoretical approach. It's like now I am able to regulate my emotions well
without explicitly thinking about the model. The experiences I have had in the
past help me overcome the emotional demands of the job effectively. (Alex, 26-
30 years old)

The findings suggested that in contrast to those participants who self-regulated
emotions independently, recruiting support was the strategy used by some participants
when in the anxiety zone. The overall sentiment is best exemplified by Dana, who
described the model using an example:

I think it's very similar to when you're dealing with difficult students and just
being able to trying to see how you can help them and just being able to take
them out of the situation, the classroom environment, and just being able to
talk to them and then see what's wrong with them. And then after bringing them
into the classroom, to see what kind of help you can provide them within the
classroom. I think once I felt like I was in the red zone, and just literally my
mentor made me leave everything and just go home. (Dana, 26-30 years old)

Recruiting support from peer pre-service teachers was a powerful motivator for James
to apply the model to his practice. He explained how he sought help from his mentors
when experiencing emotional difficulties:
There were times that I found myself in the anxiety zone. The support, I think, from mentors, from uni, and the work done to- again, as I said, the work done, to help us emotionally, through these difficult situations is massive. At the end of the day, it’s how to keep ourselves from going into those anxieties and feeling the difficulty of teaching. That helps us not stagnate our progression through this year. Because, if we let our anxieties take over, it’s just going to cause further and further problems. (James, 21-25 years old)

The findings suggest that self and critical reflection were more important to participants when using the model to manage challenges. Joseph, for example, explained how the model helped him change his perception of challenging situations to more of a challenge rather than the threat after recruiting support:

*I found the use of the growth zone model effective as it helped me identify where I was. There were times when I found myself in the anxiety zone and I had second thoughts about the profession and whether it was a right decision, but I had support from school which made things easier. Now I see myself mainly in the challenge zone which is great. Never been in the safe zone though!* (Joseph, 30+ years old)

Participants explained how moving to the challenge zone helped with professional growth. This sentiment is best exemplified by Sarah, who described the excitement of finding herself in the orange zone during her second placement:

*I feel like, in my first placement, I wasn’t as challenged, I was in my comfort zone. So, regarding to the growth zone model, I was in the green zone. And then, in my second placement, I’ve felt like I’ve had new challenges. It’s, kind of, made me grow because I haven’t reached that anxiety level, but I’ve reached the growth bit of the model. So, that’s been quite helpful.* (Sarah, 21-25 years old)

In contrast, some participants rarely experienced being in the green zone during their pre-service year. Stephen, for example, was not sure if his personality type would fit into the model as he quite often found himself in the red zone and felt that his
experience of the other two zones in the model had been rare or non-existent. He, however, commented on how the model could be used to show the feelings of pupils with mathematics anxiety.

I think it’s quite complicated for me because I have an anxiety disorder, so I’m very aware of when I’m in the panic zone, and my comfort zone is very small. I’m quite often in the panic zone. I think the awareness of it and using it to relate it back to mathematics anxiety, and maybe how my students are feeling, was really useful, but I didn’t feel like it could best fit my own resilience. (Stephen, 21-25 years old)

Similarly, Hannah in her narrative made a link between pupil anxiety and teacher anxiety exploring how teachers could help pupils with mathematics anxiety. In her description, Hannah felt confident applying the model to such an extent that she would employ it with her pupils who were prone to mathematics anxiety:

So, I’ve realised when you identify that there are students that are going through the anxieties on the red zone, and just working how to get them to the green zone. I put myself, also, in that situation. As a teacher, you’re also going to have that time where you’re in the anxiety zone. (Hannah, 21-25 years old)

4.3.4.5 Well-being

Reviewing participants’ engagement with the well-being sessions, a key thought process identified was participants’ prioritising other aspects of resilience over the physical resilience and well-being. For example, responses indicated that participants preferred developing professional resilience over physical as they perceived professional aspects as more important. Although participants stated that good well-being and work-life balance was important in experiencing teacher resilience, actions to maintain well-being and work-life balance were taken as preventative strategies to reduce stress. These preventative actions comprised spending time with family and engaging in leisure activities such as sport or meditation as evidenced by the comments from Stephen and Kim.
Sarah’s responses illuminated how finding time to engage with physical and relaxation activities was a challenge. Similar to Stephen, she described this whilst reflecting on her initial motivations for going to the gym and doing sport:

*Help ourselves out physically, so exercising, going to the gym, which I’ve tried once or twice, but I haven’t actually had that much time, so... but it does help, it does help you relieve that stress.* (Sarah, 21-25 years old)

While participants showed awareness of the crucial role of well-being in developing teacher resilience, they preferred to postpone engagement with this aspect to the year after their pre-service year; for example, Dave stated: “The importance of physical well-being and work-life balance, that’s something that is a priority for me next year” (Dave, 26-30 years old). Similarly, Fran indicated intention to engage with the online module of well-being after her pre-service year:

*I think the well-being and work-life balance sessions were one of the best and I certainly will go through these modules over the summer before I start my new job. Work-life balance is still something I need to work on; many people say it would get better with the experience and I hope it does but being a teacher, you always need to be very organised and on top of everything.* (Fran, 21-25 years old)

Awareness of how well-being could benefit school communities was a motivator for Helen to exercise agency, despite challenging relationships with people at work:

*Doing things like baking a cake and inviting teachers to get together for a short period of time like that 15-20 minutes break time can help with maintaining teachers’ well-being. It was interesting to finally see the teachers in my department appreciating the importance of taking a break from work. In mathematics, they normally do interventions or prepare for lessons at break or lunch time.* (Helen, 30+ years old)

Participants stated that the essential nature of well-being and work-life balance became more apparent when workload increased during the second school placement.
However, responses indicated that success of this intervention required involvement from school, mentors and teachers. This in turn could potentially have positive impact on the school community and other teachers’ lives.

_I think, to have a session dedicated to work-life balance at uni was very helpful. I think, particularly at the time when we had it at the beginning of our second placements, I think that really helped, when we were going to be teaching more. Particularly within the second placement, I think something like that from the school, from the teachers, could be very helpful, particularly because they are teaching a lot more than us. So, to hear from them, would have been very good._ (James, 21-25 years old)

While maintaining work-life balance was insignificant to most participants, a small group considered it ‘important’; the following comments were made by Levi who regularly engaged with sport and physical activities outside school:

_The importance of physical well-being and work-life balance, that’s something that I’ve done pretty much throughout my whole life anyway. So, even though it’s not something that I need to be educated on, it’s definitely something that I hold in quite high regard. I find that is a very good stress eliminator and helps me just stay focused._ (Levi, 26-30 years old)

Some participants stated that it would be nice to maintain good work-life balance; however, this notion somehow contradicted the role of teachers in schools:

_I think for me, if I’m at school, I don’t really have a work-life balance, I just do my work, work, work, and that’s what I’m going to keep doing, until I finish the course, because I have to pass._ (Sofia, 21-25 years old)

_I was trying to engage with the resilience sessions, but then also know I have to get lessons planned. It’s the same with, as I was saying a minute ago, about the taekwondo and also taking up running as well. Just, exercise was part of the resilience that we talked about, and it’s helpful, but it’s hard to find the
time to do it when you're in a very intense course like this. (Stephen, 21-25 years old)

While participants who had no responsibility for young children had less focus on work-life balance, those participants with young children recognised the importance of work-life balance and risks associated with being immersed in the work:

Looking after own health and well-being was another important aspect that I learnt from the online sessions; especially for me having a young child this is something I need to be aware of. (Helen, 30+ years old)

4.3.4.6 Managing Workload

Participants identified several strategies used in the interventions for managing workload as helpful; this included strategies for time management and compartmentalisation. However, some participants stated they had already engaged with some of the strategies; Shirley discussed this in her response: “I’m quite good at compartmentalisation anyway, so I think that naturally helped. I split it up and decided when I was going to work on things and did that.” (Shirley, 21-25 years old)

Other examples included situations where participants struggled with focusing on one task at a time or where concerns had been raised over participants’ use of mobile phones or social media at work which could have potentially led to issues with expectations regarding teachers’ professional conduct at work. This is further captured in Laura’s statement:

I thought that the strategies for compartmentalisation were helpful and I’ve tried to separate things out a bit more. I’ve now stopped using Facebook when I am at school. So, it’s been better at keeping me focused on work while I’m doing work and then it means that I get work done quicker and I have more time to go and do other things. (Laura, 21-25 years old)
Participants reported how managing workload impacted on their ability to maintain work-life balance; however, it was not always feasible to implement the strategies and at times, participants had to work outside school hours to manage the workload.

>This is one of the challenges I had at the start and then when you introduced the idea of compartmentalisation, I started implementing it at school and it did help; then I had more time for myself in the evening and the weekends. I just need to maintain it; the problem is sometimes I am too tired and then things pile up and this is when I get stressed. (Fran, 21-25 years old)

Comparing participants’ strategies for managing workload and reflections on their own experiences of the interventions, a key thought process indicated that managing workload for some participants involved working beyond school time to ensure less stress over heavy workload:

>I really liked the way you talked about reducing workload. So, I felt like that helped me manage my time a bit more. Just doing compartmentalisation and having less worries, less stress as well. (Hannah, 21-25 years old)

Kim’s response illuminated how, for some participants, this also meant being able to recognise limitations of the strategies for managing workload and trying to adapt them to suit individuals’ needs:

>Trying to compartmentalise, trying to think that’s the time I’ve got for that task and trying to stop when I’d got to that point. It doesn’t always work. I make lists and then cross off the list because it helps me get a better sense of satisfaction, if I get a job done I can tick it off and then it helps, also, not having that many things going around in your head at the same time. So, in a way I’m perhaps a little bit robotic in terms of my approach to being organised but it works for me. (Kim, 30+ years old)

In addition, some participants explained how time management and prioritising work was important in managing workload:
Compartmentalisation; yes! I have seen a difference from just putting everything else away and focusing, I’ve seen a difference from there. So, just practising it, I’ve seen so much difference. Now, in two hours I can do a lot, unlike in two hours I would still be staring at the same thing. But now I can make use of my time effectively and have so much done in less time than I used to do, before. (Naomi, 21-25 years old)

They also described believing that strategies for managing workload helped participants experience teacher resilience:

When I did compartmentalisation, I was more resilient as a teacher, but when I didn’t do it, it was because I was overwhelmed with the workload and how much I had to do, then, I started having anxiety and panic attacks because of the workload. (Stephen, 21-25 years old)

4.3.4.7 Online Sessions

Another aspect of the intervention programme captured in the interviews was the online sessions and whether participants engaged with them. The explanations suggested that participants would have preferred themes such as online well-being sessions to be introduced earlier in the programme when participants faced heavy workloads and pressure. According to participants’ statements, while they experienced no issues accessing the online sessions, the timing of these sessions could have been improved. Alex referred to this, giving a detailed insight into his own engagement in the thought process:

The online sessions could have been introduced earlier though. I really liked the module on the well-being and work-life balance, it had lots of practical and useful tips and strategies; however, these modules could have been introduced before Christmas when we had the pressure of the teaching and the university assignments; many people struggled at that point. (Alex, 26-30 years old)

The responses suggest that some participants liked using online sessions; unlike the face-to-face sessions, they still had opportunity to engage with them later in the year:
I really liked the BriTE module that we had to do. I found it really helpful when I did it because it’s got all the comments from other people as well for tips and then it has research into it as well if you wanted to look at it a bit more. So, I thought that was really useful and I keep meaning to go and do some of the other modules as well. I did watch the videos, but I think I remember the strategies more. It’s been on my list to do the others at some point as well.

(Laura, 21-25 years old)

4.3.4.8 Resilience as a Personality Trait

Resilience as nature was also identified as important in teacher resilience (6 responses). While one participant felt that no one could help with developing resilience, the notion of developing resilience in childhood or during previous life experiences was mentioned in a variety of ways by some participants. The nuances that existed within this theme are discussed subsequently:

It probably stems from childhood, I’m the eldest child so my parents gave me an awful lot of independence. Yes, so again having the independence and responsibility meant that I became quite self-sufficient and self-efficacious definitely. That carried on in my career and I had quite a successful career and with a big paycheque comes a lot of responsibility and you have to be resilient because at times it’s very difficult. (Alex, 26-30 years old)

Exploring this theme further, showing links between participants’ beliefs regarding resilience as an innate ability and participants’ past and lived experiences, there were comments made by these participants narrating their experience of resilience during childhood or adolescence through taking wider responsibilities such as caring for family members or being raised in an environment where faith played a role in their resilience building process. All participants, except one, in this category were from ethnic minority backgrounds. Helen and Jack considered themselves naturally resilient; the impact of the interventions was notable for them as they affirmed their perceived resilience and the fact that they were moving in the right direction.
I think of myself as a resilient person so for me the sessions were more like a confirmation that I was on the right track more so than pushing me in the right direction. (Helen, 30+ years old)

Additionally, while this group of participants commented on their perception of resilience as an innate trait, there was still evidence of active engagement with social activities to develop resilience. For example, Levi explicitly used the term ‘innate’ to describe his experience of resilience; however, he attributed his resilience to his participation in group sport and seeking help, aspects which both could have been acquired through his engagement with social activities to build resilience:

I think it’s quite an innate thing, anyway. I think, generally, some people do have quite high resilience and other people may not. I’ve always found, coming from a sporting background, that’s, kind of, really helped a lot as well, having challenges and huge highs, huge lows. You learn how to deal with them really well. Another thing from that, being in a group environment, being used to it, and being used to calling on others for support and just knowing my support network, really, that’s helped me just to stay resilient. (Levi, 26-30 years old)

Therefore, despite using the term ‘innate’, Levi’s comments did not suggest that he solely viewed resilience as innate; his rationale for considering himself resilient could be encapsulated as combination of both nature and nurture in which personality traits and individual agency to employ strategies for building resilience came together to strengthen his resilience characteristics.

4.3.5 Overarching Theme Four: Changes to the Intervention Programme

As a part of the interviews, I asked participants about possible changes to the intervention programme. Many responses encompassed more focus on specific strategies relevant to context and participants’ specific needs such as more involvement from school mentors and teachers, more time for the interventions, and development of professional skills (Table 4-28). Some participants indicated that changes should go beyond the interventions; changes should be made to the ITE programme. These participants described how a stand-alone intervention programme
could not always aid them to overcome issues related to the structure of the ITE programme and, unless these issues were addressed through more involvement from the ITE, some challenges such as heavy workload or well-being remained difficult to manage.

Table 4-28. Possible Changes to Intervention Programme

<table>
<thead>
<tr>
<th>Changes to Interventions</th>
<th>Number of Responses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Providing practical development of resilience and potentially activities where participants are not necessarily taught about resilience, but they are developing resilience.</td>
<td>T2</td>
</tr>
<tr>
<td>Getting more advice, tips and strategies for specific challenges and threats from experts, newly qualified teachers, and experienced teachers: bringing in other people’s experience by using real life examples. Sometimes beginning teachers do not necessarily have the knowledge or the experience.</td>
<td>T6, T9, T10, T12, T15, T22, T24</td>
</tr>
<tr>
<td>It needs to happen early on and be interspersed with the assignments and professional assessments, so when pressures are at the highest in terms of university workload and school workload.</td>
<td>T13, T17</td>
</tr>
<tr>
<td>More focus on developing professional skills to develop participants’ confidence in the professional aspects of resilience.</td>
<td>T7, T8, T6, T17, T14</td>
</tr>
<tr>
<td>Capturing the face-to-face sessions and online access to the sessions for those who missed on previous sessions.</td>
<td>T9</td>
</tr>
<tr>
<td>More specific strategies based on scenarios for certain challenges such as maintaining work-life balance or developing professional resilience.</td>
<td>T13, T15</td>
</tr>
<tr>
<td>Focusing on maintaining motivation of trainees; some people lost motivation facing multiple challenges, perhaps, a more pragmatic approach to sustain participants’ motivation.</td>
<td>T17</td>
</tr>
</tbody>
</table>

Table 4-29 shows participants’ suggestions regarding changes which could be made to the ITE programme.
Overarching Theme Five: Intention to Stay in Teaching

Participants’ intention to stay in teaching (Table 4-30) mainly linked to positive or negative experiences during the year. While a large group of participants (22) had decided to stay in teaching for the next few years, three participants were hesitant to work full-time or in a challenging setting, particularly where there would be challenges with behaviour management. Reflecting on their reasons for staying or leaving the
profession, participants discussed intrinsic and altruistic motivations, perceived professional mastery, school culture, leadership support and extrinsic motivations for staying in teaching.

Three participants thought working part-time in a reduced capacity would be preferable for them to ensure well-being and maintain work-life balance. One participant stated that she would not be willing to take on a teaching role if behaviour of pupils was poor; her decision to take a teaching role would depend on the setting. These participants outlined the following reasons for making such decisions:

- working part time to minimise stress and workload as teaching involved high levels of stress, high amount of work to take home and guilt a teacher would feel about not doing work at home (T21, T24, T25);
- issues with the structure of teaching as it seemed like teachers worked very hard during term time, and then got the payoff at half term, and summer – this

<table>
<thead>
<tr>
<th>Responses</th>
<th>Reasons</th>
<th>Participants</th>
</tr>
</thead>
<tbody>
<tr>
<td>enjoying the profession and the challenging nature of teaching</td>
<td>intrinsic motivations</td>
<td>T1, T2, T3, T4, T10, T11, T17</td>
</tr>
<tr>
<td>a rewarding profession, building relationships with pupils, and helping pupils make progress and become successful</td>
<td>altruistic motivations</td>
<td>T2, T5, T6, T8, T9, T11, T15, T19, T21, T22, T23</td>
</tr>
<tr>
<td>having a positive school experience, being good at teaching</td>
<td>perceived professional mastery</td>
<td>T3, T5, T8, T9, T12, T17, T18, T20</td>
</tr>
<tr>
<td>supportive leadership and school culture</td>
<td>leadership and school culture</td>
<td>T7, T8, T23, T24</td>
</tr>
<tr>
<td>early career financial incentives for new teachers</td>
<td>extrinsic motivations</td>
<td>T10</td>
</tr>
<tr>
<td>working towards becoming a mathematics teacher in previous years (positive teaching experience as a non-qualified teacher) and opportunities for career progression</td>
<td>perceived professional mastery</td>
<td>T12, T13, T14, T16, T20, T23</td>
</tr>
</tbody>
</table>
might work for some people, however the high workload during term time made it difficult to keep performing at a high level (T24);

- reluctance to work in any environment; applying for a teaching post in an unknown school and not knowing whether it would be easy to fit in or whether the behaviour was good, or if the school leaders and parents were supportive (T7, T24).

4.4 Observational Research

Table 4-31 demonstrates the frequency of each indicator for the ten participants observed at the end of their school practicum.

Although capturing all these aspects in a two-hour observation was challenging, collaboratively completing the proforma with the mentors helped with validation of data obtained from my own observations and field notes. Participants scored lowest in the following indicators:

- professional aspects: creativity (4) and self-efficacy (4)
- motivational aspects: internal locus of control and agency (5), like challenges (2) and confidence and self-belief (3)
- emotional aspects: a sense of humour (3), care for own well-being (4) and ability to restore self-esteem (2)
- physical aspects: participation in schools’ physical activities (3), taking lunch break (3) and work-life balance (2)

The findings from observational research showed that, while participants were doing well in areas such as professional and social aspects of resilience, there were areas for further improvement in domains such as motivational and physical resilience. This will be explored further in the discussion chapter.
### Table 4-31. Frequency of Indicators for Five Aspects of Resilience

<table>
<thead>
<tr>
<th>Indicators</th>
<th>Professional Resilience</th>
<th>Motivational Resilience</th>
<th>Emotional Resilience</th>
<th>Social Resilience</th>
<th>Physical Resilience</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>effective planning skills (10)</td>
<td>determination (10)</td>
<td>happiness (7)</td>
<td>communication skills (10)</td>
<td>subjective well-being (happiness, relationship, job satisfaction, school involvement, etc.) (8)</td>
</tr>
<tr>
<td></td>
<td>effective teaching skills (9)</td>
<td>perseverance (10)</td>
<td>recognition of feelings (9)</td>
<td>build support and relationships (8)</td>
<td>cognitive performance (reaction time, memory, fluid intelligence, etc.) (10)</td>
</tr>
<tr>
<td></td>
<td>effective behaviour management strategies (8)</td>
<td>internal locus of control and agency (5)</td>
<td>emotional management skills (8)</td>
<td>seek help (10)</td>
<td>participation in schools’ physical activities (3)</td>
</tr>
<tr>
<td></td>
<td>creativity (4)</td>
<td>positive and optimistic (6)</td>
<td>ability to control temper (9)</td>
<td>take advice (9)</td>
<td>taking lunch break (3)</td>
</tr>
<tr>
<td></td>
<td>commitment to learners (10)</td>
<td>like challenges (2)</td>
<td>bounce back (9)</td>
<td>solve problems (7)</td>
<td>work-life balance (2)</td>
</tr>
<tr>
<td></td>
<td>flexible and adaptable (8)</td>
<td>persistence (10)</td>
<td>a sense of humor (3)</td>
<td>empathy skills (7)</td>
<td>attendance (8)</td>
</tr>
<tr>
<td></td>
<td>organised, prepared and manage time (8)</td>
<td>focus on learning and improvement (9)</td>
<td>cope with job demands and stress (8)</td>
<td>has strong interpersonal skills (7)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>insight and reflective skills (10)</td>
<td>maintaining motivation and enthusiasm (10)</td>
<td>hopefulness (10)</td>
<td>multi-cultural competencies (7)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>high self-efficacy (domain specific) (4)</td>
<td>confidence and self-belief (3)</td>
<td>care for own well-being (4)</td>
<td>relationship with learners (7)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>realistic expectations and goals (10)</td>
<td>enjoys teaching (8)</td>
<td>show empathy (7)</td>
<td>don’t take things personally (7)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>ability to restore self-esteem (2)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Chapter 5: Discussion

In this chapter, I discuss the presentation and analysis of the data. I discuss the findings in relation to the literature in chapter two to answer my research questions. I follow the guidelines recommended by Lunenburg and Irby (2008) to structure the discussion chapter: referring back to each research question and discussing the results and findings of this study in relation to the theoretical framework and factors and strategies contributing to resilience. To present a rich insight into the process of building capacity for teacher resilience, I present my analysis and interpretation of the main research findings; this includes triangulation of data as well as comparing the data with pre-existing literature.

5.1 Discussion of the Results and Findings

Previous researchers (Beltman, Mansfield and Price, 2011; Gu and Day, 2013; Mansfield et al., 2016) extensively studied the factors and strategies contributing to the development of teacher resilience. Even though research affirms the need for resilience to be a part of teacher education and makes recommendations for teacher education programmes, there are few examples of how this may happen through implementation of such recommendations (Beltman, Mansfield and Wosnitza, 2018). Concern about attrition, stress and the burnout of beginning teachers (Tait, 2008; Flores, 2018) suggests that a more explicit, directed approach to skills and practical strategies that support resilience may be beneficial. However, what is less clear in the literature is exploring teacher resilience from the “contemporary landscape of teaching in which teachers both influence and are influenced by their professional worlds” (Gu, 2018, p.5).

The goal of this study was to explore the approaches and strategies for developing resilience of 25 pre-service mathematics teachers through introducing and implementing an intervention programme, taking into account the differences in participants’ personal and contextual challenges and resources. This section discusses the implications of the results and findings for each of the four research questions and how triangulation of the data can help answer the research questions.
5.1.1 Sub Question One

How do pre-service teachers of mathematics understand teacher resilience?

Explanations of how resilience is manifested by pre-service teachers can help with identifying challenges presented within this particular context and career stage as well as identifying skills, attributes or characteristics resilient teachers possess or demonstrate (Mansfield et al., 2012). Findings related to research sub-question one were important for two reasons. Firstly, they could be compared with conceptions of teacher resilience in the literature and contributed to existing understandings of teacher resilience from the perspective of pre-service mathematics teachers. Secondly, the findings from this research question helped with identifying participants’ understanding of resilience with regard to the theoretical framework, which allowed for the planning and design of the interventions.

The findings indicated that participants interpreted teacher resilience as the possession by individuals of attributes related to resilience. Participants perceived resilience as personal characteristics and the capacity of teachers to be professionally resilient, bouncing back after challenges. The data suggested that there was some fixed mindset around resilience in the cohort, at least initially. My supervisors and I coined the term ‘anti-resilient’ to describe this mindset; the existence of anti-resilient thinking and being self-sufficient, whatever the level of challenge, was a prevalent aspect captured in the qualitative questionnaires.

While most participants described teacher resilience as a set of personal qualities, recent research on the successful promotion of resilience amongst early career teachers rejects psychological explanations of teacher resilience as the personal characteristics of trait-resilient people, and instead endorses an alternative socio-cultural and critical approach to understanding teacher resilience (Johnson et al., 2016): the capacity of individuals to be resilient in different sets of positive and negative circumstances. This view of resilience emphasises the role of the context and how teacher resilience can be enhanced or inhibited by the nature of the external and internal environments in which teachers work, and their interactions with these environments and the people with whom they work (Day and Gu, 2014). Based on this view, resilience is a construct
that is relative, relational, developmental and dynamic (Gu and Day, 2013). That said, while resilience can be seen as both a product of personal and professional experiences, exercised through professional values and dispositions, it is influenced positively and negatively by personal and contextual factors and determined by individuals’ capacities to manage these factors in a range of anticipated and unanticipated circumstances.

For most of the participants, a resilient mathematics teacher possessed a set of personal abilities such as effective pedagogical knowledge and understanding. Ungar (2012) asserts that conceptualisation of resilience should focus on both individual abilities and ecological factors that shape resilience either in a supportive or threatening manner. Ungar (2012) strongly argues that the individuals’ factors and strategies are context dependent, with the ecological resources having a stronger impact on individuals' capacity to develop resilience to create positive outcomes. The processes involved in individuals building resilience are dependent upon how they navigate through challenges and negotiate for social ecological resources associated with resilience (Ungar, 2012). Hence, resilience is a shared quality of the individual and their social ecology, with social ecology playing a larger part in shaping individuals’ experience of resilience.

While there were references to interactions between the teacher and their pupils in participants’ responses, there was only one comment regarding the interactions between the teacher and other professionals. ‘Helping pupils overcome their learning barriers, building mathematical resilience’, was a prevalent response in participants’ perceptions of a resilient mathematics teacher. From the participants’ view, resilient teachers developed capacity for their pupils to build resilience too. Showing empathy with pupils who struggled with mathematics was another interaction between a resilient maths teacher and their pupils highlighted by some participants; these participants had previously experienced issues with lack of empathy from their mathematics teachers while being taught at school. This perezhivanie and lived experience (Fleer, 2016) contributed to their awareness of the importance of teachers’ empathetic relationship with pupils; Werner (1985) suggests that individuals demonstrate responsibility and empathy towards the needs of others as a consequence of developing resilience.
Participants’ responses indicated that showing empathy could help a resilient mathematics teacher build relationships with pupils and improve their academic attainment. These findings support pre-existing literature on the categorisation of cognitive, affective and behavioural empathy: cognitive empathy involves teachers identifying the best ways to help pupils, while affective empathy involves teachers showing altruistic behaviour leading to the development of teacher-pupil relationships (Zhu et al., 2019). From the participants’ view, empathy could help teachers see issues from their pupils’ point of view, considering their pupils’ feelings and thoughts, thereby choosing suitable teaching methods that cater for the needs of their pupils (Zhu et al., 2019). That said, the literature identifies pre-service teachers with greater empathy as those with stronger professional identity and greater self-awareness (Zhu et al., 2019). Nonetheless, teacher empathy can be affected by context, through real involvement in teaching and contact with pupils, as evidenced by Jack’s comment, empathising with his disadvantaged pupils.

Another interesting point captured in the participants’ perceptions of resilience was the exercise of everyday resilience. Concentrating on professional aspects of resilience, such as teaching practice and ensuring that all pupils could access mathematical concepts, participants stated that teacher resilience could be achieved through commitment to their practice. According to participants’ narratives, the process of teaching and learning in mathematics required those who were engaged with this process to have resolute everyday persistence and commitment, which was much more than the ability to bounce back in adverse circumstances. This description supports pre-existing conceptualisations of teacher resilience: that the nature of teaching and learning (considering the contextual challenges in which they take place) demands everyday resilience (Day and Gu, 2014) because of the variety, intensity and complexity of the environments around teachers. As participants stated, everyday resilience required the ability to engage with individuals and groups of pupils. However, in participants’ responses, there was no reference to other stakeholders such as staff or parents, or any external stakeholders.

While participants’ educational values, and their teaching and learning practices, were likely to be challenged both directly and indirectly through policy initiatives and accountability, participants showed more attention to micro-level factors such as
personal competencies and less to macro-level factors (Bronfenbrenner and Ceci, 1994) such as the social environment and increased demands and policies exerted on the teaching profession that can foster or diminish resilience. Lack of significant relationship between the increased policy demands and teacher resilience in participants’ responses could be explained by the fact that participants were pre-service teachers, who had not yet knowingly experienced the policy demands and increased accountability (Peixoto et al., 2018) imposed on teachers by policy initiatives.

Understanding the factors and processes that contribute to developing resilience amongst participants involved engagement with a complex and challenging process. Whilst I used the findings from phase one to explore participants’ perception of resilience, it seemed unlikely that participants’ perceptions of resilience could be described by a single aspect, rather it was likely to be characterised by multiple, possibly inter-connected, aspects that participants could draw upon in their everyday practice. Furthermore, what were deemed the most important aspects of resilience could be seen to differ amongst participants depending on their particular environmental context and type of challenge, or their perceptions of the challenges (see Gu, 2018). Nonetheless, awareness of the importance of exercising everyday resilience was a common theme in the participants’ responses (Day and Gu, 2014).

During the first phase of the research, the most common aspects reflecting participants’ understandings of resilience were the professional aspects. Given that many participants described a resilient mathematics teacher as one who was prepared to explain a concept more than once and in different ways, it seems the description of a resilient mathematics teacher involves a specific set of professional aspects unique to mathematics due to the more abstract and complex nature of the subject, along with the way mathematics is taught in schools (Nardi and Steward, 2003). In contrast with professional resilience, the least frequent aspects of resilient mathematics teachers, as suggested by the participants, comprised social and physical resilience. Given that teachers’ work involves interaction and relationships with pupils and colleagues, it was surprising that the social aspects of teaching were least frequently mentioned. Social support from colleagues and family has been thought important in teacher
resilience (Day, 2008), yet building support and help-seeking were only mentioned by a small number of the participants on the mathematics pre-service programme.

These findings are similar to other empirical research that relates the issues with social resilience to the career stage; for example, literature suggests novice teachers are less likely to seek help as they fear this may be interpreted as weakness or lack of professional competence (Le-Cornu, 2013). This can be an aspect particularly relevant to mathematics teachers with a high proportion of introvert personality types (Per and Beyoğlu, 2011), who can potentially be, on average, more socially anxious and self-sufficient than the rest of the pre-service cohort. Literature suggests that introverted individuals tend to be independent and feel empowered knowing that they can manage the challenges and difficulties of the profession on their own (Per and Beyoğlu, 2011). While this level of independence can, at times, support introverts into becoming highly successful people, the tendency to be “quiet and self-sufficient” can be anti-resilient, by which I mean hindering teachers from developing certain aspects of resilience such as social, professional and emotional resilience, which can be developed collectively via engagement in a community of practice. The efforts to influence pupil learning through teaching one’s best on a daily basis are considerable, and, in order for teachers to grow and sustain their passion and commitment, beginning teachers themselves will need support because they are in the early phases of their professional learning lives and demonstrate different levels of capability, commitment and resilience compared to more experienced teachers (Day et al., 2007).

The comments from participants also suggested there may well be additional aspects of resilience that are unique to novice teachers or mathematics specialists. For example, aspects such as ability to regulate emotions so as to “help and care about their students’ development even if their students no longer seem to care”, stated by 8 participants, or “patient when students struggle with mathematics”, highlighted by 2 participants, or the most frequent response “the ability to explain a concept more than once and in different ways”, do not feature in most teacher resilience literature. While there are so many different, but correct, ways of thinking about mathematics and 'doing mathematics', teaching mathematics using different methods and listening to pupils’ unique perspectives, not disregarding alternative approaches, has long been a challenge faced by mathematics practitioners (Drury, 2018). Nardi and Steward (2003)
argue that if teachers are to engage more pupils in mathematics, they need to exploit these different routes to tease out the one that piques pupils’ interest. That is, to retain the integrity of the subject alongside respecting pupils, so mathematics is not a ritual of symbol manipulation but is given meaning as a growing capability. It may be that aspects such as the importance of finding an effective mathematics pedagogy are particularly important to the teachers in our sample in the English context due to historical issues with teaching and learning of mathematics in schools; the data suggest, however, that more research investigating the influence of effective mathematics pedagogies on teacher resilience in a non-English context would be beneficial.

5.1.2 Sub Question Two

What challenges do teachers of mathematics face in their pre-service year? What factors and strategies do they identify as helpful for developing teacher?

The interview questions investigated the types of challenges participants faced and the strategies they employed to overcome their personal and professional challenges in the pre-service year. The aim was to illuminate what factors and strategies participants perceived as contributing to their resilience. As indicated by the literature review, the findings related to research sub-question two revealed a wide range of factors and strategies used by the participants to overcome the daily challenges of the teaching profession (see Beltman, Mansfield and Price, 2011). The findings from the interviews affirm the multifaceted nature of teacher resilience depending on a range of personal, professional, and contextual factors.

5.1.2.1 Professional Challenges and Strategies

Participants stated professional challenges as having the greatest impact on their pre-service year. While challenges related to behaviour management and teaching practice were amongst the top three challenges in this category (see section 4.3.1), behaviour management was the most cited challenge, stated by eighteen participants. This finding supports the pre-existing literature recognising behaviour management as a persistent source of concern and stress for beginning teachers (Melnick and Meister,
leading to issues with well-being and burnout (Gibbs and Miller, 2014), main reasons for those who decide to leave the teaching profession.

Classroom management and teaching pupils with SEND have been cited as major challenges for new teachers in studies reviewing the content of ITE programmes (see for example; Carter, 2015). These issues become more prominent with concerns being raised that the ITE programmes inadequately prepare new teachers to address classroom management and SEND, two challenging issues to fully grasp and address in a year-long programme (Carter, 2015). However, for the participants, the challenges related to teaching practice were not only limited to teaching pupils with SEND; there were wider issues such as pupils’ disengagement in mathematics lessons, pupils’ negative attitude towards the subject or pupils having mathematics anxiety. In addition, some participants felt their subject and pedagogical knowledge did not suffice to address pupils’ diverse learning needs; these participants then experienced lower self-efficacy in their teaching practice throughout the pre-service year.

While participants did not make connections between the challenges of class management and teaching practice, literature suggests that these two issues should not be investigated in isolation (Melnick and Meister, 2008). The interlink between classroom management and classroom practice demands a holistic view of this complex relationship; Melnick and Meister (2008) explore the issues around the dichotomy from the perspective of new teachers. The issues mainly stem from new teachers not necessarily having the knowledge, understanding or experience of the complex interrelationship between classroom management and classroom practice. This lack of knowledge and experience, therefore, resulted in participants isolating these two fundamental components of teaching and learning while trying different procedures and methods to improve their own learning (Melnick and Meister, 2008; Korkut, 2017).

Additionally, some participants, as evidenced by the comment from Kim, articulated the importance of consistency with following school behaviour policy to ensure improvement in their classroom management and teaching practice. The literature criticises ITE programmes in England for placing a heavy emphasis on implementing
rules and routines in the classroom, rather than encouraging new teachers to view the issue from a wider perspective (Carter, 2015). It argues that a broader contextual social-ecological perspective (Melnick and Meister, 2008) considering the differences between the socio-economic status of pupils, issues with inclusion, physical and mental development of adolescents at different stages (Carter, 2015), etc. should replace the current ITE curriculum, which concentrates on normal management issues or classroom rules and routines.

Participants’ narratives regarding challenges with classroom management included personal, professional, and contextual challenges in which participants described the impact of the context on their practice. Schools’ behaviour policies were perceived as either a barrier or a facilitator to effective behaviour management by some participants. Participants referred to their experience in two different settings during their school practicum and how each setting’s approach to class management influenced their expectations, abilities and skills to deal with challenges of class management. In participants’ narratives, there were frequent references to school’s behaviour policies and the importance of consistency in following and adhering to them to ensure successful classroom control through a managerial framework (Melnick and Meister, 2008; Wang, Odell and Schwille, 2008).

Nonetheless, some participants viewed this challenge from a different autonomous perspective rather than merely reflecting on school’s behaviour policy and classroom rules and routines. Jack, for example, emphasised the importance of building teacher-pupil relationships to address this issue while Levi exercised agency by seeking help from his mentor to manage this challenge. For Jack and Levi, experiences of teacher resilience occurred as a result of exercising agency (see Worth and Van Den Brande, 2020). Conversely, those participants who completed their practicum in a school where there was less focus on teacher autonomy and more on teachers following the behaviour policy prescribed by the school expressed a rather anti-resilient view regarding their challenges with behaviour management; for example, Sofia commented that “It’s just no-one can help. You can only- and you must deal with it yourself. Because I’m the only person that’s going to take the class.”
The findings suggest that most participants addressed issues with behaviour management from a behaviour policy perspective, whereas the literature encourages teachers to frame these issues around socio-economic, socio-emotional and socio-political perspectives too (Chaux, Molano and Podlesky, 2009; Hosokawa and Katsura, 2018). Recognising the complexity of classroom life, some participants used their agency, reframing their perspective to more caring teacher-pupil relationships by employing more personalised strategies to tackle issues with behaviour management; however, it was not easy for all participants to do so. While participants acknowledged that issues outside the school context could impact on pupils’ behaviour, this perspective did not provide a pragmatic approach to address class management issues, and schools did not always appreciate alternative approaches to their policy. Wang, Odell and Schwille (2008) criticise schools’ decontextualized approach to behaviour management, demanding new teachers conform through following school behaviour policy, not taking into consideration external factors impacting pupils’ behaviour. This supports previous literature indicating negative effects that teachers’ lack of autonomy can have on teachers’ job satisfaction and therefore resilience (Lam and Yan, 2011; Worth and Van Den Brande, 2020). These findings suggest that developing deeper understanding of professional issues and underlying causes, before investigating and implementing professional and relational strategies, may be a way forward.

Although a few participants associated issues with teaching practice in mathematics lessons with the nature of the subject – rather abstract with little or no relevancy to pupils’ real life, leading to negative pupil attitudes and disengagement (see Table 4-25) – most participants did not make links between effective planning and teaching and preventing behaviour issues. Nardi and Steward (2003) describe the issue with disengagement in mathematics lessons, often appearing in the form of off-task behaviour and low-level disruptions, as related to teaching methods that are tedious, isolated, elitist, based on rote learning and decontextualized. The impact of planning and teaching with pace and creativity on pupils’ behaviour has been widely acknowledged (Coe et al., 2014); however, sometimes good teaching cannot completely prevent behaviour issues occurring (Carter, 2015). Therefore, more attention to planning and teaching, while setting realistic expectations (Day and Gu, 2010) may be an appropriate response to ensure resilience in the face of professional challenges like behaviour management or teaching practice.
The literature suggests that pupil behaviour is a common reason why new teachers leave the profession (Barmby, 2006; Hudson, 2013). That said, while participants’ narratives suggested that low-level disruptions were common within their schools, some explicated their view that behaviour management could not be taught, and teachers needed to develop their own strategies. Lack of willingness to seek help dealing with this professional challenge was a theme identified in data collected from both interviews and qualitative questionnaires. Previous research on teacher resilience suggests that teachers can overcome their professional challenges in collaboration with other professionals (Le-Cornu, 2013). This is particularly important as teacher resilience can be learned in a school setting (Gu and Day, 2013). Although findings from the current research did not refute this claim, for some participants being self-sufficient and having traits of resilience were important factors in overcoming classroom management challenges. That said, considering the fluctuating nature of resilience (Day and Gu, 2014) and the role of temporal factors (Bonanno, Romero and Klein, 2015), it may be reasonable to suggest that participants’ resilience was not stable throughout the year and that they experienced different levels of resilience at different time periods; this could have potentially influenced their mindset regarding the nature of resilience and whether it is fixed or not.

In summary, the findings show that in some instances there was mismatch between participants’ views on effective behaviour management and evidence-based research. Nevertheless, participants’ narrations describing their strategies to overcome issues with behaviour management match Unger’s (2004) interpretation of resilience as individuals’ self-constructions of resilience whereby participants employ different sets of strategies to overcome challenges depending on their interpretation of the circumstances. Responses from participants suggest that, while not all participants felt confident with behaviour management at the end of the year, they used two types of strategies to overcome this challenge: the academic actions including gaining experience, trying many different strategies, consistency with implementation of school’s behaviour policy, getting advice, critical reflection, recruiting support and attending CPD sessions as well as relational actions such as building relationships with pupils through understanding the causes of poor behaviour and empathising with pupils. Research such as that by Carter (2015) agrees that behaviour management is not straightforward with simple answers; however, Carter argues that more practical
and specific advice on managing behaviour and what strategies are likely to work can be a way forward. Korkut (2017) concurs with Carter’s (2015) recommendations, stating that with more experience, pre-service teachers can adopt more flexibility and autonomy into their planning, which can lead to improvements in classroom management.

Fifteen participants indicated teaching practice was their professional challenge. The types of challenges comprised lack of experience, lack of subject knowledge, lack of knowledge of pedagogy and curriculum, lack of contextual resources and teaching lower attaining groups. Participants’ responses indicated consistent patterns regarding challenges related to catering for the different needs of pupils with a wide range of abilities. Some participants, for example Megan, attributed this challenge to pressure and expectations from the mentors to ensure pupils’ progress. Korkut (2017) argues that presence of mentors in classrooms observing pre-service teachers to give feedback on performance can potentially affect the nature of observed lessons by making them focus on the competence of the new teacher rather than teaching the pupils. This issue can be linked to resilience from two standpoints: first, pre-service teachers’ restrictions in the exercise of agency while trying to show mentors their professional competence and, second, assessing new teachers’ professional competence against the Teachers’ Standards (see section 2.5.4.2) shifting the focus from processes of learning to outcomes for the new teachers.

Participants’ narratives regarding their professional challenges gave significant attention to areas of Teachers’ Standards framework for schools in England (DfE, 2013). There were frequent and explicit references to the standards in participants’ narration of professional challenges. Conversely, challenges not detailed in the Teachers’ Standards framework received little or no attention; for example, lack of professional networks in school settings was not mentioned as a challenge by participants. Although the majority of participants’ responses that included descriptions of professional challenges were limited in richness beyond the Teachers’ Standards framework, literature suggests that such a mandatory and generic framework limits teachers’ autonomy and flexibility (Fletcher, Walker and Boniface, 2013) by drawing attention to assessing teachers against standards rather than more
contextualised applications of the framework in order to create more opportunities for teacher autonomy, which can potentially facilitate teacher resilience.

Lack of subject knowledge and teaching pupils with SEND were amongst other professional challenges stated by participants during interview. Adam and Dana felt their subject knowledge was insufficient for teaching pupils with different learning needs. Coe et al. (2014) propose acquisition of subject knowledge as one of the main characteristics of good teaching; the authors argue that when teacher knowledge falls below certain levels, it is a significant impediment to pupils’ learning (Coe et al., 2014). Although the impact of teachers’ content knowledge on their teaching practice cannot be denied, research on relations between teacher subject knowledge and teacher resilience gives further insights into this aspect of teacher resilience by providing useful directions for supporting teachers. Since previous research indicates that perceived professional mastery positively impacts on teachers’ self-efficacy and therefore resilience (Chiong, Menzies and Parameshwaran, 2017), perhaps ongoing subject knowledge training during the pre-service year can be useful in helping new teachers boost their self-efficacy and resilience.

There were specific references to a lack of required subject knowledge and skills to teach lower attaining or pupils with SEND in participants’ comments reflecting on their teaching practice. Participants felt that teaching lower attaining and SEND pupils was uniquely challenging to mathematics teachers, due to the challenging nature of the subject and inter-connection between different areas of mathematics making it difficult to teach new concepts when prerequisite concepts have not yet been mastered by pupils. The literature recognises challenges with implementing inclusive teaching; however, it argues that good teaching for SEND is good teaching for all pupils (Carter, 2015).

While participants shared understanding of challenges with teaching lower attaining and SEND pupils, they often struggled to articulate responses to this challenge. A concern related to this can be linked to fixed-mindset and anti-resilient beliefs about pupils’ ability in mathematics. Promoting growth mindset regarding pupils’ academic abilities (Yeager and Dweck, 2012), educating new teachers in differentiated instruction to help with diverse abilities in the classroom and more field experiences
with focus on inclusive education may prepare beginning teachers better for working with all pupils (Carter, 2015). However, arguably, this involves equipping pre-service teachers with deep knowledge and understanding of school context due to context-specific nature of issues related to inclusion.

When asked to discuss their strategies to overcome challenges with meeting pupils’ diverse learning needs, Alex, Megan, and James used descriptions of situations where they believed they had used effective pedagogy. Participants discussed developing good relationships with pupils, lesson observations, recruiting support, having good lesson plans and engaging in reflective practice, actions which all have been categorised as attributes of good teaching (Coe et al., 2014). The critical point in the participants’ narrative was strong personal agency regarding recruiting support (Le-Cornu, 2009), in addition to recognising context-specific challenges such as teaching lower attaining pupils, responding to context-specific challenges by employing a variety of strategies.

Dana made comments regarding the new mathematics curriculum and challenges related to the teaching of new content; she made frequent reference to lack of confidence in teaching the new content because she had not been exposed to this curriculum as a pupil. Choi (2003) criticises simultaneous introduction of multiple reform initiatives for creating a huge burden on teachers, particularly those new to the profession. Danas’ lack of confidence with teaching of new curricula could potentially lead to over-work and lack of coping skills (Lam and Yan, 2011); nonetheless, Dana in her narrative emphasised the importance of adapting to demands of new curriculum and educational pedagogies (Grenfell, 2012). Questions, however, remain as to whether new teachers can retain their autonomy and sense of ownership while constantly being observed and monitored; the literature argues that this can lead to feelings of lower autonomy, unsettledness and alienation (Korkut, 2017). Evidence of such feelings can be found in comments from Megan regarding the requirement for her to conform to the teaching style desired by her mentor.

In order to overcome teaching practice challenges, participants used a variety of approaches to develop professional mastery through peer observations, co-planning, team-teaching, simplified planning, gaining more experience with different teaching
groups, lesson observations, small group teaching, sharing resources, reflection and adapting teaching strategies to cater for the needs of pupils from a wide range of backgrounds (see section 4.3.2). Evidence from research suggests that behaviours exhibited by teachers such as taking CPD sessions, or reflecting on and developing professional practice in collaboration with colleagues, are characteristics of effective teaching practice and mastery (Coe et al., 2014). Higher academic and professional mastery has been cited as a major indicator for resilience in literature (Garmezy, 1985). Similarly, teacher resilience literature postulates that perceived professional mastery acts as a major protective factor for teachers staying in the profession (Chiong, Menzies and Parameshwaran, 2017). Despite clear connections between professional mastery and resilience, little research exists on practical strategies for developing professional mastery of pre-service teachers within given contexts.

Although ten participants indicated academic skills were their professional challenge, only two responses were collected regarding strategies to overcome this challenge. Joseph attributed this challenge to high demands of academic modules and university assignments while being on full-time practicum. Levi explained it from the perspective of natural science graduates new to modules and assignments in the field of social science; however, not all participants were willing to invest time in attending the academic writing sessions at university. Compared to the professional demands of practicum, most participants viewed academic demands as their second priority, to engage with during school holidays. The challenges related to the need for new teachers to constantly re-position themselves to the demands of being postgraduate students and novice teachers (see Beutel, Crosswell and Broadley, 2019) emerged from narratives. In addition, participants linked demands of the academic side of the programme with heavy workload, which was found stressful when participants felt inadequately prepared for the academic demands of the Masters level modules.

Seventeen participants reported workload created by combinations of school practice and university work as another professional challenge. The transition between being students on university days and teachers on school days was found to create heavy workload. Each role involved different sets of expectations and identities requiring participants to respond to the demands of each role. Previous research on teacher resilience shows that despite the differences in the type of challenges faced by teachers
in different career stages, both pre and in-service teachers experience issues with time constraints and workload (Melnick and Meister, 2008; Gu, 2018). Coupled with the high demands of practicum, the participants felt the ITE programme added to the workload.

While it appears that currently there is no magic fix to resolve issues with teachers’ workload, the data suggested that participants strived to manage the demands of their workload by employing strategies such as negotiating practicum workload with mentors, improving time management and organisational skills, and recruiting support. Participants’ narratives suggested that they entered the profession expecting heavy workloads, with some participants using different strategies to manage workload rather than attempting to reduce it. Kim’s narrative considered heavy workload as an intrinsic component of teachers’ professional identity, explaining her strategies to manage it by working outside school hours. High workload is one of the most commonly cited drivers for teachers leaving the profession and dissuading potential new teachers from joining (Hobson et al., 2007; Struyven and Vanthournout, 2014).

Stacey commented that addressing issues with heavy workload initially involved her exercise of personal agency for maintaining work-life balance. This is consistent with literature encouraging teachers to use agency in protecting their well-being and to challenge all practices and processes established through custom rather than evidence of what works (Greer and Daly, 2019). Nevertheless, (drawing on participants’ experience) demands regarding reduction in workload can sometimes be interpreted by schools as lack of commitment or unwillingness to work hard.

To conclude, although professional experience has been cited as both the most significant and most stressful element of the pre-service year (Gray, Wright and Pascoe, 2017), the findings suggest that teachers’ development of professional resilience can serve as a buffer, leading to further development of teacher resilience (Peixoto et al., 2018). However, this cannot be achieved unless teachers engage with exercising agency, employing practical strategies (Castro, Kelly and Shih, 2009) to overcome professional challenges while critically reflecting on professional identity and behaviour, a vital skill for developing professional competency (Belknap, 2012).
That said, data from this research shows that while new teachers are more at risk of lower personal agency and autonomy (Korkut, 2017) compared with more experienced teachers, help-seeking and using more direct coping strategies, in an adequate and timely manner, can help novice teachers develop further resilience.

5.1.2.2 Motivational Challenges and Strategies

Although only seven participants spoke about motivational challenges, losing motivation in the face of challenges was reported by three participants; however, their narratives suggest that this was a temporary feeling. This challenge mainly stemmed from, first, mismatch between personal values and teaching reality, as in the comment from Jack that he was not prepared for the difference, and second, negative feedback from mentors. Fran, for example, explained that she was affected by negative feedback after being observed by her mentor. The responses from participants that discussed strategies and situations to maintain motivation included altruistic motivation, realistic expectations and trying to stay positive (see section 4.3.2).

These findings are consistent with the literature citing mismatch between expectations and reality as motivationally challenging for pre-service teachers (Day and Gu, 2014). The dissonance between ‘the idealistic situation’ and ‘the realistic situation’ can be stressful and unsettling to those individuals who do not have necessary skills and experience of reflexivity to resolve these conflicts to yield positive outcome (Grenfell, 2012). When participants (see comments from Dana, Levi and Sarah in section 4.3.3.2 and 4.3.4.2) were able to use reflexivity to address this challenge through participation in shared reflective practice with other professionals including peer pre-service teachers, alteration of participants’ practice was one of the outcomes experienced by the participants (Grenfell, 2012).

Participants stated that the collaborative reflexive practice was useful in developing their social capital; it also encouraged them to exercise agency, reshaping their personal, professional and contextual identity (Day and Gu, 2014). Helen, for example, was reluctant to discuss her own influence on field practice through changing norms and practices in the field; however, her narrative suggests that she was not solely the passive recipient of school culture; this relationship was bidirectional with
her influencing and being influenced. An example of this was captured in her narratives of times she experienced conflicts between personal, professional, and contextual identities: she struggled with building positive relationships at her practicum. Helen’s effort to address the challenge by inviting teachers in her department to a coffee break could potentially lead to teachers in her department questioning some aspects of the adopted school culture in areas such as teacher well-being and workload.

Perfectionism created by the culture of so called ‘outstanding practice’ in school was another challenge faced by participants. The narratives suggest that participants’ inner dialogue – taking time to have self-dialogue about realistic expectations – as well as advice from other professionals assisted them. Accepting the reality that teachers are a finite resource at risk of burnout made participants realise that “good enough is good enough” as Stacey commented. Analysis of narratives within this category suggests that participants who had anticipated challenges of the teaching profession were able to address motivational challenges more optimally. These participants relied on intrinsic and altruistic motivations (Heinz, 2015) to remain positive despite daily challenges of teaching, as illustrated by Jack’s comment.

5.1.2.3 Emotional Challenges and Strategies

Participants’ challenges within this category comprised emotional responses to challenges, such as relationships with pupils or mentors’ negative feedback, leading to rumination and self-criticism. Some participants, evidenced by comments from Levi, Laura and Shirley, recognised forces of socialisation (Le-Cornu, 2013) and made efforts to address emotional challenges through receiving support from family, peers and mentors. However, this was not the case for all as some participants feared that help-seeking may be a sign of weakness or lack of independence. These findings are consistent with previous research indicating that many new teachers are reluctant to seek help (Castro, Kelly and Shih, 2009). The notion of anti-resilient behaviour, however, perhaps can be linked to either participants’ personal beliefs regarding their abilities to manage challenges independently or organisational cultures at schools discouraging help-seeking.
Participants commented how discussions of feelings with mentors, friends, family, as well as self-dialogue to appraise emotionally stressful situations, helped them to recognise and manage feelings and emotions. This is consistent with literature suggesting that, for teachers, learning to recognise and manage emotions through interactions with others is one way to develop coping strategies and emotional resilience (Tugade and Fredrickson, 2004; Le-Cornu, 2013). Nonetheless, not all participants were willing to discuss emotionally challenging situations with other professionals at work; for some participants, being professional meant keeping those struggles to themselves. For example, family and friends were who Shirley and Laura turned to at emotionally challenging times. Moreover, the power of self-dialogue in which participants raised self-awareness was recognised by some participants as effective in dealing with emotionally challenging situations.

Levi, for example, received support from his mentor when he faced a pupil who was disrespectful in his lesson. It is clear from evaluations that, where participants were able to establish trusting, mutual respectful relationships with other professionals, this enabled them to feel more empowered in overcoming emotional challenges. Previous literature has recognised the overwhelming emotional experience of new teachers (McNally and Blake, 2010) and the intense and debilitating journey that some experience. It is because of this that novice teachers’ relationship with other professionals play a significant role in developing resilience. The new teachers’ relationships with other professionals, therefore, can help them recognise and manage undesirable feelings such as fear, anger or disappointment (Tugade and Fredrickson, 2004).

Looking at challenges as learning opportunities rather than threats, showing empathy with challenging pupils (Wang, Odell and Schwille, 2008) and depersonalising challenges by speaking to peers and witnessing other peers going through similar challenges helped Jack and Naomi step back and reflect on their own experiences. Participants who appraised stressful situations as challenges rather than threats (Lazarus and Folkman, 1984) used direct coping strategies to address and overcome challenges by employing personal and contextual resources. Kim, for example, indicated that the challenges motivated her to utilise her resources; she was confident in her ability to overcome the challenges with the help of her professional network.
Palliative coping strategies (Parker and Martin, 2009), on the other hand, such as taekwondo lessons taken by Stephen, were used to alleviate stress that stemmed from challenges. Stephen decided to switch off from work to manage emotional difficulties when he felt his relationship with his mentors was exhausting him. The problem with stress worsened when demands exceeded perceived resources. The imbalance between demands of teaching and resources (Lazarus and Launier, 1978) led to extra stress and burnout for three participants, leading to decisions regarding working part-time or in less challenging settings after the pre-service year.

5.1.2.4 Social Challenges and Strategies

Lack of support and feelings of isolation, troubles with building relationships, family-related issues, negative past experiences with help-seeking and reluctance to seek help were amongst social challenges faced by participants (see Table 4-25). While for Daniel negative experiences with building relationships in his first practicum (see section 4.3.1.8) resulted in his reluctance to seek help, Stephen feared that help-seeking could be interpreted by others as a sign of professional weakness (Le-Cornu, 2013). This was in addition to other underlying reasons for reluctance to seek help; Fran, for example, called herself a reserved teacher who would struggle to approach others for help. This finding is consistent with literature suggesting that building social networks can be particularly challenging for mathematics teachers who are more likely to be introvert personality types (Per and Beyoğlu, 2011). Including instruction and activities that encourage new teachers to view help-seeking strategies as an essential attribute of a resilient teacher (Eldrige, 2013) and developing reflective capabilities can potentially help ITE programmes and schools address this challenge.

Participants’ responses indicated that building relationships and help-seeking were strategies employed by those participants who considered themselves very resilient; an example of this can be found in Levi’s comment considering himself both sociable and very resilient. Levi viewed mentors’ support and advice as important in dealing with challenges. This finding supports previous literature identifying good interpersonal skills as essential for resilient teachers. Hernandez-Martinez and Williams (2011) argue that a socio-cultural framework, emphasising impact of social skills and development of social capital on individuals’ resilience, should replace the
traditional resilience framework focused on the personality traits of resilient people. Similarly, Beltman, Mansfield and Price (2011) describe how the definition of resilience has been reframed to include external social factors such as interpersonal skills, school culture and environment. As such, Le-Cornu (2013) posits that development of resilience requires teachers’ engagement in a social practice in which, through a bi-directional relationship, teachers build their self-efficacy by sense of connection and belongingness.

With teachers’ worlds being surrounded by well-defined sets of relationships with pupils, parents and other teachers, as evidenced by the comments from Dana, Megan, Laura and Levi, a supportive and collegial relationship between different stakeholders can promote teachers’ commitment and effectiveness, leading to development of resilience (Le-Cornu, 2013). While resilience resides in the context and environment surrounding individuals (Ungar, 2012), it needs development through teachers’ exercise of agency in interactions with the environment; for example, Stacey discussed how she was supported by her mentors when she used personal agency, speaking to her mentors about feelings of stress and anxiety when her university assignment was due.

5.1.2.5 Physical Challenges and Strategies

Similar to the results of the qualitative data at phase one of the research, physical resilience was only mentioned by a few participants as their main challenge. Lack of sleep, poor diet and lack of time for relaxation and rejuvenating activities were challenges stated by four participants.

These participants considered engagement with rejuvenation activities a coping strategy to recover from stress. The responses from Hannah, Dave, Kim, and Stephen indicated that this involved several different activities such as taking lunch breaks at school, healthy eating, doing sports, taking new hobbies, sleeping well and relaxation activities with family or friends. In addition to reducing stress, engagement with physical activities helped Dave reflect on his daily practice. These findings are consistent with resilience studies on the use of coping strategies to reduce stress and to maintain physical and mental well-being as indicators of resilience (Werner and
Smith, 1982). While participants felt that engagement with physical activities was essential for teachers in developing capacity for managing and regulating emotions, not all participants had time for such activities because they were either busy or too tired to engage; as Stephen and Kim stated, the school work was the priority.

The findings suggest that participants who considered themselves most resilient were those who benefited from engagement with sport as a regular activity after school. For example, for Levi, doing sport led to development of physical well-being; also for him, the physical strength was internalised as mental strength (Folkman, 2008) leading to higher self-efficacy and therefore higher perceived resilience. The physical activities acted as buffers against stress (Silverman and Deuster, 2014) leading to more effective emotional management.

5.1.2.6 Mathematics Specific Challenges and Strategies

The challenges highlighted by participants as specifically pertinent to mathematics teachers have been frequently stated in the research related to issues in mathematics education (Nardi and Steward, 2003; Watson and Dawes, 2017; Barton, 2018). These challenges can be categorised into two groups: cognitive and affective learning. For participants, challenges related to the cognitive domain of learning comprised teaching lower attaining pupils, differentiating lessons to cater for the needs of pupils with a wide range of abilities and issues with the nature of the subject, having to teach rules and definition of concepts that may lack immediate relevancy to pupils’ lives. Mathematics anxiety and pupils’ low mathematical self-efficacy, along with pupils’ disengagement and negative attitude towards mathematics, were challenges falling into the affective domain of learning.

While participants adapted their teaching to cater for pupils’ different needs, strategies to adjust teaching methods were not always perceived as successful by participants because successful teaching involved making connections between previous and current learning. Since lower attaining pupils did not have the prerequisite knowledge to make meaningful links between previous and new learning (Drury, 2018), teaching new concepts became a major challenge, leading participants to feel less self-efficacious in their ability to teach lower attaining groups. Implementation of the
growth zone model (Johnston-Wilder et al., 2013), more pupil collaboration and group work (Swan, 2006) and creating a supportive classroom environment (Johnston-Wilder and Lee, 2010) have been cited in literature to address affective issues with learning and some participants, as evidenced by Sarah’s comments, implemented some of these strategies into their practice.

In summary, findings from interviews illustrate that participants used various strategies to overcome challenging situations; these include:

- developing professional mastery through gaining experience and with support of their personal and professional network;
- retaining a positive teacher identity through ongoing discussion involving successful negotiation of teacher identity in reflective practice;
- emotional management and regulation of emotions;
- social competence through building relationships and help-seeking;
- taking up physical activities as a direct or palliative coping strategy;
- managing workload and maintaining work-life balance.

The findings from research question two suggest that when notions of what it meant to be a competent teacher conflicted with the actions that were needed to facilitate teacher resilience, it was possible that participants were less likely to cope successfully with challenging situations as evidenced by the comment from Stephen regarding the termination of his practicum due to high stress and anxiety. For Stephen, the need to feel competent reduced his experience of resilience.

The wide range of challenges and strategies stated by the participants to answer research question two affirms that understanding teacher resilience as multifaceted and relational is crucial for sustaining teacher quality. In addition, these findings suggest implications for pre-service programmes through future thinking on processes involving resilience building, so that new teachers can increase resilience in various settings considering the uniqueness of each setting (Ungar, 2004) while facing multiple daily challenges of teaching. The findings from research question two suggest that resilience needs to be nurtured in context (Gu and Day, 2013), through interaction between teacher and environment.
5.1.3 Sub Question Three

What was the impact of the interventions implemented in this research on teacher resilience?

I collected data from the TRS scale, semi-structured interviews and observations to answer research sub-question three.

Quantitative Questionnaire- TRS Scale

Analysing the results of the TRS scale to evaluate the impact of the interventions on participants’ resilience, the mean score of overall resilience improved significantly (p<0.05) at the end of the intervention. In addition, the post-test results showed slight, non-significant improvement in professional, spiritual, and emotional aspects of resilience (p>0.05), whereas motivational, social, and family cohesion aspects increased significantly (p<0.05). Since there was no control group to evaluate whether these results were related to the interventions, I used interviews and observations for triangulation. The findings from both interviews and observations match those of the TRS scale; participants’ perceived social resilience improved by the end of the interventions; that said, encouraging participants to develop personal and professional networks, using relational links to seek help and receive support, was a theme embedded in each intervention session. Reflecting on the intervention programme, participants’ higher scores in the social aspects could be related to the nature of the intervention programme, which focused more on developing participants’ resilience in social settings. In addition, increase in motivational aspects could be linked to the impact of the interventions or the timing of the final TRS measurement, which was conducted in the final weeks when the majority, if not all, of the participants had already secured teaching positions in secondary schools.

While modifying the interventions to equally focus on all aspects of resilience can be a way forward, it should be noted that the decrease in the emotional resilience at post-test might be associated with participants’ experience of various professional and academic challenges including external lesson observations and university assignments during final weeks of the pre-service programme. Beltman (2015) argues
that exposure to multiple challenges can result in individuals’ depletion of resilience; hence, perhaps it would be reasonable to suggest that participants’ perceived resilience was affected by their experience of multiple simultaneous challenges.

Moreover, it is worth noting that participants’ perceived resilience could have been affected by a wide range of other factors; for example, the temporal factors related to the ITE programme need to be taken into account as an external factor having impact on the perceived resilience of participants (Bonanno, 2005). I conducted the post-test during the final weeks when participants had multiple summative assessments such as academic essays and professional practice assessments. Such external factors could have impacted on participants’ perceived resilience; this is why studies investigating the process of resilience building should consider the relational and context bound nature of resilience (Day and Gu, 2014). Literature suggests that understanding factors and processes that help individuals build resilience requires examination of these factors and processes over time (Bonanno, Romero and Klein, 2015). A temporal framework for understanding resilience in the context of the current research was particularly important in order to explore the interactions between challenges and protective factors identifying what internal or external factors facilitated resilience-building processes at a particular time during the research.

The score for the spiritual aspect was lowest at all stages of the tests; this could be related to the questions measuring this aspect of resilience; for example, the question ‘Sometimes fate or God can help me overcome my challenges.’ might yield different results with a sample of teachers from countries where there are larger populations of religious people. Another factor which could have had impact on the average score for each aspect of resilience was the uneven number of questions related to each aspect of resilience; for example while there were only three questions to evaluate participants’ spiritual resilience, there were eight questions falling into the social aspect of resilience which meant that the average for the spiritual resilience could be more skewed by participants’ higher or lower scores in one question compared to the social resilience. This needs to be taken into consideration in future research splitting the TRS score of participants into various aspects of resilience.
The results for physical aspects of resilience showed improvement at post-test; however, there was no consistent pattern of increase from mid- to post-test. Using indicators for physical resilience, at post-test, sleeping well and good diet was stated by 64% of participants in comparison to 56% and 40% of participants stating good sleep patterns and regular exercise, respectively. I explored these results further through interviews; participants stated that they had no or little time for exercise during the year. The combination of academic and professional demands left little or no time for participants to engage with physical activities. Participants were aware of interdependence between their physical and mental well-being and, while physical health was perceived as important by participants, they were also aware of risk to their mental well-being if they fell behind with work. Hence, most participants preferred to use after-school and free time to manage and complete work to protect mental well-being through reducing stress caused by heavy workload. Poor sleep patterns were another issue faced by participants. The heavy workload and stress related to university assignments were mentioned by participants as factors associated with poor sleep patterns; however, another factor could be linked to schools’ long hours; participants had to leave home early to arrive at work early avoiding the rush hour and to prepare lessons and print resources before pupils arrived.

There was a slight non-significant increase in perceived professional resilience of participants at post-test. The four questions assessed participants’ self-efficacy, ability to adjust to changes and abilities to use direct coping strategies in the face of challenges. Although most participants scored higher in ability to adapt to changes, they scored lower for questions assessing their self-efficacy and ability to use direct coping strategies to overcome challenges. This finding is consistent with research showing that beginning teachers have lower self-efficacy in comparison with more experienced teachers (Day, 2008). The challenges with professional aspects, including participants’ lower self-efficacy in teaching practice and class management, were later captured in participants’ one-to-one interviews: most participants commented that professional challenges were their main challenge during the pre-service year.

Further data analysis to capture differences in the TRS scores between female and male participants showed that the mean score for female participants was lower at all stages including pre- and post-test (see section 4.2, Table 4-24). These findings are
consistent with literature indicating gender difference in self-efficacy between men and women, with females holding on average lower expectancies for success and self-efficacy compared with male counterparts in STEM subjects (Chen, 2015). Good, Aronson and Harder (2008) argue that societal stereotyping, that men hold higher mathematical competences and problem solving skills, leads to women’s lower performance in mathematics; this in turn can result in women’s lower self-efficacy in the subject. There is also evidence that women’s lower self-efficacy, lack of confidence in ability to study STEM subjects, leads to less motivation amongst women to study STEM programmes (Chen, 2015).

Reflecting on the use of Likert-scales to measure change in participants’ perceived resilience after the interventions, taking the mean of ordinal data perhaps was not the best way to capture change because values in Likert-scales do not necessarily change in a linear fashion. For example, while the numerical difference between ‘strongly agree’ and ‘agree’ is ‘one’ ordinal value on the Likert-scale, quantifying the difference between these two statements can be problematic as the difference depends on participants’ perception rather than the assigned numerical values on the scale. While I decided to address this issue by calculating ‘statistical significance’ on changes after the interventions, for future research using the TRS, instead of using Likert-scales, I may assign only numerical values on a continuum using a wider range of values. The alternative approach to using the Likert-scale could be calculating the difference in the TRS scale for each participant rather than calculating means. Nonetheless, one reason for not taking this approach for the current research was to ensure the anonymity of the TRS scale; calculating the difference in TRS score for each participant involved conducting the scale in a non-anonymised manner, which could impact on participants’ willingness to provide truthful answers.

**Semi-structured Interviews**

The interview questions provided further insights into impact of each intervention session on participant’s use of practical strategies to overcome challenges. While all participants recalled strategies introduced in the interventions, there were variations in use of the strategies with some participants modifying the strategies introduced in the intervention sessions to make them suitable for their needs and context.
The sessions with the theme ‘Building Resilience’ aimed to introduce the theoretical framework, rationale for the interventions, and importance of exercising agency in developing teacher resilience. Responses provided an inconsistent pattern as to whether this intervention had a positive impact on participants’ development of resilience or not; for example, Dana stated that learning the theory on its own did not lead to building resilience, whereas James commented that this theme prepared him to experience resilience. This study found that resilience was enhanced when the participants were able to retain a strong sense of personal agency (Bandura, 2000), exercising control over their thoughts and actions working through the uncertainties of their new teaching roles. For example, Dana commented that building resilience could not be achieved unless individuals exercised agency applying the theory introduced in the interventions into their practice.

Most participants explained how the ‘Reflective Practice’ sessions helped them de-stress and feel reassured that other pre-service teachers also experienced similar challenges. Naomi and Shirley’s responses, for example, illuminated how the collaborative reflective practice taking place at university fostered resilience by building self-efficacy (Bandura, 1997) through vicarious experience (comparing their performance with peers and realising that others experienced the same types of challenges). Discussions with other participants provided opportunities for a reality check in that Naomi and Shirley were able to confirm many of the same feelings and similar experiences; this resulted in developing their capacity to cope with new challenges (Gu and Day, 2007). Furthermore, Kim thought that the reflective practice in combination with the introductory sessions was useful in reassuring her about the temporary nature of the pressure and stressors (Bonanno, Romero and Klein, 2015) rather than pressure and stress being perceived as integral to the profession. Moreover, the reflective practice sessions provided opportunities for sharing good practice, in that participants, as evidenced by Sarah’s comment (see section 4.3.4.2), were able to develop strategies for professional practice within their practicum.

Responses indicated that the intervention session themed at ‘Connectedness’ raised nineteen participants’ awareness of the importance of having strong personal and professional connections in building teacher resilience. Hannah commented how the connectedness session helped her realise that developing resilience took place within
a community of practice with teachers adopting the mindset that help-seeking was crucial to building resilience. Positive relationships with the school community were perceived as an important element that increased likelihood of participants experiencing teacher resilience. Ample evidence from educational research affirms that social organisation of the school – including supportive, trustful and collegial relationships between different stakeholders – can foster teachers’ collective capacity, commitment and effectiveness and, therefore, can lead to developing and strengthening teachers’ professional identity and thus resilience (Sammons et al., 2007; Le-Cornu, 2013). Rory commented that he would not have successfully got through the year if he did not have a strong support network at school.

The relationships that participants developed with their relational links and other participants appeared to promote resilience by increasing self-efficacy, skills of critical and empathetic reflection, problem solving and coping skills, and feeling valued and appreciated in school (Mansfield et al., 2012), as evidenced by the comments from Kim, Rory and Stacey. Support from other peer pre-service teachers who had experienced similar challenges helped Sarah to reframe pre-existing thoughts, critically reflect and adapt teaching practice when necessary. Moreover, these relationships meant that participants were able to maintain positive feelings such as interest, enthusiasm, and trust through engagement in empathetic and non-judgmental relationships. Rory, for example, stated the empathetic relationship at practicum helped him develop his coping strategies, and successfully complete the pre-service year.

Building relationships helped participants with experience of social resilience; it also helped them manage and regulate emotionally challenging situations leading to emotional resilience; for example, Helen commented how building relationships and help-seeking during practicum helped her feel more relaxed. These findings are consistent with Ungar’s (2012) social ecological framework for resilience explaining how resilience building processes are dependent on individuals’ negotiation for resources associated with resilience; that is, for participants, other individuals’ in the community of practice, such as mentors and peers, made these resources available in meaningful ways. That said, participants’ narratives suggested that building resilience was dependent on the capacity of their social ecology as well as agency to facilitate
positive development at the time of challenges (Ungar, 2012). Hence, resilience was a shared quality of participants and social ecology.

Participants’ engagement in problem solving with relational links (Jordan, 2006a) assisted them in developing teaching resources and also their teaching practice as evidenced by comments from Hannah and Stacey. Additionally, the findings provided insights about the nature of professional support received from relational links. Participants particularly appreciated autonomy and sense of agency; they were actively engaged in problem solving rather than passively advised or guided by relational links (Le-Cornu, 2009). They were viewed as active participants in their own learning as well as being able to contribute to others' learning through sharing ideas and resources; for example, Stacey commented on participants’ active engagement in their WhatsApp group. Rather than struggling and pretending that everything was ok, participants used agency to engage with challenges, for example, Hannah commented how she perceived help-seeking as her first step in tackling professional challenges; Hannah felt that unless she asked for help, her colleagues could not know that she was struggling and needed support.

Although all participants engaged with the sessions on the use of ‘Growth Zone Model’, there were variations in the way participants used the model to manage emotions while facing challenges. Stacey employed the model when she found herself in the anxiety zone, whereas Adam felt adept at managing his emotions independently, not needing to apply the model. Adam stated that his resilience was stable and that he never experienced the red zone; in contrast, Stephen stated that his experience of the non-red zones was scarce during his pre-service year. Participants frequently used terms such as green, red, or orange zone to describe their feelings at the time of the challenges. James commented how recruiting support (Johnston-Wilder et al., 2013) at his practicum helped him to overcome emotional challenges while in the anxiety zone. In contrast, Shirley was reluctant to seek help at her practicum establishment and preferred to keep her emotional struggles to herself.

Kim adapted her use of the model to suit her needs: instead of taking a step back and stopping while in the red zone, she chose to work harder to overcome challenges. Conversely, for Levi, depersonalising challenges and going back to the green zone
was the first step in implementation of the growth zone model (Lee et al., 2018). For Levi, increasing self-awareness of the situation when experiencing emotional difficulties was the first step before recruiting support. Awareness of self and critical reflection along with recruiting support were found crucial to get out of the anxiety zone for Joseph. After going back to the green zone, moving to the challenge zone helped with participants’ personal and professional growth; that said, some participants rarely experienced the green zone, as stated by Joseph, throughout their pre-service year.

Sarah commented on feeling stifled in her first practicum as she was constantly in her green zone. This statement could illustrate the link between experience of struggle and development of resilience. While Sarah viewed experience of struggle as inherent in teaching, she felt that experience of the yellow zone would help her grow professionally. Paired up with self-efficacy, Sarah recognised the importance of growth mindset (Dweck, 2017; Yeager and Dweck, 2012) to respond favourably to professional challenges in order to experience growth and resilience. Fleer (2016) states that while individuals’ perception of the level of challenges can be different, it is important that individuals do not interpret challenges as an indication of weakness or incapability. Instead, attributing the causes of challenges to the context, rather than to limitations in their professional ability (Ungar, 2012), can assist pre-service teachers with emotional resilience. The comments from the participants illuminate how context can impact teachers’ experience of challenges; for example, contrast between Sarah’s experience in her first practicum constantly being in the green zone with that of Stephen and Joseph not recalling any green zone can be attributed to the role of context in the type of challenges faced by these participants.

Recruiting support was used by participants in the growth zone to avoid challenges turning into threats. This finding illustrates Johnston-Wilder et al.’s (2013) growth zone model, highlighting the importance of recruiting support in order to develop resilience. For Levi, a major result of recruiting support was developing empathy and dialogue leading to creation of a positive working climate when dealing with emotionally taxing challenges. Creating a positive climate potentially helped Levi develop his sense of belonging, a prerequisite element of individual motivation (Dewsbury and Brame, 2019). This is why encouraging participants to identify
relational links within schools was important from the outset to foster supportive working environments which promoted sense of belonging, considering isolation and reluctance to seek help as potential threats to growth.

Reflecting on participants’ engagement with the ‘Well-being’ sessions, a key thought process identified was participants’ tendency to prioritise professional resilience over physical resilience and well-being. Although participants appreciated the importance of maintaining well-being in teacher resilience, the actions within this category, as evidenced by Sarah and Stephen’s comments, mainly involved palliative coping strategies to alleviate pressure and stress caused by professional challenges. Literature associates physical activities that maintain good health and well-being with personal resilience (Werner and Smith, 1982). Individuals’ engagement with physical activities can strengthen resilience by inducing positive physiological and psychological benefits (Fragala et al., 2011), reducing stress reactivity and protecting against future threats through direct coping strategies (Parker and Martin, 2009). Nonetheless, participants’ comments suggested that they did not consider physical activities as direct coping strategies, rather indirect strategies to reduce stress and pressure caused by everyday challenges at school; for example, while Fran found the well-being sessions one of the best themes introduced in the intervention programme, she could not recall employing any strategies from this theme; Fran, instead, decided to engage with this theme over her summer holidays. Coming from a sport background, Levi was the only participant who regularly engaged with physical activities; he considered himself very resilient while attributing this resilience to his engagement with sport.

For participants, the importance of well-being and work-life balance became more apparent when workload increased during their second practicum. James, in his response, commented that the promotion of well-being and work-life balance in schools required exercise of collective agency (Bandura, 2000) where schoolteachers were also engaged with these intervention themes. In his narrative, Levi emphasised the importance of engaging with physical activities and maintaining work-life balance as direct coping strategies (Parker and Martin, 2009); however, he mentioned that he had been engaged with this prior to the interventions. Helen felt that, having parental responsibilities, the intervention themes raised her awareness of the importance of maintaining well-being and work-life balance. The impact of physical well-being and
work-life balance increasing individuals’ capacity to cope with professional challenges has been highlighted in the literature (Childs and Wit, 2014). Sofia, nevertheless, considered maintaining well-being and work-life balance insignificant compared to professional challenges.

Participants used a number of strategies introduced in the interventions for ‘Managing Workload’. While managing workload through compartmentalisation, time management and prioritising work based on deadline had impact on Shirley, Laura and Naomi’s ability to maintain work-life balance, managing workload for Hannah and Kim meant working longer hours to ensure that work did not pile up. Kim, for example, recognised her own weakness and vulnerabilities regarding challenges with accrued work, trying to adapt her toolkit of strategies for managing workload to suit her needs. Maintaining work–life balance has already been highlighted in the research studying resilient practitioners (Kinman and Grant, 2011; Grant and Kinman, 2012). Nonetheless, participants’ comments regarding the intervention themed as ‘managing workload’ indicated that they were more engaged with strategies for managing rather than reducing workload; for example, compartmentalisation to manage workload received a huge attention from participants meanwhile strategies such as sharing resources or asking for help to reduce workload, introduced in this intervention, received little or no attention.

Reflecting on participants’ engagement with strategies for ‘managing workload’, when the notion of what it meant to be an effective teacher conflicted with actions needed to experience teacher resilience, it was possible that participants were less likely to engage with strategies introduced in the intervention themed as ‘managing workload’. A final thought process from participants regarding interventions themed as ‘managing workload’ was their request to merge this theme with the online sessions themed as ‘well-being’ by introducing them earlier in the programme when participants faced heavy workload and pressure.

The responses from participants in this study show that participants experienced different types of challenges at different levels. This highlights difficulties in investigating resilience, especially as it may only be evidenced in contexts where challenges are present. At the start of the intervention, not all participants felt
comfortable or confident to employ the strategies introduced in the interventions. As the participants’ autonomy grew, they became increasingly aware of the importance of engaging with the strategies, at both personal and professional levels, as evidenced by comments from Hannah, Helen, Stacey and Stephen regarding exercise of agency to overcome professional and emotional challenges by help-seeking, building relationships and taking time off from work. The more experience they gained employing the strategies, the more the strategies became natural and habitual to them, to a point that a group of participants found themselves using them for solving problems outside the interventions, for example, some participants used the growth zone model to address their pupils’ mathematics anxiety. The interview narratives indicate that although most participants emphasised the role of personal agency in building resilience, at times, participants used proxy agency (Bandura, 2000) seeking help from more senior staff such as mentors or university tutors to act on their behalf to achieve desired outcomes such as taking a break from work at the time of emotional challenges or retaining class control when there were issues regarding authority or teacher-pupil relationships, as evidenced by comments from Levi and Stacey.

Resilience arising from nature rather than nurture was also identified as an important factor in teacher resilience by some participants; however, the notion of developing resilience in childhood or during previous life experiences, captured in interviews, indicates the growth of resilience in the past rather than possession of resilience as a personality trait. The findings from this research demonstrate strong connections between teacher resilience and the context (Gu, 2018) as participants consistently referred to context when describing challenges and experience of resilience. Nonetheless, for the research to gain further insight into participants’ interactions with challenges or setbacks in their given context, perhaps, a more in-depth understanding of challenges specific to each context would have allowed for further comparisons between these contexts.

Changes to Intervention Programme

Possible changes to the intervention programme were identified in interviews: more focus on personalised and context-specific strategies, more collaboration with school mentors and teachers, earlier interventions with more time, changes to the ITE
curriculum, and more sessions on development of professional skills were amongst the changes proposed by participants.

A key constraint on the intervention programme felt by participants was lack of involvement from schools: personalised strategies relevant to the context and the specific needs of participants could have been introduced in collaboration with school mentors and expert teachers. This has echoes of other research in the field (Day et al., 2007; Day and Gu, 2014; Beltman and Mansfield, 2018) that suggests that resilience studies should focus on the role of the context and interactions between teachers and environment. Participants felt that more involvement from new and experienced teachers could better equip them with the knowledge and experience they needed for developing resilience. This, in turn, could lead to alteration of practices in school; for example, participants felt that with more collaboration between ITE and school, it would be easier to raise awareness about the importance of well-being and work-life balance at an organisational level. Additionally, participants would have liked more well-being sessions that were accessible to all beginning teachers on the ITE programme, rather than just mathematics pre-service teachers. Another suggestion was for the ITE to address the challenges of attending well-being sessions held on campus: participants were unable to attend sessions that took place during practicum. In addition, embedding physical and rejuvenation activities at well-being sessions was another intervention change suggested by the participants. Nevertheless, participants spend nearly eighty percent of their pre-service year in their school placement; perhaps running future physical and rejuvenation activities requires school engagement too.

Supporting participants to maintain motivation while facing multiple challenges was another suggestion for improving the programme. Participants felt that reassurance from other pre-service teachers that everyone experienced struggles helped to increase self-efficacy through vicarious experience (see Bandura, 1997); however, losing motivation was an ongoing risk for those who faced multiple daily challenges (Day and Gu, 2014). In addition to the interventions, participants thought the ITE programme could give reassurance that challenges were ingrained in teaching and there was no quick or magic fix. While school leaders used various strategies such as organising end-of-term social events for teachers to celebrate engagement and success, there was no provision in the intervention programme for organising such events for
participants that could potentially help with maintaining motivation. This needs further exploration through both implementation and evaluation of the impact in future interventions.

Participants found the blended mode of delivery for the interventions useful; some participants thought that capturing face-to-face sessions and online access to sessions for those who missed previous sessions could have helped with engagement and continuity of learning. Although making resources available online risked lower engagement, it could foster participants’ autonomy (Kebritchi, Lipschuetz and Santiague, 2017), encouraging them to develop skills of self-regulated learning by identifying their learning needs and strategies to achieve learning goals (Luyt, 2013). With the intervention programme being focused on developing participants’ autonomy and sense of agency, it seemed relevant to design and introduce online themes into the intervention sessions.

More time for the interventions and a whole ITE approach to building teacher resilience were also suggested by participants. This finding is consistent with recent research suggesting implementation of teacher resilience modules in the ITE curriculum (Mansfield et al., 2015); however, while there are scattered sessions in the ITE curriculum to address issues with well-being and heavy workload of pre-service teachers, there is currently a lack of coherence in introducing and implementing teacher resilience modules in most ITE programmes. Pre-service teachers’ engagement with such modules can potentially develop knowledge, skills and experience of teacher resilience (Beltman, Mansfield and Wosnitza, 2018) by developing personalised toolkits suitable for their particular contexts.

Expansion of the intervention programme throughout the academic year as well as earlier and more reflective practice sessions with peer pre-service teachers and one-to-one meetings with the ITE tutors discussing challenges and possible strategies were other suggestions made to improve the intervention programme. Comparing this with the suggestion for more engagement with the mentors and schoolteachers to provide positive support shows that participants’ thought processes that facilitate teacher resilience involved engagement with professional and social networks, receiving support from peers, university and school tutors, mentors, and teachers. These findings
are in line with extensive literature discussing the role of social networks and support systems in developing teacher resilience (Le-Cornu, 2009; Doney, 2013; Beltman, 2015).

The importance of considering the timeline for the year is captured in some participants’ narratives. The temporal factor (Ungar, 2012) was taken into account while collecting data during the research period to avoid data collection during a peak or trough of the course when participants were under pressure or were on school holidays; however, there was a time constraint as both interviews and class observations were conducted towards the end of the course when participants experienced various summative academic and professional assessments. While a group of participants stated that the interventions needed to happen earlier in the course and be interspersed when pressures and workload were highest, this was not always possible due to clash between the interventions and the other professional and subject studies sessions scheduled by the ITE. On reflection, negotiating the timetable for future interventions with the ITE leaders should involve requests for earlier interventions using shorter periods of time for each session so the interventions could be spread throughout the year; this could potentially lead to more sustainable and continued engagement from participants.

One of the suggestions for the changes involved school experience and a taster week within school prior to the training year to give participants more awareness of existing professional and contextual challenges within teaching. While gaining school experience prior to starting the pre-service year is no longer a requirement for those applying to ITE programmes, participants thought that gaining school experience could help with raising awareness of challenges presented in teaching. Nonetheless, being in a school to observe practice might provide a different picture to gaining experience in a teacher role, as evidenced by Jack’s comment regarding mismatch between his expectations and the reality of his teaching practice in school. In addition, the context-bound nature of the profession suggests that experience can vary from one setting to another (Gu and Day, 2013); therefore, questions remain as to the extent such experience can help pre-service teachers develop contextualised understanding of challenges and issues around teaching.
Intention to Stay in Teaching

During interviews, all participants expressed willingness to remain in the profession despite the everyday challenges and setbacks of teaching. The findings suggest that, while most participants had secured teaching positions for their induction year, decisions about whether to stay in teaching were mainly influenced by experiences in the pre-service year. Reflecting on reasons for staying or leaving, participants discussed intrinsic and altruistic motivations, perceived professional mastery, schools’ culture, leadership support and extrinsic motivations for staying in teaching (see Table 4-30, section 4.3.5).

Eighteen participants identified intrinsic and altruistic motivations as reasons to stay in teaching. Participants’ intrinsic motivations mainly involved enjoying the profession and working with young people and the challenging nature of teaching. The altruistic motivations included teaching as rewarding, building relationships with pupils, and helping pupils make progress and become successful. The expectation that teaching will generate its own rewards through engagement in a socially meaningful profession could be found in participants’ narratives articulating motivations to stay. These findings are consistent with research showing that intrinsic motivations and altruistic motivations are the most important reasons for those entering teaching (Heinz, 2015). While there are interconnections between these two types of motivations (Cohen, 2009), findings suggest that love of teaching and enjoying the profession (intrinsic motivations) led to participants’ desire to help pupils progress (altruistic motivations). Day and Gu (2014) argues that not only are motivations for entering teaching mainly intrinsic, but also the rewards of teaching are often intrinsic and difficult to quantify.

In addition to intrinsic motivations, one participant highlighted ‘early career financial incentives for new teachers’ as one reason to stay in teaching. Although only one participant mentioned extrinsic reasons, the literature suggests that, longer term, school leaders and policy makers need to consider extrinsic rewards to encourage motivation and teacher retention (Chiong, Menzies and Parameshwaran, 2017). Research shows that for more experienced teachers, motivations to stay in teaching are related to both intrinsic and extrinsic rewards (Chiong, Menzies and
That said, the literature highlights extrinsic motivations such as pay or holidays as marginal reasons for entering teaching (Heinz, 2015). With teaching as high demand, low return, questions remain as to whether intrinsic and altruistic motivations would still be compelling reasons for participants to stay in teaching beyond early years of their career.

Twelve participants identified perceived professional mastery, including positive school experience, being good at teaching, positive previous teaching experience as a non-qualified teacher and opportunities for career progression, as their rationale for staying. This is consistent with literature suggesting teachers’ perceived ability in teaching is a prominent retention factor because of mutually reinforcing relationships with intrinsic and altruistic motivations (Chiong, Menzies and Parameshwaran, 2017). Operating in synthesis with these, perceived professional mastery helped some participants feel they were well placed to make positive differences through teaching. Nevertheless, teachers’ professional motivations are context and policy dependent (Day and Gu, 2014). As evidenced by participants’ comments regarding motivations to remain in teaching, teachers’ perceptions of their ability to meet pupils’ learning needs can impact on retention; having confidence in enabling pupils to make progress can be a main source of motivation for teachers to stay (Day and Gu, 2014).

Supportive leadership and school culture, including pupil behaviour, were reasons given by four participants to stay in teaching. These findings are not surprising considering the main challenges identified by participants were behaviour and class management. The importance of supportive leadership and a supportive culture has been consistently highlighted in literature regarding teacher retention in various countries (Castro, Kelly and Shih, 2009; Doney, 2013; Day and Gu, 2014; Johnson et al., 2016). Some participants decided to revise their decision to work full-time: negative experiences with school culture led these participants to consider working part-time to ensure well-being and maintain work-life balance. Reluctance to take on a teaching role in certain schools was another point made by two participants. These participants were reluctant to work in an environment where they felt they did not easily fit or where pupils’ behaviour was challenging, or where school leaders and parents were not supportive. These findings are in line with research highlighting the importance of school culture and the role of environment in teacher retention (Day and
Gu, 2014). Ungar (2012), in his socio-ecological framework, takes this argument further, asserting that the context, and community within the context, plays a larger role than the characteristics of individuals in building resilience.

Although at the time of writing all participants are still working as teachers, it is too soon to hypothesise any direct link between the interventions and retention rate, which has been around 90% in the previous years. That said, having full retention in a cohort of mathematics pre-service teachers is unusual for this ITE programme: the current cohort are the first group without any attrition by the end of the training period.

**Observational Research**

Areas of strength included in the indicators for professional aspects of resilience were effective planning skills, effective teaching skills, effective behaviour management strategies, commitment to learners, being flexible and adaptable, organised, prepared and managing time, insight and reflective skills (see Table 4-31, section 4.4). Two areas for improvement in the professional aspects were low creativity and low self-efficacy. The low score in creativity may be related to either the structure of the mathematics secondary curriculum – teachers following prescribed contents, potentially restricting teachers’ choices – or challenges with observing rather subjective and interpretative skills such as creativity objectively. While most participants scored high in professional mastery, lower self-efficacy could be related to gender as most participants being observed were female: women studying STEM subjects are generally found to have lower self-efficacy than men (Chen, 2015).

For motivational aspects of resilience, determination, perseverance, positivity and optimism, persistence, focus on learning and improvement, maintaining motivation and enthusiasm, realistic expectations and goals were areas of strength (see Table 4-31, section 4.4). These findings are consistent with data obtained from the TRS scale (see Table 4-9, section 4.2) in which the perceived motivational resilience of participants improved significantly at post-test. Internal locus of control and agency, enjoying challenges, confidence and self-belief were amongst areas for improvement. Participants’ lower score on confidence and self-belief, internal locus of control and agency can be explained by exploring the interconnectedness between these three
constructs. While internal locus of control refers to individuals’ beliefs about their capacity to achieve desired goals, agency refers to individuals' beliefs about their access to different means to facilitate achievement of goals (Chapman, Skinner and Baltes, 1990). Although individuals’ with higher self-efficacy tend to possess higher agency and locus of control (Bandura, 2000), perhaps participants’ lower score on self-efficacy can be linked to lower scores on agency and locus of control. Nevertheless, ambiguities regarding differences between conceptualisation of self-efficacy, agency and internal locus of control might have influenced the decisions of the researcher (myself) and the research assistant (the school mentor) in awarding a lower score for these three indicators.

Most indicators within the category of emotional resilience were identified as areas of strength for participants being observed at the final phase of the research (see Table 4-31, section 4.4). Happiness, recognition of feelings, emotional management skills, ability to control temper, bouncing back, ability to cope with job demands and stress, hopefulness, enjoying teaching, showing empathy and not taking things personally were areas of strength identified, while areas for improvement were identified as humour, care for own well-being and ability to restore self-esteem. Emotion regulation and empathy have been noted as two of the major indicators of resilience in the literature regarding the conceptualisation of teacher resilience of novice teachers (Mansfield et al., 2012). While the literature recognises teaching as emotionally taxing for new teachers (McNally and Blake, 2010), relationships that new teachers develop with other professionals have been linked with positive recognition and management of feelings as well as the development of empathy skills (Le-Cornu, 2013). The observation findings are consistent with the interview transcripts: some participants commented that engagement in mutually empathic and responsive relationships with mentors and schoolteachers helped them develop their sense of belonging and resilience (Jordan, 2006a; Dewsbury and Brame, 2019), all crucial elements for maintaining motivation and commitment to teaching.

Social aspects of resilience were the strongest aspects observed during school visits with communication skills, building support and relationships, help-seeking, taking advice, solving problems, empathy skills, strong interpersonal skills, multi-cultural competencies and relationships with pupils identified as areas of strengths for the
majority of the ten participants being observed (see Table 4-31, section 4.4). While these findings are consistent with results from the TRS scale and interview narratives, (see Table 4-15, section 4.2 and Table 4-27, section 4.3.3) one possible explanation for the increase in participants’ perceived social resilience could be the role of their relational links and the feeling of support participants experienced during the intervention programme. Le Cornu (2013) posits that, for new teachers, building resilience is reliant on formation of professional networks and relationships. Building relationships, fostering connections and support networks have been highlighted as major protective factors in psychological resilience literature (Jordan, 2006b), with social contexts facilitating resilience growth.

The strengths of physical aspects of resilience were identified as subjective well-being (see Table 4-31, section 4.4) including happiness and job satisfaction, cognitive performance including reaction time, memory and fluid intelligence and attendance. Areas for improvement involved participation in schools’ physical activities, taking lunch breaks and work-life balance. While variables that correlate with physical aspects and well-being include physical health and health maintenance skills such as exercise, good diet and sleep (Werner and Smith, 1982) as well as subjective well-being (Dolan, Peasgood and White, 2008), observing indicators of physical resilience such as good diet or good sleep patterns was not possible. Therefore, I decided to use indicators such as cognitive performance or attendance, which correlate positively with physical health and well-being (Fox, 1999), to observe for physical resilience at school.

The use of indicators highlighted in observation proforma can be far from ideal to assess participants’ physical well-being and resilience; perhaps accurate evaluation of this aspect would require a scientific approach as well as observation; nonetheless, with one goal of this research being increasing participants’ awareness of the importance of physical health and well-being, and its impact on resilience, initiating dialogues with participants and their mentors as well as practical strategies being introduced in the interventions might have served this purpose as evidenced by participant narratives showing awareness of the importance of well-being and physical resilience during semi-structured interviews.
To conclude, it is worth noting that I carried out evaluation of participants’ strengths and areas for improvement in each indicator using my own observations and observations by the subject mentors to ensure moderation of each observed indicator. It should be noted that these evaluations are subjective and based on researcher/practitioner professional judgements which can be biased (Coghlan and Brannick, 2014). While the subjective nature of these evaluations needs to be taken into consideration, the findings from observational research indicate that participants were doing well in areas such as professional and social aspects of resilience; however, there were areas for further improvement in domains such as self-efficacy and physical resilience. These findings complement data from the TRS scale and interviews; however, discrepancy between the findings of the TRS scale and the observations regarding improvement in the motivational aspect of resilience can be explained through the sampling for the observational research, which was based on targeted observations rather than random selection of participants. The latter approach could have more representative data of the participant population (see Table 4-9). Another factor that might have impacted the frequency of each indicator could be related to the record of the observations from the perspective of a researcher (myself) and a non-researcher (mentor); this could potentially bring two sets of different views and biases into the research. Finally, a challenge regarding the indicators for each aspect of resilience involved overlap between the indicators, for example, overlap between confidence and self-efficacy meant participants’ low score in one aspect had an impact on their score for the other aspect. These issues need to be addressed in future versions of this research instrument.

5.1.4 Main Research Question

How can I help pre-service teachers of mathematics develop more resilience?

To answer the main research question, I synthesised the findings from the three sub questions. Table 5-1 summarises the findings from each method of data collection.
The key findings show that participants associated the intervention programme with use of various strategies to overcome daily challenges during their pre-service year; this was consistent with literature suggesting that development of the five aspects of resilience can lead to more teacher resilience (Mansfield et al., 2015). Both quantitative and qualitative data confirm that participants had less focus on physical aspects of resilience. Perhaps a way forward to address this issue can be an intervention programme in collaboration with schools to raise awareness about the positive correlation between resilience and quality teachers before introducing aspects of resilience, including the physical.

<table>
<thead>
<tr>
<th>Key Findings</th>
<th>Qualitative Survey</th>
<th>TRS Scale</th>
<th>Interview Data</th>
<th>Observational Research</th>
</tr>
</thead>
<tbody>
<tr>
<td>Participants’ perceived resilience and their retention rate was improved at the end of the intervention programme. Behaviour management, teaching practice, workload, building and managing relationships were the most frequent challenges cited by the participants. Although there was evidence of anti-resilient thinking at different stages of the research, participants’ exercise of agency was key in developing their abilities to maintain well-being, a key part of experiencing resilience.</td>
<td>Teacher resilience is a multifaceted construct (section 5.1.1) with professional resilience being perceived as the most important aspect while social and physical resilience were perceived as the least important aspects by the participants at the start of the research.</td>
<td>The interventions were most successful (section 5.1.3) in developing participants’ motivational and social resilience. They were least successful in developing the physical aspect of resilience.</td>
<td>Participants experienced (section 5.1.2 and 5.1.3) a range of personal, professional, and contextual challenges in their pre-service year with more participants citing professional aspects as their main challenge. Participants used a variety of strategies to overcome their daily challenges (section 5.1.2 and 5.1.3) and at times, had to adapt the strategies introduced in the interventions to suit their needs and the context they were working in.</td>
<td>The interventions were most successful (section 5.1.3) in developing participants’ social aspect of resilience and least successful in developing participants’ self-efficacy and the physical aspect of resilience.</td>
</tr>
</tbody>
</table>

Table 5-1. Findings from Different Sources
Triangulating the data, the results from the TRS scale and observational research indicated that the interventions were most successful in developing participants’ social aspect of resilience: this could be related to emphasis placed on the social ecological nature of resilience and development of resilience in social settings rather than individual efforts. Data from interviews suggested that participants’ self-efficacy increased through vicarious experience. Conversely, data from the observational research indicated lower self-efficacy for participants.

In addition, the interview data confirms that more collaboration is needed between the ITE programme and schools to introduce and implement more individualised intervention programmes. The key finding is that while successful implementation of an intervention programme is contingent on teachers’ exercise of agency, some participants suggested that collaborations between the ITE programme and schools can help improving the quality of future intervention programmes.

The findings suggest that a strong personal agency may be a key factor that can facilitate teacher resilience. Reflecting on why this was helpful, participants’ responses revealed that the exercise of agency offered them opportunities to develop new practical strategies, discuss their professional challenges with their relational links, discuss the advantages and disadvantages of various teaching methods, ask for help, and learn from the experiences of others. The findings indicate that a complex relationship exists between teacher agency and school context. These findings strengthen the validity of literature suggesting the importance of exercising agency in facilitating teacher resilience and emphasising that teachers’ must act on their environment in order to experience teacher resilience (Castro, Kelly and Shih, 2009; Day and Gu, 2014). Nonetheless, if teachers do not feel encouraged to use the support provided, then it is unlikely that school culture will facilitate teacher resilience (Ungar, 2012). The findings suggest that for participants this involved working in a school culture that was flexible where mentors listened and the whole department adapted in order to reduce the likelihood of the participants experience similar situations as challenging in the future. Participants described situations where their behaviour might have impacted on all teachers in their department by facilitating systemic changes to the school’s culture. Helen, for example, described a challenging situation with building relationships, and how her experience led to the whole department...
Helen’s response revealed that the department and Helen were responding and adapting to each other simultaneously; together this interaction between the teacher and the environment facilitated teacher resilience (Ungar, 2012; Day and Gu, 2014). Rather than developing a fixed teacher identity and a fixed school culture, the participants and their school environment continued to learn and grow as they interacted with each other.

## 5.2 Implication for Practice

Using the current teacher resilience framework based on the five aspects and their inter-connections has implications for practitioners and ITE programmes wishing to plan and implement interventions for development of teacher resilience. Addressing issues with heavy workload, maintaining physical activities and emotional management (Meyer, 2009), for example, receive minimal attention in ITE programmes in England. If ITE programmes want to support the development of teacher resilience, all aspects of resilience should be addressed at appropriate times; findings from this research indicate interlinks between the five aspects of resilience and how they influence and are influenced by one another. Although ad hoc professional development sessions for building teacher resilience are available, currently many ITE programmes offer limited sessions, focusing on a limited number of skills, such as offering support to cope with work-related stress. This was captured in the interview transcripts in which participants demanded changes to the ITE curriculum for their peers.

New teachers’ experience is still seen to hang largely on quality of support received in the school in which the student teacher undertakes their teaching practice. The nature of the mentor role could change, from a one-to-one relationship based on procedure and progress to a team approach, facilitating development of competent, resilient teacher identities. The ITE programme could also develop to include specific taught modules pertaining particularly to professional resilience such as co-planning and team-teaching, both of which can develop knowledge and experience required for new teachers to feel confident and competent in their new professional context. Much of this could be achieved before completion of the pre-service programme.
The content of the ITE curriculum was not necessarily appreciated by all participants. It was perceived as rigid, adding to the heavy workload, by a group of participants. To avoid those experiences that are found to be non-educative and irrelevant by some pre-service teachers, finding ways to better integrate the ITE curriculum may be a way forward, so the crucial and current concepts relevant to new teachers’ daily experience at schools are continually reinforced throughout the duration of the ITE programme.

This study will also be useful to school leaders and policy makers. Many researchers have indicated that developing teacher resilience involves the engagement of schools. Such studies, in most cases, looked at the role of school leaders in creating cultures of resilience in schools (Day and Gu, 2014). This study looked at beginning teachers exercising agency to not only build their own capacity to develop resilience, but to support other teachers in their journey to develop resilience through sharing practical strategies to develop the five aspects of resilience. The information contained in this study indicates that increasing capacity for pre-service teachers to work collaboratively, supporting one another, can play a role in developing teacher resilience, which could potentially lead to improved teacher retention.

Another important finding that should concern policymakers is that most new teachers feel the pressure of heavy workload while they are yet to feel competent and confident with their teaching skills and professional resilience. The findings from this research suggest that rather than solely making recommendations for teachers to ensure work-life balance, perhaps more practical approaches and policies to develop teachers’ professional resilience, including reducing workload, should be a way forward. This study implies that regular professional development training for resilience, creating a supportive school culture and flexibility for teachers to work part-time may encourage more teachers to stay in the profession. The data suggests that issues with lack of leadership support and professional challenges such as behaviour management need to be addressed by schools because they can have direct effects on teachers’ decisions to leave, as illustrated by the comments from the participants. Schools that want to retain their workforce require supportive cultures with specific strategies, enabling some teacher autonomy, to be used for managing pupils’ behaviour effectively.
5.3 Reflexive Account of the Research Process

Within certain research traditions, notably PR and interpretative approaches, it is often necessary to explain in the thesis the interactive and dynamic processes between researcher and participants as each affects the others (Oliver, 2014). These interactions alongside intervention processes can change the dynamics of situations and the behaviour of both researcher and participants. The reflexive account of the research process is particularly important for a practitioner researcher, who is not a passive or an objective observer within the research setting. They are continually making decisions about how to interact with participants, what problems to raise and how to address them in practice, as well as what changes to make to the practice after participatory critical reflection. In this section, I discuss the impact which this research and the interactions with participants have had on me and things that I have learnt from this experience.

A practitioner researcher ideally is as reflective about their own teaching as a practitioner expects their students to be about their learning. In this sense, PR is not only a research methodology, but a philosophy that forms the basis of pedagogy that recognises the whole person. This philosophy, founded in the research cycle, is a form of reflexive enquiry undertaken by the practitioner in order to improve the rationality and justice of their own practices, their understanding of their practice, and the situations in which the practice is carried out (Carr and Kemmis, 1986). In this study, my initial aim was to improve my own practice, and to explore the implications for teacher educators and ITE programmes to consider introducing and developing a resilience building programme in their pre-service curriculum. I summarise my reflexive account of this PR in the following section.

5.3.1 Developing Self-awareness

One of the main aims for this research was to observe and collect data in a rigorous and trustworthy manner (Lincoln and Guba, 1985). This had implications for my research as it involved me recognising and acknowledging my role as an insider researcher, reflecting on my own histories and pre-assumptions that I brought to the research cycles. Conducting this research based on collaborative reflection required
use of a different lens to not only understand myself, but to understand participants’ voices and how practitioner-participant relationships influenced the reflection process. Understanding such contexts was critically important in conducting my PR because the social emancipation of my research involved recognising the ecology of knowledges (Whitehead, 2019) by identifying other knowledges and living theories, empowering my participants to become involved as equal partners when reflecting on each intervention.

Developing self-awareness had implications for both me and the ITE programme. Understanding how my personal identity as a pupil studying at a secondary school in the Middle-East (a very different educational context from England), a physics graduate viewing the world from a rather positivist lens, a former mathematics teacher working in a comprehensive, inner-city school located in one of the most deprived areas in England and a current teacher-educator working in one of the top universities in the world, has informed my ever-changing contextual identity. For example, perhaps, my teaching background had given me a different perspective on resilience than a practitioner working in an independent school located in an affluent area of England. Not fully understanding these pre-assumptions, for me, could threaten learning progressively by doing and by making mistakes in a reflexive cycle of planning, acting, observing, reflecting, re-planning, etc. in an iterative manner.

In addition, developing an understanding of the mindset and history of my ITE with regard to teacher resilience, and how this had previously impacted the ITE, helped with raising my self-awareness. Evaluating the connection between the ITE mindset on teacher resilience and the process of resilience-building of the pre-service teachers prior to and after the research as well as to assess the shifts in mindset of the ITE were all parts of my reflexivity.

5.3.2 Developing Empathy

To understand participants’ voices, I engaged in a process in which I made deliberate attempts to get to know participants, and learn about their unique backgrounds and learning needs (Freire, 1970). Without this, it would have been impossible to design interventions that were inclusive of participants’ voices. Developing dialogues with
participants during the intervention sessions was the key to developing my knowledge of them; this in turn was the key ingredient for authenticity and potential to generate meaningful learning experiences at the end of each research cycle. This was crucial; including participants’ voices, I had to reach beyond static metrics such as age and ethnic demographics of participants. While categorisation of participants into demographics was a useful starting point, considering these demographics in isolation could serve to mask the nuances present in participants’ unique stories. Instead, embedding reflective activities (see section 3.7.3) that allowed participants to articulate how the research related to their own contexts helped with improving my knowledge of them. This active participation in PR was powerful because it assured participants of their agency in the cycles’ process, encouraging them to engage in collaborative reflective processes, as evidenced by the data collected in the semi-structured interviews.

Engagement with participants’ voices and acknowledging their agency (see section 2.7.1) transformed the ways in which I conducted the resilience interventions. Not only did participants’ voices guide the intervention cycles, but interventions were tailored for participants’ needs (see section 4.1), identifying tools that would promote a positive classroom climate. During the research activities, it was important for me to ensure that participants’ voices were valued, appreciated, and taken on board while re-planning the intervention cycles. This was to develop empathetic relationships within the research group as well as enhancing critical reflection skills, key attributes to reframing both my own and the participants’ professional identities.

While practitioner-participant and participant-participant interactions were a key part of creating a positive and empathetic research climate, establishing norms of mutual respect and support that governed these interactions during the interventions and upholding those norms consistently and clearly was important throughout the research period. Building on this basis, encouraging participants to interact and collaborate with one another, both within and outside the research capacity, generating opportunities for participants to recognise one another as sources of support and knowledge (as evidenced by participants’ relationships acting as relational links to one another) were among the strategies introduced in the intervention sessions.
5.3.3 Tailored Intervention Programmes

All a practitioner’s prior experiences feed into their identity (Day and Gu, 2014); therefore, moving towards the end of the academic year, it was important for me to pay close attention to my changed perceptions of teacher resilience when beginning a new cohort. While the iterative approach to this research allowed flexibility and ongoing change to meet the needs of the research activities in response to new information (Bassett, 2010), more could be done to ensure planning of more tailored interventions in my future practice.

In the first few months of the practicum, steps could be taken to provide personalised support to guide new teachers from pupillage to novice stage. While this research helped me develop my understanding of some challenges new teachers face, the context-specific nature of these challenges meant any future interventions should consider participants’ unique needs. Comments from participants in the intervention sessions and semi-structured interviews suggested that a more personalised intervention programme is a way forward. Therefore, for my future interventions, the use of some one-to-one meetings to facilitate the interventions appear to have merit.

Having reframed my own perspective of teacher resilience, for the next academic year (before the start of the new cycle of resilience interventions) I will conduct a needs assessment with the pre-service teachers I work with. This will be to identify the areas in which the new teachers may require support as well as the types of relationships that can provide that support and help plan and deliver interventions tailored for the needs of each individual teacher. Nonetheless, the success of such programmes will be contingent on collaboration with school mentors to ensure support in both the ITE and the practicum. It may therefore be that by engaging effectively with the school mentors, discussing openly issues and barriers to resilience, the school mentors and I will be able to gather evidence to inform effective changes to the intervention arrangements.

Supporting new teachers with development of realistic role expectations over the duration of the pre-service programme, including shifting the perspective of new teachers who may hold unrealistic expectations about the work and the life of a
teacher, I will introduce collective reflective practice in my ‘professional enquiry’ sessions at ITE. Offering the opportunity to share difficult feelings with other pre-service teachers can stop new teachers from feeling isolated, and this in turn can facilitate their teacher resilience through utilising coping strategies (Lazarus and Folkman, 1984). Using this approach, rather than being advised by experts, participants can learn from each other, depersonalising the challenges where the experience of challenges is normalised to support teachers in not feeling isolated. Although discussing challenging situations, and any negative feelings associated with challenge, may not necessarily take away the problem, discussing the challenges with peers working in a different context could potentially ensure that the pre-service teachers are supported to consider alternative ways of thinking about their school culture by not becoming stuck within the same discourse and remain open and accepting of change.

5.3.4 Practitioner Research in Higher Education

Accountability of higher education institutions to society has become more and more critical in recent years (Zuber-Skerritt, 2015). There is evidence that PR can be appropriate, effective and transformative in higher education (McNiff, 2013; Zuber-Skerritt, 2015). Conducting this research with the aim to improve my teaching practice was likely to contribute to protecting my own department’s autonomy, identifying and setting future strategic plans internally. Whatever future changes may be necessary, reviews and revisions of ITE programmes are best carried out by academics themselves on the basis of their research (Zuber-Skerritt, 2015), rather than on policies and decisions imposed by government or institutional central administration.

Conducting this research within my own institution created opportunities to participate in decisions about my ITE’s educational context and how to develop relevant departmental strategic plans to meet the demands of its context. Instead of passively receiving these decisions and the formulation of educational theories from outside experts and researchers, participation in decisions about my ITE’s educational context allowed me to achieve positive change in academic culture through engagement with external stakeholders and the wider community, sharing useful, practical and transformative research in meetings and conferences held within the ITE in order to
identify and map out the ITE’s future strategic plans. This seemed to be particularly appropriate to the goals of my institution with its focus on teaching, research and outreach meeting the requirements of accountability to the wider community. Indeed ‘providing opportunities for building resilience of the pre-service cohort’ has been outlined in my department’s strategic plan for next academic year.

Summary

The interpretation and discussion of three sub questions in this chapter allowed me to consider the main research question: how I can help pre-service mathematics teacher develop resilience? Using different methods of data collections, teacher resilience was identified as a multidimensional construct.

Although literature shows the importance of a social-ecological framework and exercise of agency to facilitating the process of resilience building of new teachers, at the start of the research some anti-resilient thinking seemed to be prevalent amongst participants. With the focus of interventions shifting to change the mindset and to raise awareness of the importance of developing the five aspects of resilience within social settings, more participants at the end of the research attributed their experience of resilience building to the support from the context and the community surrounding them.

While the data collected suggest that there were continuous interactions between the participants and their ecology, participants’ agency was the key factor in their experience of resilience building. Nevertheless, it should be noted that at times participants chose not to use certain strategies introduced in the interventions; an example of this was the lack of engagement with the strategies for physical resilience by most of the participants. A key message from the discussions in this chapter is that the combination of interactions between participants and context along with participants’ exercise of agency led to their decisions to employ practical strategies for building resilience.
Chapter 6: Conclusion

This chapter presents the summary of my study and the original contribution that this research makes to teacher resilience literature. To achieve this aim, I have returned to the research questions and reflected on the extent to which they have been addressed. Implications of the research for practitioners and ITE programmes are discussed and limitations are identified and reflected upon. The chapter ends with a summary of recommendations and suggestions for future research on teacher resilience and the personal significance of the research to me.

During this research, I examined recent literature on the topic of teacher resilience and identified that there was still no consensus on the definition of teacher resilience; this construct has been conceptualised in different ways. One possible reason for lack of consensus regarding a definition for teacher resilience could be that the definitions are still heavily context bound and, depending on the context and the differences in types of challenges teachers face, the definitions vary from one setting to another. I initially focused on what teacher resilience meant from the perspective of pre-service teachers; I hoped that, by exploring the process of building resilience, I could explore and introduce practical strategies that beginning teachers could use to develop resilience.

To begin with, I reviewed a wide range of definitions for teacher resilience, and developed a working definition of teacher resilience: teacher resilience is a process of employing practical strategies in collaboration with others to overcome daily challenges of the teaching profession through developing five aspects of resilience. For the remainder of this chapter, I discuss how this research has answered my research questions and the extent to which ITE programmes may/could support pre-service teachers to develop resilience.

6.1 Summary of the Study

Research into teacher resilience is growing (Gu, 2018). Researchers and teacher educators have called for introducing teacher resilience programmes in the ITE curriculum (Beltman, Mansfield and Wosnitza, 2018). However, to date, very few ITE courses have implemented and evaluated the impact of such programmes on teacher
resilience, well-being and retention (Beltman, Mansfield and Wosnitza, 2018). The purpose of my study was to explore practical strategies pre-service mathematics teachers could use to develop resilience. I also wanted to examine the impact of my interventions on the retention of 25 pre-service mathematics teachers attending one ITE programme.

My initial literature review to identify practical strategies for developing resilience uncovered overwhelming amounts of material, so I refined my parameters to pieces specifically dealing with the research questions. This more specific search yielded more manageable results including multiple articles discussing the use of specific exercises and techniques to develop resilience within healthcare and school settings. This led to the design of an intervention programme using a blended mode of delivery to introduce strategies and activities to build capacity for five aspects of resilience, namely professional, motivational, social, emotional and physical, based on a theoretical framework by Kumpfer (2002). I collected quantitative data at different phases of the interventions; I interviewed and observed participants at the end of the interventions to evaluate the impact of the intervention programme. This study sought to answer one main research question along with three sub-questions:

**Main Research Question**

How can I help pre-service teachers of mathematics develop more resilience?

**Sub-questions**

1) How do pre-service teachers of mathematics understand teacher resilience?

2) What challenges do teachers of mathematics face in their pre-service year? What factors and strategies do they identify as helpful for developing teacher resilience?

3) What is the impact of the interventions implemented in this research on teacher resilience?

I answered sub-questions one and two qualitatively from data obtained from questionnaires exploring participants’ perception of a resilient teacher and semi-
structured interviews. I answered the main research question and sub-question three using both quantitative and qualitative data obtained from participant scores on the TRS scale, interviews, and observational research. I partly answered sub-question three using results from a t-test comparing means of pre-test and post-test TRS scores for each aspect of resilience. Additionally, I carried out NVivo analysis of qualitative data to assess and evaluate the impact of each intervention session. The primary analysis of the data collected from observations at ten different secondary schools coupled with a search for pertinent literature provided a clear focus for the discussion of my findings. After coding classroom observations for indicators of the five aspects of resilience, it became apparent that analysis of resilience development within the classroom would produce rich results for discussion.

6.2 Original Contribution to the Knowledge

What is already known on this subject?

- teaching has one of the highest attrition rates in UK with STEM subjects including mathematics being the subjects with the highest rate (Worth and De Lazzari, 2017);
- new teachers’ attrition is often seen as being linked with individual or contextual factors such as issues with well-being and burnout, lack of resilience, lack of teacher support, pupil issues, and inadequate teacher education (Le-Cornu, 2013; Day and Gu, 2014; Beltman and Mansfield, 2018; Mansfield and Beltman, 2019);
- resilience has been shown to be central in improving retention and teachers’ well-being (Gu, 2018);
- examples of operationalisation of a coherent resilience programme and its impact on retention and well-being of pre-service teachers can be hard to locate (Mansfield et al., 2015);
- teacher resilience has not been explored or examined within different secondary subjects to investigate the challenges specific to each subject.

What does this study add?

- identifying and exploring the challenges mathematics teachers face during their pre-service year;
• identifying and exploring factors and strategies that can help pre-service mathematics teachers develop more resilience;
• planning and implementing a one-year intervention programme for pre-service teachers of mathematics;
• critical reflections on the impact of the research illustrating how a range of different practical strategies can be applied and adapted to address teacher resilience.

The findings from this research indicate that teachers who develop resilience are more likely to remain committed to and motivated by teaching, and are more likely to remain in the profession, as evidenced by full retention of the mathematics teachers participating in this research. For this reason, the current research makes a timely contribution to teacher resilience literature on how to facilitate development of resilience. In addition, it can inform new policy initiatives for teacher education and assist in the design of ITE courses that can encourage teachers to take agency in developing their resilience and make teaching a sustainable career choice.

Whilst much can be captured from the resilience literature, the complex and challenging nature of the teaching profession demands that research focus on factors and strategies that contribute to teachers’ development of resilience. That said, most of the research on teacher resilience seems to solely make recommendations for ITE programmes without much consideration of how this construct can be operationalised. The current research, therefore, strengthens the small but already burgeoning research on teacher resilience by operationalising this construct and evaluating its impact in the school settings. This research highlights the operationalisation of teacher resilience through interventions using the five-aspect framework and strategies for building resilience of pre-service mathematics teachers.

The current research was conducted in two phases; data from phase one illustrated how pre-service teachers of mathematics described resilience mainly as a professional competence. Phase two then examined the process of resilience development through implementing interventions to shed light on how resilience could be developed in action. The findings highlighted the crucial role of growth-enhancing social resilience
and increased awareness of the role of recruiting support and agency in development of teacher resilience.

During the interventions, developing and nurturing relationships with personal and professional networks encouraged participants to become more aware of the importance of social networks, emotional management and empathy, well-being, and work-life balance in developing coping strategies and therefore teacher resilience. Self-care activities and compartmentalisation of tasks to manage the workload and to maintain work-life balance enhanced participants’ somatic and emotional states leading to increase in professional, motivational, and emotional resilience. The critical message from this research is that everyone surrounding pre-service teachers, and pre-service teachers themselves, can have an active role in building teacher resilience.

The findings of this study have far-reaching implications for ITE programmes, teacher educators and pre-service teachers. This study identified several links between building teacher resilience and the likelihood of beginning teachers staying in the profession despite challenges. Those interested in issues with teacher attrition, policy, and research will find the evidence of links between the five aspects of resilience and teachers’ professional competency, well-being, and retention very useful.

For ITE programmes and teacher educators, this study offers insight into what practical strategies are more likely to positively influence teacher resilience. It will also give teacher educators an insight into the practice and the course structures that may negatively influence teacher resilience. In particular, this study suggests what types of interventions embedded in the ITE sessions may help with development of teacher resilience.

6.3 Limitations of the Thesis

The goal of this study was to investigate the practical strategies that could help beginning teachers build resilience. I collected data to answer four research questions related to this goal. I introduced an intervention programme, and I collected data to assess the impact of the interventions. I then analysed the data, from which many significant findings resulted. The findings, although significant, have some
limitations. While the validity of this study stems from the multiple sources of data and length of the study, this study is limited by data collection of a relatively small sample size through both quantitative and qualitative methods.

Although this research has provided evidence on practical strategies for teacher resilience, another limitation that needs to be acknowledged is that the findings may not be generalised, though they may be of interest to ITE institutions other than the one institution included in this study. Although the participants represented a broad array of individuals from university graduates to change-of-careers, still there are three levels of concern related to generalisability across ITE institutions. First, all participants, except one, completed their practicum in comprehensive state schools. It is unknown if these findings generalise to other institutions representing independent or grammar schools. Second, even though similar patterns of responses across the research group emerged, it is not known if the patterns function in similar ways across other ITE programmes. Third, all participants attended the same ITE programme; further research should be attentive to this issue by conducting the research with participants from different ITE programmes to increase generalisability of the research.

Another limitation of the research is that it does not provide information on the ways in which ITE institutions may work in collaboration with schools to plan and implement a more personalised intervention programme based on individuals’ needs. There is a body of research that has indicated the importance of school context in success of resilience-building interventions in the field. Unfortunately, it was not possible to implement this aspect and examine the impact on participants’ resilience in the current study.

Although the participants were diverse in terms of their previous work experiences, the age composition of the participants was not sufficiently diverse to allow exploration of differences between younger and older participants. It was therefore not possible to include age differences in the results and findings. The issue of age and teacher attrition thus remains to be investigated systematically.
Another limitation of the study centres on the data. I gathered the participant responses at one point in time, which means the relationships are based on concurrent responses. As such, the impact of the temporal factors on participants’ resilience cannot be determined. Longitudinal research is needed to explicate the impact of the interventions on participants’ retention longer term and to better understand the reciprocal effects that emerge over time between resilience and retention.

6.4 Recommendations for Further Research

Future longitudinal research can provide more details about the impact of the intervention programme longer term and the influence of the various school contexts on teacher resilience. At this level of detail, the researcher would be able to tell what setting and school culture was having the greatest effect on building teacher resilience. It would also be able to show if higher teacher retention was obtained for this group compared to the average attrition rate for teachers, for example in their first five years of teaching.

Another avenue of research could be to institute case studies of several schools to discover their unique practices leading to higher or lower teacher retention rate. The information from the case studies could be combined to ascertain if there are common practices schools with higher retention are using. These practices could include information about school culture, leadership support, teachers’ professional development, pupils’ outcome, and teacher workload. This type of research could also be used to study strategies for building teacher resilience and well-being.

This study has shown that there are many factors that can impact on teachers’ development or depletion of resilience. The data indicate that the ITE programme is not the only factor that is related to teacher resilience. In other words, the keys to teacher resilience development may lie outside of the ITE programme and within schools. More personalised intervention programmes designed in collaboration with schools targeting a wider range of participants can be a way forward to meet the specific needs of individual pre-service teachers. The data also indicated that other factors such as family support had a strong impact on teacher resilience. Future
research may illuminate how family support can be utilised to facilitate the experience of teacher resilience.

The quantitative TRS scale showed that male participants scored higher in their resilience score post-test. It was also found that participants from ethnic minority backgrounds considered themselves very resilient in the interviews; nonetheless, ethnicity of participants was not captured in the TRS scale. The problem is that the statistical methods used to analyse the data from the TRS scale could not provide complete answers to the complex relationships between teacher resilience, age, gender, and ethnicity. Further research along these lines could use a variety of data collection methods. Quantitative and qualitative analysis with a larger sample of participants from diverse backgrounds and a wider age range could identify and map specific examples of relationships between these variables. A study in this format could go beyond simply exploring the impact of an intervention programme on participants’ capacity to build resilience. It would allow researchers who have discovered a relationship to delve far deeper into the factors causing the relationship, and hence to suggest more personalised strategies for participants along with implications for the ITE programme and policy makers.

### 6.5 Personal Significance

While I intend to finish this thesis by explaining the personal significance of this research to me as a practitioner, I feel that I, first, need to refer to the significance of this phenomenon in my life and my experience of resilience during the current Covid19 pandemic. Fifteen weeks into the lockdown, encountering everyday uncertainties and the constant fear of losing loved ones, personal resilience in the time of this pandemic for me and my family means to keep functioning, both psychologically and physically. Resilience in these days, for me and my family, does not mean to be tough or ignore our feelings. We experience sadness, anger, anxiety, grief, and pain, but we are still able to engage with our daily life; we remain generally optimistic and get on with life. Reflecting on this experience, these days, being able to reach out to others for support and maintaining balance in our life are the key components helping us to build resilience in the face of the everyday adversities and uncertainties.
The purpose of my research was to inform practice. As a pragmatic researcher, this is what I tried to achieve by conducting an emancipatory research project. To begin with, the process seemed fairly straightforward as I was led by a research question relevant to my daily practice as a teacher educator. The plan was to read literature, engage with the experts and the practitioners to gather ideas about the type of interventions that I could deliver to help my research participants develop resilience. Researching practical strategies relevant to developing teacher resilience of pre-service teachers, in the first year of my PhD, I actively researched ideas from literature, teacher educators and practitioners while attending weekly ‘advanced research methods’ sessions at university.

At the start of the second year, after my upgrade, I realised that successful completion of a research programme was not a smooth process. It involved engagement in a steep learning curve in which I was required to develop a range of knowledge, skills, and experiences. In this year, I engaged with relevant conferences to gather more current ideas about my research topic. Attending various university training sessions on themes such as data analysis using SPSS and NVivo, using reference managers and thesis writing were steps I took before my data collection.

Progressing through the second year, I realised that conducting my research would not be as straightforward as I had thought. There were challenges with fitting the intervention sessions within the tight ITE timetable; inviting participants to attend the semi-structured interviews during their timetabled sessions or their lunch time was an ethical dilemma for me. Follow-up meetings with those participants who had missed the intervention sessions was another challenge. Beginning to analyse my data towards the end of the second year, I faced more challenges; triangulating my data to answer my research questions and validating my data analysis made researching a complex, unstable and relational construct such as resilience more difficult. At this stage, approaching colleagues, researchers, experts, and practitioners to discuss my data helped me to enhance my data analysis and the research trustworthiness. Discussing my research findings with other researchers and practitioners, and publishing a paper, provided me with opportunities to receive feedback and critically reflect on my research.
The final year was, by far, the most challenging year, writing and rewriting my thesis draft chapters numerous times, addressing my supervisors’ feedback and facing the Covid19 pandemic living in the lockdown for months prior to my thesis submission all involved me developing more resilient behaviours to get through this difficult time. Now at the end of this journey, again, I have realised how valuable the topic of developing resilience is for future research.
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### Abbreviations

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Explanation</th>
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<tbody>
<tr>
<td>AR</td>
<td>Action Research</td>
</tr>
<tr>
<td>BRiTE</td>
<td>Building Resilience in Teacher Education</td>
</tr>
<tr>
<td>CPD</td>
<td>Continuing Professional Development</td>
</tr>
<tr>
<td>DfE</td>
<td>Department for Education</td>
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<tr>
<td>EI</td>
<td>Emotional Intelligence</td>
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<tr>
<td>GCSE</td>
<td>General Certificate of Secondary Education</td>
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<tr>
<td>HE</td>
<td>Higher Education</td>
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<tr>
<td>ITE</td>
<td>Initial Teacher Education</td>
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<tr>
<td>PGCE</td>
<td>Post Graduate Certificate in Education</td>
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<tr>
<td>PR</td>
<td>Practitioner Research</td>
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<tr>
<td>QTS</td>
<td>Qualified Teacher Status</td>
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<tr>
<td>RCT</td>
<td>Relational Culture Theory</td>
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<tr>
<td>SEND</td>
<td>Special Educational Needs and Disability</td>
</tr>
<tr>
<td>SKE</td>
<td>Subject Knowledge Enhancement</td>
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<tr>
<td>STEM</td>
<td>Science, Technology, Engineering, and Mathematics</td>
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Appendices

Appendix I: Questionnaire: Teacher Resilience Scale

Please tick here to indicate your informed consent to participate in this study.  

Please complete the following questions regarding the above research, by placing a circle around your response.

**Gender:** Female- Male  

**Route:** School Direct- PGCE Core

1. I am able to adapt to change.

   Strongly Agree (5)    Agree (4)    Neither agree or disagree (3)    Disagree (2)    Strongly Disagree (1)

2. Sometimes fate or God can help me overcome my challenges.

   Strongly Agree (5)    Agree (4)    Neither agree or disagree (3)    Disagree (2)    Strongly Disagree (1)

3. Sometimes I believe things happen for a reason.

   Strongly Agree (5)    Agree (4)    Neither agree or disagree (3)    Disagree (2)    Strongly Disagree (1)

4. Under pressure, I am able to focus and think clearly.

   Strongly Agree (5)    Agree (4)    Neither agree or disagree (3)    Disagree (2)    Strongly Disagree (1)

5. I prefer to take the lead in problem solving.

   Strongly Agree (5)    Agree (4)    Neither agree or disagree (3)    Disagree (2)    Strongly Disagree (1)

6. I am not easily discouraged by failure.

   Strongly Agree (5)    Agree (4)    Neither agree or disagree (3)    Disagree (2)    Strongly Disagree (1)

7. I think of myself as a strong person.

   Strongly Agree (5)    Agree (4)    Neither agree or disagree (3)    Disagree (2)    Strongly Disagree (1)
8. If necessary, I can make unpopular or difficult decisions that affect other people.

<table>
<thead>
<tr>
<th>Strongly Agree (5)</th>
<th>Agree (4)</th>
<th>Neither agree or disagree (3)</th>
<th>Disagree (2)</th>
<th>Strongly Disagree (1)</th>
</tr>
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9. I can handle unpleasant feelings, such as anger or fear.

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<tr>
<th>Strongly Agree (5)</th>
<th>Agree (4)</th>
<th>Neither agree or disagree (3)</th>
<th>Disagree (2)</th>
<th>Strongly Disagree (1)</th>
</tr>
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10. Sometimes I have to act on a hunch.

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<tr>
<th>Strongly Agree (5)</th>
<th>Agree (4)</th>
<th>Neither agree or disagree (3)</th>
<th>Disagree (2)</th>
<th>Strongly Disagree (1)</th>
</tr>
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</table>

11. I like challenges.

<table>
<thead>
<tr>
<th>Strongly Agree (5)</th>
<th>Agree (4)</th>
<th>Neither agree or disagree (3)</th>
<th>Disagree (2)</th>
<th>Strongly Disagree (1)</th>
</tr>
</thead>
</table>

12. I work hard to attain my goals.

<table>
<thead>
<tr>
<th>Strongly Agree (5)</th>
<th>Agree (4)</th>
<th>Neither agree or disagree (3)</th>
<th>Disagree (2)</th>
<th>Strongly Disagree (1)</th>
</tr>
</thead>
</table>

13. In my workplace I enjoy being together with other people.

<table>
<thead>
<tr>
<th>Strongly Agree (5)</th>
<th>Agree (4)</th>
<th>Neither agree or disagree (3)</th>
<th>Disagree (2)</th>
<th>Strongly Disagree (1)</th>
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</table>

14. New friendships are something I make easily in my workplace.

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<tr>
<th>Strongly Agree (5)</th>
<th>Agree (4)</th>
<th>Neither agree or disagree (3)</th>
<th>Disagree (2)</th>
<th>Strongly Disagree (1)</th>
</tr>
</thead>
</table>

15. Meeting new people in my workplace is something I am good at.

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<tr>
<th>Strongly Agree (5)</th>
<th>Agree (4)</th>
<th>Neither agree or disagree (3)</th>
<th>Disagree (2)</th>
<th>Strongly Disagree (1)</th>
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</table>

16. In my workplace when I am with others I easily laugh.

<table>
<thead>
<tr>
<th>Strongly Agree (5)</th>
<th>Agree (4)</th>
<th>Neither agree or disagree (3)</th>
<th>Disagree (2)</th>
<th>Strongly Disagree (1)</th>
</tr>
</thead>
</table>

17. My family’s understanding of what is important in life is very similar to mine.
18. I feel very happy with my family.

19. My family is characterized by healthy coherence.

20. In difficult periods my family keeps a positive outlook on the future.

21. Facing other people, my family acts loyal towards one another.

22. In my family we like to do things together.

23. I can discuss personal issues with my peers.

24. The bonds amongst my peers and me are strong.

25. I get support from my peers.

26. When needed, I always have someone in my workplace who can help me.
27. **Tick the statement which describes your sleeping, eating and exercise pattern.**

<table>
<thead>
<tr>
<th></th>
<th>sleeping well</th>
<th>lack of sleep</th>
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<tbody>
<tr>
<td>good sleep patterns</td>
<td></td>
<td>disturbed sleep</td>
</tr>
<tr>
<td>good diet</td>
<td></td>
<td>eating less healthy</td>
</tr>
<tr>
<td>regular exercise</td>
<td></td>
<td>little or no time for exercise</td>
</tr>
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Appendix II: Semi-structured Interview Questions

1. Can you explain the main personal, professional and contextual challenges and threats you faced in the pre-service year? What were your key strategies to overcome them at the time?
2. Can you describe anything (interventions and others) contributing to your development of resilience during your pre-service year?
3. How effective do you think each individual intervention was? Why? How about the impact on you? How about possible changes to the interventions?
4. What else could have helped you develop more resilience?
5. Do you have intention to stay in teaching in the next few years? What are your reasons for making this decision?
Appendix III: Sample Interview Transcript

Interviewer: The first question is about the main challenges and threats you faced in your pre-service year. Can you explain the main personal, professional and contextual challenges and threats you faced in the pre-service year? What were your key strategies to overcome them at the time?

Sarah: Okay. So, I feel like, in this practice that I’ve been going through since August, I feel like, in my first placement, I wasn’t as challenged, I was in my comfort zone. So, regarding to the growth zone model, I was in the green zone. And then, in my second placement, I’ve felt like I’ve had new challenges. It’s, kind of, made me grow because I haven’t reached that anxiety level, but I’ve reached the growth bit of the model. So, that’s been quite helpful.

I feel like the challenges in this placement are behaviour issues, sometimes. The students can be quite outspoken or very vocal about their opinions. And, sometimes, I feel like it does grate on me a bit when they say something like, “Oh, why is there not an actual teacher teaching us?” or something like that. Sometimes, it hits confidence, but then you just have to act like it doesn’t really affect you.

Another thing is, like, professional relationships with the staff. I find it a little hard to get on with them, but I am trying to resolve this issue by, you know, like, giving them certain things, like presents or food, or anything like that. Which you’ve discussed in your resilience lectures and seminars, that it can be quite helpful to build relationships with the staff. I do feel like you can sometimes buy people’s affection. Especially with people that you work with, they do feel like you care a little
more if you make them a tea or coffee or pay them compliments. It really does have a positive impact.

**Interviewer:** How about the problems with the behaviour management with students? How did you approach this challenge?

**Sarah:** Yes. I’ve spoken to the teachers, and I’ve asked them what they’ve done in previous cases, and I’ve tried to replicate that. Tried to speak to them, but not too much. I’ve given them two minutes or three minutes to cool down, so I can get away from the student, come back, and then they’ve calmed down and they’re speaking to me at a respectful level. Tried that. I’ve also tried the consequence system, with the behaviour system at my school. So, that’s been quite helpful as well. Some of the challenges were specific to mathematics. Mathematics anxiety plays a lot. And because students are aware of this, which I’ve become aware in your resilience sessions, that students are aware that they might not like mathematics. Or, sometimes, something just goes off in their brain, where they feel like, ‘We don’t understand it. We just see numbers and we can’t comprehend what to do.’ So, because of that, they do make a bit of a fuss, they do say, “We don’t understand. We don’t want to do this.”

For example, I was teaching simultaneous equations and because there are quite a few steps, it was quite hard for them to actually inhibit this kind of concept and, yes, it was quite difficult. Especially as they were set two, so that, kind of, like, made me feel like I wasn’t teaching them properly. But, after marking their tests, some of the students did understand, so I put faith back into myself and thought, “It’s not my teaching, it’s just their self-efficacy and their self-belief of how they can do the topic.”
Interviewer: So how did you help students with their self-efficacy?

Sarah: They’ve got time out passes at my school. So, they can use that to go by themselves and work on the problems themselves. Because, sometimes, I feel like students helping students works a lot better than teachers just talking at them. Because they’re able to relate to the students better, maybe they feel like- I’ve had students say to me, “Miss, this is easy for you because you’ve done your degree.” So then, I think that students helping one another, pair work or peer assessment is a lot better in those cases.

Interviewer: Thank you. Can you describe anything, interventions and others, contributing to your development of resilience during your pre-service year?

Sarah: Yes. I feel like, at certain times in this year, I have been put under pressure. Just the workload, in terms of building up lessons. And I feel like your resilient teacher sessions have been quite helpful. You told us that we have to compartmentalise, and we have to take our time, and just block out anything else, stay focused on one thing. You’ve also told us to help ourselves out physically, so exercising, going to the gym. Which I’ve tried once or twice, but I haven’t actually had that much time, so… But it does help, it does help you relieve that stress. Also, the sessions on the connectedness made me aware of the importance of building relationship with others and since then I have made effort to maintain a positive relationship with my subject mentor, teachers in my department and other PGCE trainees. This has really made my life much easier; when I am in the red zone, these are the people I get support from. I remember a day last half term when I was too stressed at school. I had such a bad day, my year 9 and 10 were awful and I got such a negative feedback from my mentor after my lesson. But
then at the end of the day the other 3 PGCE students invited me to go out with them to have a coffee and chat about things. They were very supportive and shared their own stories. It was then that I realised that actually my Year 10 were behaving the same in their lessons as well. I had always thought that my Year 10 didn’t actually like me and that it was a problem with me or my teaching. The two mathematics trainees came to my next lesson with the Year 10 and became my TAs. They worked with the boys who were disrupting my lessons. It really helped me to pick up myself when I was in the red zone; I was seriously considering leaving the course at that point. The 3 trainees at school have been so supportive helping me to cope well. Yes, definitely in my second placement I became more resilient compared to my first one.

Interviewer: How effective do you think each individual intervention was? Why? How about the impact on you?

Sarah: I feel like your resilient sessions have been helpful. First, it was useful to know more about the theories behind resilience and why teachers need resilience and how they can build resilience. The session on connectedness, for example, made me aware of the importance of building and maintaining positive relationships at school. I faced some massive issues in my second placement, you remember the day you came for the observation and my mentor offered me tea in front of you. That was the only time that . . . ever offered me tea, in front of you. I made lots of efforts there to have a positive relationship with them and finish the placement doing a good deed, I am pleased that I finished the placement with ‘outstanding’, but it wasn’t always easy. It took so much effort. As I said, I found the well-being and work-life balance very useful; however, I personally think I could have engaged with them more, they’re on my list for the NQT year, this year I had to prioritise other things like
planning, teaching and essays. Hopefully, next year would be better as I don’t have to do the university assignments. Regarding the sessions on ‘growth zone model’, with …, we talk a lot about our ‘growth zone’, these days I am more in this zone which is good. I also used stuff about this model with my students and in my essay about mathematics anxiety.

Interviewer: How about possible changes to the interventions? What else could have helped you develop more resilience?

Sarah: Yes. I definitely feel that some sessions on well-being would have helped. Rather than telling us what we could do, actually sitting there, letting us just have a bit of a breather for, like, half-an-hour would be quite helpful. It’s just coming to the resilience sessions at uni, kind of, eases our day. We get to talk to friends, we, kind of, you know, confide in our friends and the people doing the same course as us about the challenges, the stress of teaching. So, actually, just sitting down for an hour, just not talking, not doing anything, just relaxing for a bit would be quite nice. Speaking to other students going through the same challenges, has definitely helped me. It makes me feel like I can relate to others, I’m not alone in this. And, actually, talking to the trainees at my old school as well, because we do share some of the same classes, it’s quite relieving that the same students that we have problems with have the same problems with the other trainee teachers as well. So, it’s not only me, and it helps me with behaviour management sometimes. So, with some difficult students, it helps to give them positive reinforcement, and I’ve taken that off one of the trainees and the trainees here that I talk to. So, it has helped me out. Also, I feel like talking
to others about it, who actually do the same thing as you, helps you a lot better. It makes your practice more worthwhile if you actually talk about the different steps and different methods you take when in that practice. Maybe I’m a bit biased in my thinking when I’m by myself, reflecting. But with other people, you get different kinds of viewpoints, and that’s where you can act upon it. For example, if I had, like, a teaching method, I was told that my teaching method was really good, it was, in fact, rising into double brackets. And with teachers and with other trainees in mathematics, specific to mathematics, it was quite helpful to find out different methods or different behaviour management techniques and, yes.

Interviewer: Do you have the intention to stay in teaching for the next few years? What are your reasons for making this decision?

Sarah: Oh, definitely, yes. I see teachers all the time, they just come into their classrooms, put in their lessons and then they start teaching. And it’s, like, no preparation, nothing, it’s instant to them, and I want that familiarity with myself. I want to be that kind of person. I definitely feel like I don’t want to limit myself to just being a teacher, I would like to end up in, like, a management position, maybe lead practitioner or Head of Mathematics. Because it’s that authority that gives you that power, and I just want to share my experience with everyone.

Interviewer: Is there anything else you would like to add?

Sarah: No, thank you.

Interviewer: Thank you for participating in this interview.

Sarah: Okay, thank you. Thanks
Appendix IV: Ethical Approval

Application for Ethical Approval
for Research Degrees
(PhD, EdD, MA by research)

Student number: 1852696
Student name: Holly Heshmati
PhD ☐ EdD ☐ MA by research ☐

Project title:
Developing Teacher- Resilience Using Growth Zone Model

Supervisor: Sue Johnston-Wilder and Madeleine Findon
Funding body (if relevant): N/A

Please ensure you have read the Guidance for the Ethical Conduct of Research available in the handbook.

Methodology
Please outline the methodology, e.g. observation, individual interviews, focus groups, group testing etc.

Undertaking my action research, I wish to research developing resilience of pre-service teachers of mathematics (Secondary Maths PGCE Students) through the use of the growth zone model and taking into account factors influencing teacher resilience. The intervention programme will be looking at the resilience strategies that the novice
teachers can use with a focus on the following five aspects of resilience: professional, motivational, emotional, social and physical resilience.

To gain insights into the underlying factors as well as explore ideas and approaches to develop teacher resilience, I will be using mixed methods. These include both qualitative and quantitative methods to collect my data.

I intend to use a mixed methods approach in which I will document my findings. Using qualitative and quantitative data will inform my findings and enable me to triangulate some of the findings.

After critically evaluating the potential research methods, I have decided the most useful methods for my research involve:

1. Pre- and post-intervention questionnaires for the pre-service teachers involved in this action research.

2. One to one interview with the pre-service teachers to discuss their views on teacher resilience and the interventions.

3. Observational research involving lesson observations of a sample of participants to validate my data from the questionnaires and the interviews. Furthermore, I will use the observations to identify strategies to further tackle the challenge of resilience through modifying the interventions.

4. My field notes for recording my observations.

Participants
Please specify all participants in the research including ages of children and young people where appropriate. Also specify if any participants are vulnerable e.g. children; as a result of learning disability.
The research involves the participation of 25 Mathematics PGCE students aged 21+ attending one initial teacher training provider, University of Warwick. All Maths PGCE students including those with specific learning needs are invited to participate in the research.

Respect for participants’ rights and dignity
How will the fundamental rights and dignity of participants be respected, e.g. confidentiality, respect of cultural and religious values?
All participants will be briefed about the research and they will be given the option to take part in the research or to decline. Conducting the research, it is vital to minimise risks and maximise benefits; respect participants’ dignity, privacy, and autonomy; take special precautions with vulnerable participants. Thus, the name of the -ITE provider, schools, participants’ school mentors, and participants’ personal information and their data will remain anonymous throughout the research. I will obey relevant rules and institutional and governmental policies regarding conducting research within schools when I conduct observation of the participants. I am committed to avoid discrimination against participants on the basis of sex, race, ethnicity, religion or other factors while conducting my research.

Participants will be given anonymous questionnaires to complete at different stages of the research. They will also be asked to voluntarily participate in semi-structured one-to-one interviews. I will ensure that the questionnaires and interviews are designed fairly to avoid leading or biased questions or questions which might embarrass, worry or upset the participants. My Participant Information leaflet will also include my contact information should someone wish to make further enquiries, withdraw or complain about the research. The participants will be informed that I will be conducting a research as a part of my PhD studies and of the steps that will be taken to ensure confidentiality. Since
my role as a teaching fellow working with the participants can pose the challenge of participants-researcher power relationship, I need to ensure that during the research I provide open communication that allows criticism of the research and of the method. I also need to make sure the participants have the right and the opportunity to object to the approaches being introduced to develop teacher resilience and that I remain neutral regardless of participants’ opinions and views. In addition, I need to commit to the principle of justice by continuously making sure that there is a fair distribution between the benefits experienced by the participants and the burden they experience. This can be achieved through the objectives of the research, developing teacher resilience, which can potentially help participants with their role as a teacher. Finally, I will conduct verification of data analysis with my supervisors at various stages of the study to confirm my understanding of the information collected and to address the challenge of bias through my role as an ‘insider’. Participants’ professional performance is assessed by their placement schools and their academic performance is assessed through anonymous assignments so participation in the research will have no impact on the participants’ academic progress. This will be made clear to participants.

Privacy and confidentiality
How will confidentiality be assured? Please address all aspects of research including protection of data records, thesis, reports/papers that might arise from the study. I will be using anonymous questionnaires and interviews. My participants’ interviews and their questionnaires will be used without the participants’ personal details including names. To ensure the confidentiality of the participants, no names will be recorded on any formal documentation or records. Although my lesson observations will contain the names for the use of the moderation visits carried out by the ITE provider, records of the names will be destroyed after the data has been collected from them. The data related to
each participant will be represented using numbers so participants’ personal details remain anonymous. The data will be represented in form of tables, charts and graphs as well as narratives without participants’ personal information or their names or classes. Any data or narratives which may be traced to a specific participants or schools would not be included in the report. The data related to the schools where participants are completing their placements will remain anonymous.

This data will be stored in my personal folder on the secured network, which is only available to me. The data are stored on my university’s personal device. I will encrypt my data and restrict the access so I am the only person who could access this data. The data will be removed from the system at the end of a period of ten years from the start of the research.

Consent

How will prior informed consent be obtained from the following?

From participants:

It is essential to first obtain the consent from the participants and the ITE provider to undertake the research. The director of the ITE provider, The Secondary Head of Department, participants and their school mentors will be informed about the research purpose and will be given the option to opt in/out. I will conduct the lesson observations as a part of my role in the ITE; however, I will obtain the consent from the participants and their school mentors for using the data from joint observations with the mentors. I will also obtain consent from the Secondary Head of Department and the Director of ITE to use this data for my research. I will not be using any pupils’ information to collect this data.

The research is open to all maths PGCE students attending the ITE provider. I will hand out the information and consent forms during one of the subject sessions, after a deadline of one week; I will monitor which students agreed to participate. For those
students who do not return the consent forms within deadline, I will extend the deadline for another week to ensure the students are given sufficient time to provide consent. Should a student decide to opt out, they do not need to complete the questionnaires or participate in the interviews; however, I still may need to conduct lesson observations for them as a part of my role; however, this data will not be used for research. The same procedure will be followed for the school mentors; I will hand out their information and consent forms during my school visit prior to the observations. Should participants have questions about the research, I would respond to their queries. The director of ITE, the Secondary Head of Department and the participants have the option to opt out/withdraw from the research at any point.

From others:
The director of the ITE and the Secondary Head of Department as well as the school mentors involved in the lesson observations will be informed about the research purpose and will be given the option to opt in/out.

If prior informed consent is not to be obtained, give reason:

N/A

Will participants be explicitly informed of the student’s status?
The participants will be informed that I will be conducting a research as a part of my PhD studies and of the steps that will be taken to ensure confidentiality. My Participant Information leaflet will also include my contact information should someone wish to make further enquiries or complain about the research.
Competence

How will you ensure that all methods used are undertaken with the necessary competence?

Methods used have been discussed with my supervisors. The questionnaire has been used and tested by other researchers. Recent literature on research methods have been used to inform my research methodology. Regular contact via face-to-face, email and Skype with my supervisors will take place during the research to discuss any potential issues. As a part of my PhD programme, I have already completed the Advanced Research Methods training with Centre for Education Studies at University of Warwick.

Protection of participants

How will participants’ safety and well-being be safeguarded?

This research will take place in students’ timetabled sessions at university and their schools’ placement arranged by the ITE provider so there will be no physical risk involved. I will check and recheck my obligation to the study population, which includes sincere concern not to pose any psychological risk to the participants and not to expose them to situations which can make them anxious or uncomfortable. I will acknowledge the strength of the participants (e.g., the coping strategies used by the participants) and I will show empathy when conducting interviews. Finally, I will use reflexivity to be transparent and accountable for the methodology and its limitations; I will ensure that the methodology will represent the influencing factors, such as the power relationship and my role as an insider, that play a role in interpreting and writing the findings. Lesson observations will take place as part of my role as a teaching fellow at the ITE provider and all school’s health and safety and safeguarding policies will be followed during the schools’ visits.
Child protection

Will a CRB check be needed? Yes ☐ No ☐ (If yes, please attach a copy.)

In order for me to be able to work in the ITE provider, I have already obtained a CRB check which I use for the schools’ visits.

Addressing dilemmas

Even well planned research can produce ethical dilemmas. How will you address any ethical dilemmas that may arise in your research?

In real-life scenarios, a teacher’s decision to engage is influenced by a range of factors including their emotions. I will not replicate real life professionally challenging scenarios for my research for ethical reasons. For example, it would not be ethical to recreate the emotional response to the high stress involved when a parent becomes aggressive, and then ask a teacher to state what they would do.

Using focus groups for the interview would have created opportunities for participants to engage in an interactive discussion and could enable participants to extend and build upon their initial ideas about teacher resilience. However, this can be problematic for the current research because the perception of what constitutes a ‘professional challenge’ is highly personal and subjective and could be a sensitive issue that participants may not feel comfortable discussing in a group. Furthermore, participants may not have wanted to disclose their professional challenges, and how they managed the situation, in the presence of other teachers. Therefore, I will use one-to-one interviews to address these research dilemmas.

In addition, I will follow the BERA guidelines and I will address the issues by liaising with my supervisors.

Misuse of research
How will you seek to ensure that the research and the evidence resulting from it are not misused?
I will use anonymous questionnaires and interviews. I will first remove participants’ personal information from the lesson observations and then use them for the research. I will only send anonymous data to my supervisors and other relevant academics from university. I will send transcripts of interviews to participants and state clearly in advance that the research will be used for my thesis and for publication of articles in academic journals.

Support for research participants
What action is proposed if sensitive issues are raised or a participant becomes upset?
The research can involve sensitive issues. However, I will follow BERA’s ethical guidelines at all times and any issues of concern will be raised to the safeguarding lead in the ITE provider and my supervisor. For the questionnaires and the interviews, I will avoid using made-up scenarios involving professionally challenging scenarios which can make the participants anxious or upset. I will also conduct one-to-one interviews to avoid emergence of conflicting views or/and sensitive issues in the presence of other participants. Participants will be familiar with the growth zone model and the possibility of ‘going red’. Participants have the option to withdraw from the interviews at any time.

Integrity
How will you ensure that your research and its reporting are honest, fair and respectful to others?
Conducting my research, I will ensure to adhere to all ethical principles regarding various codes. I will strive for honesty and trustworthiness in my communications concerning my research. These include the report data, results, methods and procedures, and
publication status. Regardless of my findings, my data will not be fabricated, falsified, or misrepresented.

I will avoid careless errors and negligence, and carefully and critically examine my own work and the work of others. I will keep good records of research activities, such as data collection, research design, and correspondence with organisations or journals.

I will ensure that all participants involved in the research have the opportunity to express their thoughts and ideas regardless whether I agree with them or not.

Triangulation of data will help ensure data is valid and all data analysis will be discussed with my supervisor in order to receive support in terms of data interpretation and whether there is a need for further data collection.

Finally, I will honour patents, copyrights, and other forms of intellectual property. I will not use unpublished data, methods, or results without permission. I will give proper acknowledgement or credit for all contributions to research.

What agreement has been made for the attribution of authorship by yourself and your supervisor(s) of any reports or publications?

Any reports or publications of this research will be attributed and authored by me and when explicit attribution is made, I will co-author with my supervisors. Some parts of the work presented in my thesis will be solely authored by me. The names will be ordered according to the level of contribution from each party.

Other issues

Please specify other issues not discussed above, if any, and how you will address them.
Signed:

<table>
<thead>
<tr>
<th>Student:</th>
<th>Holly Heshmati</th>
<th>Date: 01.08.2018 revised Oct 2019</th>
</tr>
</thead>
<tbody>
<tr>
<td>Supervisor:</td>
<td>Sue Johnston-Wilder</td>
<td>Date: 24th October 2019</td>
</tr>
</tbody>
</table>

Please submit this form to the Research Office (Donna Jay, Room B1.43)

Office use only

Action taken:

- [ ] Approved
- [ ] Approved with modification or conditions – see below
- [ ] Action deferred. Please supply additional information or clarification – see below

Name: Emily Henderson
Signature: [redacted]
Date: 28/10/19

Stamped:

Notes of Action: