Supporting adolescents with attentional difficulties to develop their metacognition skills: an action research project

Ruth Elizabeth Thomas

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Abstract

Metacognitive skills are important for effective learning, with literature suggesting these skills are particularly difficult to acquire for those with a diagnosis of ADHD. This action research project investigated how best to support adolescents with a diagnosis of ADHD to develop their metacognition, specifically around planning, monitoring, and evaluating. It sought to encourage them to self-reflect on independent work completed during English lessons in an intervention session with the researcher. There were four participants from Year 9 (age 13 to 14 years) at a secondary school in the West Midlands and they were in the same English class; three of them had a diagnosis of ADHD. Data was collected from recordings of the intervention sessions, the participants' self-reflections, questionnaires, and a reflective journal. There were four cycles of action research. Template analysis was performed on this data which produced a thematic map representing the whole data and individual thematic maps for each participant. The main findings were that each participant had an individual profile of metacognitive strengths and needs which included their motivation for changing their behaviour and knowledge of metacognitive strategies. They required an individual approach to support, whether that be the explicit modelling of a strategy or requiring a prompt to use one. The consideration of group dynamics was an important factor for the intervention to work. This action research project offers further discussion of implications and challenges for working with adolescents who have a diagnosis of ADHD or similar needs.

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Declaration

I, the author, confirm that the Thesis is my own work. I am aware of the University's Guidance on the Use of Unfair Means (www.sheffield.ac.uk/ssid/unfair-means). This work has not been previously been presented for an award at this, or any other, university.

Chapter 1: Introduction

My interest in Attention Deficit Hyperactivity Disorder (ADHD) was sparked during my observation placement in the autumn term of the first year of training to be an educational psychologist. Before starting the course, I had been a teacher, and I just assumed ADHD was something concrete and tangible that was measured and diagnosed by a doctor. Equally I do not feel I really understood what it was or the impact it has on a child other than they displayed difficulties with attention. While on the observation placement I attended several Team Around a Child meetings where the pupils were Children Looked After but they also had a diagnosis of ADHD. I began to question whether ADHD was something which could solely explain a child's behaviour and whether there were other explanatory factors in a child's life for the behaviours they were displaying at both home and school.

I wanted to conduct a research project which looked at practical and manageable ways to support pupils in the classroom, specifically adolescents, with an ADHD diagnosis. There was an element of serendipity with my choice of intervention. At the beginning of my second year placement myself and another trainee educational psychologist were given the task of developing some training for staff who support pupils with special educational needs (SEND) in secondary schools, focussing on study skills and developing metacognition. While researching for this I came across the idea of an Exam Wrapper. I wanted to find out more which led me to the book, 'Using reflection and metacognition to improve student learning' and the chapter 'Make exams worth more than the grade' by Lovett (2013). I wondered if the exam wrapper could be adapted for use with secondary school pupils, particularly those with a diagnosis of ADHD.

The project I will describe to you in this thesis is my attempt to investigate what schools can do to support pupils with a diagnosis of ADHD during lessons. It is an action research project which sought to investigate how best to support pupils with a diagnosis of ADHD with their metacognition skills, to enable them to reflect on their work and become better independent learners.

It was hoped that this research would enable me to support schools with understanding and managing pupils with an ADHD diagnosis in my practice as an EP.

Chapter 2: Literature Review

This chapter will look at the definitions of ADHD and the impact this diagnosis may have on a person. It then explores theories that underpin a diagnosis of ADHD including deficits in executive function skills and the role of motivation. There is also discussion around metacognition, growth mindset and self-efficacy. I explore and critique the interventions that have been researched with children and young people with a diagnosis of ADHD such as working memory training and peer coaching. Following this is an exploration of the literature around supporting college students with developing their metacognition. Finally, there is discussion as to what is missing in the literature and how my research seeks to address this. Details of how the literature review was conducted can be found in Appendix 8.1.

2.1 Attention Deficit Hyperactivity Disorder (ADHD)

Attention Deficit Hyperactivity Disorder has been defined as a neurodevelopmental disorder (Barkley, 2000; Perez-Alvarez, 2017) characterised by impairments in either or both of the following: attention, or hyperactivity and impulsivity (American Psychiatric Association (APA), 2013; World Health Organisation (WHO), 2016). These impairments are often referred to as types or subtypes for example, inattentive-type or combined-type. To receive a diagnosis these impairments must be judged to be excessive for a person's age or overall development (National Institute for Clinical Excellence (NICE), 2018) and this is generally decided by questionnaires that are completed by parents and school. It has been found to exist across the lifespan (Barkley, 2000; Daley & Birchwood, 2010). There are two main diagnostic manuals which are used for the diagnosis of ADHD: The APA Diagnostic and Statistical Manual of Mental Disorders fifth edition (DSM-V: APA, 2013) and the

International Classification of Diseases 11 (ICD-11: WHO, 2019). The DSM was developed in the United States of America whereas the ICD-11 was developed by the WHO. The criteria for each manual are given in Appendices 6.1 and 6.2 respectively. The prevalence rate of diagnosis of ADHD in the UK is 1-2% when using ICD-10 criteria but increases to 3-9% when using the DSM-IV criteria (NICE, 2018). Prevalence rates using the more recent ICD-11 and DSM-V criteria are not yet available. If untreated, ADHD can have a lasting detrimental impact on a person's life in terms of academic performance, relationships, work, and substance abuse (NICE, 2018). Adolescents with a diagnosis of ADHD have been described as a high-risk group in terms of their academic outcomes (Martinussen & Mackenzie, 2015). It is one of the most researched childhood disorders (Young & Myanthi Amarasinghe, 2010) with research coming from many different countries (e.g. Belgium, Brazil, Finland, Israel, New Zealand, Thailand, UK, USA).

The prevalent clinical view which describes the characteristics of ADHD is discussed by Barkley (2000) as deficits in sustaining attention and the presence of hyperactivity and impulsivity, but that these characteristics do not consider what might be the underlying neurological situation. Some researchers are questioning whether diagnosis can be made from a list of behaviours that were compiled by general consensus rather than scientific evidence (Perez-Alvarez, 2017). The director of the National Institute of Mental Health (NIMH) stated in 2013 that they were not going to be using the DSM-V definition of ADHD due to its lack of validity and robustness in making a diagnosis (Perez-Alvarez, 2017). The NIMH is an American agency that undertakes research into mental health disorders (NIMH, no date). Some critics see the diagnosis of ADHD using the DSM or ICD as a pathologizing of behaviour and that it is a descriptive definition but not diagnostic (Timimi, 2017). The word 'disorder' does not sit well with some researchers (A disorder for everyone!, 2020; Sherman et al., 2006; Watson, 2019) and there has been controversy over the medication of children

with psychotropic drugs (Timimi, 2017). These last two points are important to acknowledge but will not be addressed further as they are beyond the scope of this thesis.

2.1.1 NICE guidelines

The NICE (2018) guidelines for intervention are summarised in Table 1.

Table 1 NICE guidelines for intervention by age of diagnosis of ADHD

Age at diagnosis	First treatment option	Secondary treatment option	Further options
Under 5	Parent-training programme for parents or carers	Implement and review environmental changes first. If impairments remain in different environments, then obtain specialist advice.	Medication to be only prescribed after second opinion sought
Over 5	Give information and offer support which can be group-based	Medication if their symptoms are persisting in at least one domain **after** environmental adjustments have been made	Group CBT if despite benefits from medication there are still impairments in at least one domain

In addition, NICE (2018) suggest offering dietary advice to parents and carers. A full baseline assessment is recommended before medication is prescribed which includes measuring the child's height and weight, taking a medical history, and reviewing their mental health. They also recommend that medication is reviewed annually, with the child or young person being able to offer their views on whether to continue taking it. The NICE (2018) guidelines report that pharmacological interventions are a more cost-effective form of treatment than non-pharmacological treatments for children aged five and over. 6000 prescriptions of stimulant medication were given to children and young people in the UK in 1994 and this rose to over 1 million by 2013, an increase of 17,000% (Timimi, 2017). This sharp increase is one of the reasons that the group COPE (Challenging Over-prescription of Psychiatric drugs in Education) was established as a pressure group to influence public policy

around the over-medication of children, particularly related to psychiatric drugs (Traxson, 2018).

2.1.2 The role of executive function

Neuroimaging research has shown a smaller prefrontal cortex in those with an ADHD diagnosis (Daley & Birchwood, 2010). The prefrontal cortex is thought to be responsible for executive function skills in that it regulates certain mental activities that are responsible for self-control (Barkley, 2000). Executive function deficits have been posited as a theory to explain the behaviours associated with ADHD (Barkley, 2000; Holmes et al., 2010). Executive functioning is related to skills in planning and organising, not just day to day but also for the future (Barkley, 2000; Chaimaha et al., 2017) and impulse control and differentiating between thoughts and choices (Beck et al., 2010). Executive function skills are thought to be responsible for self-awareness, problem-solving and being able to shift attention between different aspects of a problem or work task (Riccio & Gomes, 2013). They require a higher-order cognitive process (Langberg et al., 2013) to work efficiently. These skills are not thought to be a unitary construct but interrelated factors (Toplak et al., 2008).

Deficits in executive functioning can lead to problems with academic achievement, inappropriate behaviour, social difficulties (Riccio & Gomes, 2013) and emotional difficulties (Steward, et al., 2017). Guare et al. (2013) discuss eleven executive function skills which include working memory, sustained attention and metacognition (see Appendix 6.4 for more). A commonly used self-report questionnaire in research with an ADHD population is called the Behaviour Rating Inventory of Executive Functioning (BRIEF, see Appendix 6.3: Gioia et al., 2000), which identifies eight areas of executive function including emotional control, working memory and monitoring skills.

2.1.2.1 Working memory

Working memory is one aspect of executive function that has been explored via a plethora of research with the ADHD population. Working memory is the ability to hold and manipulate information to inform behaviour (Rapport et al., 2008) on a temporary basis (Holmes et al., 2010). The Baddeley (2003) model of working memory has been used by several researchers to guide their research (e.g. Beck et al., 2010; Holmes et al., 2010; Orban et al., 2018). Rapport et al. (2008) see working memory as the key deficit in those with ADHD regarding their executive functioning skills. Barkley (2000) sees working memory as one of several executive functions that can be impaired and discusses both verbal and non-verbal working memory. Beck et al. (2010) state that working memory impairments in those with an ADHD diagnosis materialise as an inability to hold in mind what they are meant to be paying attention to when encountering distractions, for example when in a classroom. A similar description of working memory has been posited by other researchers, though not specifically from research with an ADHD population (Oberauer et al., 2016).

Working memory and attentional problems have been stated as being risk factors for academic failure (Rogers et al., 2011). Working memory processing skills have also been suggested as an explanation for the inattentive behaviours which may be displayed by a pupil with an ADHD diagnosis (Orban et al., 2018). Others claim that auditory-verbal working memory (the manipulation of verbal information) explains most of the relationship between teacher-observed inattention and the academic achievements of a pupil with ADHD in reading and maths (Rogers et al., 2011). A well-researched intervention is that of computer-based working memory training (e.g. Beck et al., 2010), which have shown positive results. Some later research has started to dispute whether working memory training is effective though (Apter, 2012; Buitelaar, 2017; Sibley et al., 2014), particularly the transferability and

sustainability of improvements following a computer training intervention (Anderson et al., 2018; Dunning et al., 2013).

2.1.2.2 Critique of the executive function deficit hypothesis of ADHD

Some researchers report that not all of those with a diagnosis of ADHD exhibit executive function deficits (Krieger & Amador-Campos, 2018) and that there is variability in these deficits across this population (Toplak et al., 2008). Those with the inattentive-type often present with difficulties with working memory and processing speed, whereas those with the combined-type can have more difficulties with emotional self-regulation (Krieger & Amador-Campos, 2018). Molitor et al. (2019) report that those with the combined diagnosis are at higher risk of executive function deficits. This study also reported a gender difference in that females with a diagnosis of ADHD have increased executive function deficits. Their study had 256 participants of which 26% were female. They discuss the "gender paradox" of externalised behaviour disorders, where diagnosis is less frequent in females (NICE, 2018), but their functional impairment is greater than that of males. They speculate that perhaps having females with greater impairments meant their study sample was overrepresented with this demographic which has further re-enforced the result of females with ADHD being more impaired in their executive functioning than males.

2.2 Metacognition

Metacognition is being aware of and being able to recognise your own cognitive functions and monitor or control them during the learning process (Antshel & Nastasi, 2008; Pezzica et al., 2018). The ability to directly control your attention skills is thought to improve the learning process (Pezzica et al., 2018) and to be a predictor of academic achievement (Ohtani & Hisasaka, 2018). Having control over your metacognitive abilities can also support independent behaviours (Tamm et al., 2014) and improved problem-solving performance (Swanson, 1990). Metacognition and executive function skills have a dynamic relationship in

that they are separate cognitive processes but are also connected (Reflection Sciences, 2018). Metacognition has been described as the behavioural output of executive function skills (Reflection Sciences, 2018). It has been suggested that it is related to mind wandering in that a person may not be aware that their attention has drifted from a goal-oriented focus (Sanger & Dorjee, 2016). Metacognition is generally believed to have been first discussed by Flavell (1979) where it is described as cognitive monitoring. A simple way to consider metacognition is to see it as three elements: planning, monitoring and evaluation (Lauchlan and Carrigan, 2013; Pintrich et al., 1994; Zepeda et al., 2015). These three elements are discussed in more detail in Zepeda et al. (2015) as follows: planning requires you to identify the goal of the problem and to consider strategies to move towards the goal; monitoring is being able to keep track of your progress towards the goal identified during planning; evaluation involves reviewing the strategies used to reach the goal and considering whether the solution had satisfied the goal well.

The Education Endowment Foundation (EEF) produced guidance for schools around metacognition and self-regulated learning in 2018. It produced a toolkit with recommendations for schools on how they could implement metacognition in their classrooms, as these skills have been rated by the EEF as a high impact but low-cost intervention. Recommended strategies include the explicit teaching of metacognitive strategies (including planning, monitoring, and evaluating), modelling to pupils the teacher's thinking, and supporting teachers to develop their knowledge of metacognition so they can apply it appropriately. A study by Darling-Hammond et al. (2020) produced a diagram encapsulating a holistic view of learning which considers the environment of the child, their support system, their social and emotional development, and instructional strategies. Within the instructional strategies strand there is discussion of how to develop pupil's metacognition

by explicit teaching of metacognitive strategies and providing opportunities for peer and self-assessment.

Continuing with the idea of self-regulated learning, Major et al. (2013) conducted their research with 62 13 to 18-year olds, half of whom had a diagnosis of ADHD. They wanted to find out about these pupils' beliefs around their self-efficacy for self-regulated learning (e.g. having strategies when stuck, being able to remember learned information even when anxious). The participants completed several questionnaires which demonstrated that females with ADHD had lower self-efficacy in their abilities to self-regulate their learning than the other groups. This group were 50% confident in their ability to self-regulate their learning whereas females without an ADHD diagnosis were 76% confident. No differences were found between the two male groups suggesting a possible over-estimation of skills by the male ADHD population. Klassen (2010) also discusses a gender difference with adolescent females having better self-awareness of their metacognitive skills than adolescent males as measured by the participant's rating their self-regulatory efficacy and comparing this with their end-of-term English grade.

Metacognition is believed to be crucial for successful reading comprehension so Alvarado et al. (2011) looked at correlations between reading comprehension and metacognition tests. They found that once reading ability was accounted for, those with an ADHD diagnosis still had poorer comprehension skills which is believed to be due to their metacognitive skills.

Metamemory relates to the ability to predict memory performance and how to use memory strategies (Antshel & Nastasi, 2008). Their research looked at comparing the metamemory skills of 31 children with a diagnosis of ADHD at age 4 and then again at age 5 compared with 31 age, sex, socioeconomic and IQ-matched controls. They found that at age

5 those with a diagnosis of ADHD were beginning to fall behind their control peers in terms of metamemory development. In their discussion they wonder if the knowledge deficit actually turns into a utilisation deficit once those with an ADHD diagnosis are older, so they are aware of memory strategies but are unable to use them; a distinction between knowing about strategies and actually using them. Kuhn (2000) suggests that for a student to independently use strategies they need to have experienced change at the meta-level and not just performance level. In other words, they need to understand the benefits and limitations of strategies so that they can select the most useful strategy to meet a goal. The participants in the Antshel and Nastasi (2008) study are very young and they would be at a very early stage of metamemory development, so the conclusions should be interpreted with caution.

Another avenue of research has looked at metacognition and executive function skills in those with a diagnosis of ADHD. Tamm et al. (2014) trialled an intervention where 24 children aged 3-7 took part in activities with an adult on a weekly basis, which practised different elements of executive function. The intervention lasted for eight weeks and the sessions were one hour in length. The adult talked to the children about what they thought paying attention meant. Their parents were invited to attend too, and they spent their time with a psychologist who talked about how to use these activities at home and were also shown videos of their children taking part in the activities. Parents were asked to complete at least one activity with their children three times a week or more. Standardised tests used to measure effectiveness of the intervention were the Neurodevelopmental Psychological assessment (NEPSY: Korkman et al., 1998), Clinical Evaluation of Language Fundamentals (CELF: Semel et al., 2003), Wechsler Intelligence Scale for Children – fourth edition (WISC-IV: Wechsler, 2004), and the parental BRIEF. 10-12 weeks after the initial assessments, there were significant improvements on the parent-rated BRIEF for Shift and Working Memory. There were also improvements in visual/auditory attention and cognitive flexibility, and

significant reductions in inattentive symptoms. Parental engagement was high with over 90% attending for at least six sessions. However, the authors discuss the limitation of the absence of a control group to compare whether the improvements found were due to increased parental attention or practice effects.

A specific article looked at the role of metacognition and writing proficiency (Trapman et al. 2018). It discusses three different elements of writing: planning which involves the generation and organisation of ideas; formulating where ideas are put into words; and reviewing where you need to interrupt your writing. The researchers state that metacognitive knowledge supports the writing process as there are many useful strategies for monitoring the writing process.

In summary, metacognition is more easily understood when compartmentalised into three elements: planning, monitoring and evaluation. The research reviewed suggests that a student who has a diagnosis of ADHD may have difficulties with reading comprehension due to their metacognitive difficulties and that there is perhaps a utilisation deficit of beneficial strategies. The Tamm et al. (2014) study found some significant improvements with inattentive symptoms where young children were supported to practise different elements of executive function including metacognition.

2.2.1 Self-knowledge about executive function and metacognitive skills

A problem with executive function-based interventions is that if the pupil has an over-inflated belief in their executive functioning skills then they may be less likely to engage with an intervention that is trying to improve them (Steward et al., 2017). Their study with 57 11–16-year olds used self-report and parent-report BRIEF assessments and found that there was no difference between the two groups of pupils' (ADHD or control) views around their Organisation of Materials compared with the adults' views but that there were differences in

other areas: Shift (being flexible), Monitor (an element of metacognition), Emotional Control, Working Memory, and Plan/Organise. They hypothesise that this may be because deficits in their materials organisation are probably mentioned more frequently to the pupils which makes them more aware of problems with this skill. Bar-Ilan et al. (2018) discuss something similar about the overestimation of abilities but in 144 younger children aged 5-10. For their research they were assessing the reliability and validity of a pictorial self-assessment of executive function called PIC-ME. The idea is that a child is presented with pictorial scenarios and accompanying text to see if they identify with the situation and if they also have difficulties with this area too. These scenarios are then used to help the children to set goals for themselves as a child-centred activity. They also asked parents to complete the PIC-ME and the BRIEF and found a high correlation between these parental measures. Significant differences were found between the control parents and the ADHD group parents on the PIC-ME measure, with the scores being higher and indicating a larger deficit for the ADHD group. There were no significant differences between the two groups of children which is less supportive of the PIC-ME being a reliable self-measure of executive function. The authors suggest maybe this is due to underdeveloped cognitive abilities in memory or time estimation and perhaps insufficient self-monitoring abilities in young children. This does support the Steward et al. (2017) research in the overestimation of executive function skills by children and young people with a diagnosis of ADHD.

Drawing has also been researched as an alternative method for assessing metacognitive knowledge of (in)attention (Pezzica et al., 2018). Their 92 participants were aged between 5 and 11 and either had a diagnosis of ADHD or were a control. For some analyses they were also grouped by age; 5-8 and 8-11. The participants were asked to produce two drawings that demonstrated what both attention and inattention look like in the classroom. The pictures were analysed for gaze, posture, equipment, and facial expression.

There were differences between the age groups with younger children being less aware of equipment required and about their posture and also the older children showing more negative feelings in their inattentive drawings than the younger children. The older children were moving more towards the control participants' pictures which was explained by the suggestion that the children with ADHD in this sample were aware of the behavioural expectations in class, but found it difficult to follow them, which is similar to the utilisation deficit discussed by Antshel and Nastasi (2008). The measure used to assess the drawings requires more research as it is still not valid and reliable for general use. It also perhaps overly relies on the participants' drawing ability too. They call for more research into school performance from the perspective of metacognition.

2.2.2 Adolescence, executive function and goal setting

Adolescence is thought to be a crucial age range for the development of executive function and metacognition skills (Langberg et al., 2013; Molitor et al., 2019; Stel & Veenman, 2014). The use of clear targets, and in language that students understand, is thought to help students to reflect on their progress, to self-monitor and to develop a sense of responsibility (Konrad et al., 2014). Butler (2003) discusses how adolescents and adults with learning disabilities need to be assisted to learn and select strategies to support them with their work. They suggest these can be taught explicitly or modelled by an adult to the student(s). This research involved working with teachers so they could support their students with their self-regulated learning. The teachers felt that really listening to their students helped them to identify personalised strategies for them.

2.2.3 Terminology

There are several terms that can be used to describe similar difficulties: executive function, metacognition, thinking skills and self-regulation. They all describe the mental processes associated with monitoring your own thoughts. There have been thinking skills

programmes that have been used in schools such as Thinking Actively in a Social Context (TASC: Wallace, 2008; Wallace et al., 2019) or Learning to Learn (Wall, 2008). TASC is an approach to learning that promotes how to learn skills such as linking new learning with prior knowledge, and planning, monitoring and evaluating work and projects. Learning to Learn (Wall, 2008) was an action research project conducted over four years with 33 schools across four local authorities. The schools implemented interventions relating to metacognition, thinking skills, and self-efficacy and suggest that for these interventions to work they need to be imbedded in the pupils' curriculum rather than as "bolt-on" interventions.

I will endeavour to use metacognition throughout the rest of this thesis, unless the research I am discussing has used a different, specific term.

2.3 The role of motivation

An alternative theory considers the motivational differences between those who have a diagnosis of ADHD and those that do not. Morsink et al. (2017) conducted semi-structured interviews with 39 adolescents (aged 9-16) to investigate what in general motivates them, with their definition of motivation being, "...engaging in an activity for the inherent satisfaction of the activity itself." Using thematic analysis, they found that those with an ADHD diagnosis were more motivated by the "fast passage of time" when it came to a task than those without a diagnosis, for example being motivated by tasks which they perceived would only take a short amount of time. The authors felt that this theme fitted in with the delay aversion theory of ADHD where it is proposed that those with an ADHD diagnosis are motivated to avoid slow and boring tasks. A further theme that differed between the groups was that those with an ADHD diagnosis were less motivated towards familiar and predictable activities.

Some research that combined both motivational theory and executive function theory, hypothesised that perhaps components of working memory are influenced by motivational deficits (Dovis et al., 2015). The research involved comparing two subtypes of ADHD: inattentive and combined. There were 137 participants who were aged between 9 and 12 and included non-diagnosed controls. They completed a computer game that had working memory and short-term memory elements and also the possibility of a monetary reward. The results suggest that those participants with a diagnosis of ADHD who were offered a monetary reward performed better in the tasks than those not offered a reward, but still performed more poorly in the tasks than the control group. The logic behind a monetary reward is based on previous research that inhibitory performance (difficulties with delaying a behavioural response) was improved more with a financial incentive than a social reward (Kohls et al., 2009). Money is not necessarily an extrinsic motivator for everyone; perhaps if participants had been able to choose their own reward then extrinsic motivation could have been assessed more rigorously. Dovis et al. (2015) suggest future research should look at training the central executive. The Baddeley (2003) model of working memory describes the central executive as being responsible for controlling and coordinating cognitive processes.

A longitudinal study with over 3000 participants that looked at both motivation and cognitive strategies and their contribution to the prediction of mathematical achievement (with a general population and not ADHD specific) found that there was a developmental outcome, with the older pupils in Grade 7 being more likely to apply deep learning strategies (making connections with knowledge) than those in Grade 5 (Murayama et al., 2013). They conclude that progress in mathematical achievement was predicted by deep learning strategies for the older pupils but not the younger, implying that metacognitive skills develop as a child gets older. Regarding motivation, it was found to be a predictor of growth in mathematical achievement.

2.3.1 Growth mindset and self-efficacy

Growth mindset was developed by Carol Dweck (1986) and describes how an individual approaches learning and challenge due to their perception of "intelligence". Does an individual attribute their failures to their intelligence or choose to learn from them to improve? An individual with a growth mindset believes that their intelligence can change through practice and persistence (Debacker et al., 2018). Those with a fixed mindset do not believe that intelligence is malleable and can view work as a way of validating their abilities and that failures demonstrate the limits of their abilities (Seaton, 2018). Research by Dweck fifteen to twenty years ago found that students who repeatedly failed to achieve became more averse to challenge and experienced setbacks more intensely (Dweck (1999, 2006) as cited in Rhew et al., 2018). Dweck (2015) discussed the gains in achievement through the fostering of a growth mindset approach, particularly for those at risk of low academic achievement.

A related concept to growth mindset is that of self-efficacy which is a person's beliefs in their abilities. A key figure in the literature around self-efficacy is Barry Zimmerman. In his 2000 paper he discusses that individuals with increased self-efficacy have a lesser adverse emotional reaction when they experience a difficulty, when compared with those who have lower self-efficacy. A student's self-efficacy is thought to relate to how they value a task in terms of how interesting they find it, and how important and useful they perceive it to be (Zepeda et al., 2015).

Those individuals who have a fixed view about intelligence, in that they believe it cannot be changed, have their own schemas for responding to academic tasks which are rooted in their previous experiences (Seaton, 2018). Those with a fixed mindset are thought to be less flexible when approaching academic work. The Seaton (2018) study also states that individuals can change their mindset but that an intervention which aims to do this must be embedded at a systemic level if the intervention outcomes are to be sustained.

A study by Rhew et al. (2018) found a link between a growth mindset intervention and increased motivation. For their study they worked with 68 adolescents with special educational needs that were receiving support for reading. The participants were divided into two groups, with one acting as a comparison group and the other receiving a growth mindset intervention. All participants completed self-report questionnaires pertaining to motivation for reading and their perceptions of themselves as readers (e.g. their self-efficacy in reading). They found that the group who had received the growth mindset intervention had significantly increased motivation to attempt reading tasks compared with the control group but that there was no difference in self-efficacy between the two groups. The researchers wondered whether pupils with specials educational needs may not interpret their own self-efficacy accurately. As the participants were receiving support for reading, I wonder whether self-report questionnaires are the best way to investigate motivation and self-efficacy in reading. There is no mention of whether any of the participants required support to read or understand the questions. In addition, the researchers reported that the use of a growth mindset model during teaching was more successful when it aligned with the daily curriculum. Seaton (2018) also put forward the argument that teachers are best placed to effect systemic change and to support the embedding of new concepts, such as growth mindset, in their classrooms. Haimovitz and Dweck (2017) report that a child's mindset is a robust influencer on motivation and achievement.

To summarise, the research suggests that there may be motivational differences between those with a diagnosis of ADHD compared to those without. There are suggestions of a link between working memory and motivation. Looking more generally at motivation research, pupils who are at risk of academic underachievement (pupils with an ADHD diagnosis are an at-risk group), would benefit from a growth mindset approach and that if this type of approach is embedded in the classroom positive effects are more long-term.

2.4 ADHD in school

2.4.1 What are the educational outcomes for pupils with ADHD?

Pupils with an ADHD diagnosis are less likely to pursue post-Secondary education (though this is now compulsory in England/UK) (Dupaul et al., 2011) and their academic outcomes seem to be affected negatively (Barkley, 2000; Riccio & Gomes, 2013; Rogers et al., 2011). Hyperactivity behaviours generally decline as a person ages, but inattentive behaviours can persist (Buitelaar, 2017) and become more intense than hyperactivity symptoms (Krieger and Amader-Campos, 2018) which increase chances of academic failure (Rogers et al., 2011). Daley and Birchwood (2010) argue that there are two camps that explain why there are academic deficits:

1. That poor inhibitory control is associated with dysregulation of thought and action
2. That motivational style is different due to an associated altered reward mechanism

Daley and Birchwood (2010) speculate that executive functioning could be the main cause of academic underachievement but that executive function deficits are not common to all children with a diagnosis of ADHD. They also wonder whether the inattention strand exacerbates the executive function difficulties which can then lead to academic underachievement. It would seem that executive function skills are important for academic achievement.

2.4.2 ADHD behaviour management in the classroom

Behaviourism, as implemented by positive reinforcement, has been the most commonly researched paradigm for managing ADHD in the classroom (DuPaul et al., 2011). Owens et al. (2017) investigated whether providing consultation to teachers would increase their likelihood of implementing behavioural classroom interventions. 58 teachers participated and they received up to eight biweekly consultations where they discussed

general classroom management ideas and also completed a daily report card which was completed for a target student who had a diagnosis of ADHD or similar needs. There were two types of consultation provided to enable comparisons to be made; one mirrored best practice from the literature and the other also addressed teacher's knowledge and beliefs about implementing classroom interventions. In both consultation conditions teachers demonstrated improvement with their general classroom competence as measured from two observations of what classroom management strategies the teacher was using, and how effectively, on a scale from 1-10. Those teachers who had lower beliefs about implementing interventions improved more if they were in the consultation group that also addressed their knowledge and beliefs about classroom interventions.

Qualitative research with education staff who work with pupils with a diagnosis of ADHD revealed that their responses to ADHD in the classroom were themed as the following: broad strategies, student-centred, and inclusive strategies (Moore et al., 2017). The 42 staff reported that the barriers and facilitators to managing students with ADHD were labelling, medication, and relationships as demonstrated in Table 2.

Table 2 Barriers and facilitators in managing students with ADHD

	Barrier	**Facilitator**
Labelling	Being used as an excuse by pupils/parents for their behaviour. Stigmatisation.	Important for managing the pupil's needs. Access to support.
Medication	Removing their personality.	Enables more effective use of classroom strategies.
Relationships	If support not given, then social skills can be difficult.	Increases the pupil's success and therefore self-esteem.

Information compiled from Moore et al. (2017).

A key finding was that the staff who participated felt that positive relationships were an essential component in supporting students with ADHD. This aligns with the values in research conducted by Karhu et al. (2018) where they considered the context and not just the behaviours as a means to promoting inclusion of those with an ADHD diagnosis. When the staff in the Moore et al. (2017) study were discussing the strategies that they use with students, the researchers report that they were not using strategies that targeted the specific core symptoms of ADHD (i.e. inattentiveness and/or hyperactivity/impulsivity) but instead focussed on encouraging positive behaviours such as study and social skills.

2.4.3 Utilising parents and peers in intervention

Interventions that include parent training have been studied. Barkley et al. (2000) conducted research with 158 pre-schoolers (aged 4.5-6 years old) identified as having ADHD traits by comparing four intervention options:

1. nothing,
2. parent training,
3. full-day treatment in a classroom,
4. a combination of 2 and 3.

The interventions lasted for a year. The full-day treatment involved children attending a different school where staff had been trained to use various behaviour management tools and the pupils also received some group cognitive-behavioural sessions and had a daily report card. There were approximately 15 pupils assigned to these classes. When compared with the other treatment groups, significant improvements were found for those who had the full-day treatment in the classroom in terms of teacher-reported attention, aggression, self-control and social skills and also for parent-reported home adaptive functioning (a questionnaire which asks about different areas of development such as motor skills, language, and self-help skills).

These classes had two adults plus a master teacher who spent a half-day in each. This master teacher trained the adults in the different behaviour interventions. The improvement could therefore be attributed to the lower adult to child ratio than would be found in a typical classroom. There was poor attendance for the parent training (a third of families did not attend any sessions) and none of the interventions increased academic achievement or parent rating of behaviour at home.

Different parent programme research has been conducted by Chaimaha et al. (2017). The intervention involved eight children aged between 10 and 12 with ADHD and executive function deficits. Their parent programme involved the parents receiving information about ADHD and executive function deficits, suggestions of strategies for using at home and a weekly phone call with a researcher. The other elements to the intervention were a computer-administered training programme and some pen and paper exercises for the children to improve their executive functioning skills: working memory, planning, and monitoring skills. The children's teachers were asked to check the children's self-reported self-monitoring sheet at the end of each day. This sheet asked the children to say whether they had used various strategies in their lessons that day. Teachers also had a discussion with a researcher once a week. The final element involved each child being matched up with a peer buddy who could act as a prompt in lessons. The intervention lasted seven weeks and they found a significant increase in academic school performance (as measured by taking students' Grade Point Average (GPA) scores from the first and second semesters), certain measures on the Teacher-assessed BRIEF assessment (Working Memory, Planning, Self-Monitoring) and the working memory subtest of the Wechsler Intelligence Scale for Children-Revised (WISC-R: Wechsler, 1974). The targeted areas from the BRIEF did not significantly improve on the parent-report form which is interesting considering the pupils' academic performance increased. However, there was a significant improvement on the parent-reported BRIEF for

the Behaviour Regulation Index (BRI) and Global Executive Composite (GEC) scores. The BRI comprises the Inhibit, Shift, Emotional Control and Self-Monitor sub-scales. Working memory is perhaps less noticeable at home than in school environment which could account for there being no significant improvements. Regarding the significant increase in GPA semester scores, perhaps the students in the intervention made the same amount of progress as their peers who did not participate in the intervention or made progress they were expected to make anyway so it was not necessarily because of the intervention; there was no control group with whom comparisons could be made.

Another study that utilised peers looked at peer tutoring and peer coaching of positive social behaviours (Plumer & Stoner, 2005). There were three focus participants, aged between 9 and 10, who received peer tutoring alongside their whole class and then a few weeks later also had peer coaching. Peer tutoring happened two to three times per week and involved the class being put into pairs by the teacher and them taking it in turns to support the other to learn a list of spellings. Peer coaching happened daily and involved the coach supporting the other student to set and carry out a social goal. The peer coach would remind the target pupil of their goal when it came to the time of day when they were hoping to achieve it and then review it with them afterwards. They found that the pupils within the study had increased positive peer social behaviours at school, for example at break and lunch times, once they had received the peer coaching intervention. The participants were observed at various times of the day to document their peer social behaviours. The researchers reported that one of the participants was very aware of the observer at the beginning of the study and speculate that they may have engaged in more pro-social behaviours because of this. It would have been interesting to see if the peer tutoring and coaching influenced their academic skills and also how the participants felt about themselves and their social skills. This research suggests that those with a diagnosis of ADHD need explicit prompting to engage in achieving

a goal and require individual follow up to evaluate their performance although with three participants it is not possible to generalise their findings.

The utilisation of parents and peers has mixed results from the research. The Chaimaha et al. (2017) research looked at several intervention measures so it is unknown which had the greater influence on the participants' improvements in academic school performance. Including the qualitative research with teachers and teaching assistants (Moore et al., 2017) the development of positive relationships with pupils who have a diagnosis of ADHD is a protective factor for them.

2.4.3.1 What can be done in the classroom?

There has been research on the following classroom interventions: task/instructional modifications, classroom modifications, self-monitoring with classwork or homework, strategy training such as note-taking skills, and homework-focused interventions (Daley & Birchwood, 2010). Much of the research does seem to be with younger children or relating to managing the behavioural traits of ADHD. For example, research into classroom modifications was to do with altering behaviours and not improving academic outcomes (Raggi & Chronis, 2006).

Research by Imhof (2004) looked at the effects of coloured paper on handwriting performance. They suggest that the coloured paper improved performance due to the added external stimulation provided by the colour which in turn supported regulation of selective attention and graphomotor coordination. They also offer an alternative hypothesis that the coloured paper reduced visual stress.

2.5 Therapeutic approaches

A summer treatment programme for 34 adolescents which taught them about academic and organisational skills, daily jobs (there is no explanation as to what this means

in the paper), substance use prevention and leadership training was evaluated (Sibley et al., 2012). The programmes were tailored to each adolescent. It was an intensive programme running from 8am to 5pm every day for eight weeks. 60-90% of the participants improved in each domain (e.g. sibling interactions, physical fighting, social skills) measured. The participants who were more engaged with the programme, and had lower levels of oppositional behaviour, demonstrated greater improvements in the three areas, which links with the research about motivation discussed earlier. There was no follow-up measure to see if gains made during the summer treatment programme were applicable to school and academia.

2.6 Self-reflection interventions

Some research has been conducted with college students which investigated the promotion of self-reflection after completing an exam. The first paper was written by Achacoso (2004) who wanted to find out which college students were putting in the most effort but still getting low results. To do this the students completed a questionnaire which asked them to predict their test score, rate their study effort and list their utilised study strategies. It also asked them to report what they felt were the easiest and hardest parts of the exam. The students were then able to compare their predicted and actual scores and write a comment about how they felt about this. Finally, the students wrote down any planned changes for how they might approach future exams. The questionnaire was a tool for developing metacognitive awareness. This short paper did not state the specific age of the students, so I assume they are post-18 (Gezer-Templeton et al., 2017). Achacoso (2004) reported that the class had increased metacognitive awareness due to the feedback process and that the relationship between tutor and student improved due to the tutor acting on their feedback. Another finding was that the mean class score on each exam improved over the

semester but there is no data provided to support this and one would anticipate that the mean score would improve over a semester as the pupils learn more anyway.

An additional development was researched by Thompson (2012) who sought to promote metacognitive skills with 18-25-year olds attending a Spanish class. A post-exam self-monitoring questionnaire was administered several times as an iterative approach to enquiry which was called an “exam wrapper”. It was hoped it would develop the students’ knowledge and monitoring of their cognitive processes. Similarly to Achacoso (2004), students were asked to predict their scores. Thompson (2012) found that those who received a low score on the exam had significantly overestimated when predicting their scores. A control group was used for this research, but this group started with a higher proficiency in Spanish than the intervention group and had on average better final course grades too. There was an increase of 23.40% in metacognitive self-regulation for first years in the intervention group, compared to 11.15% increase for first years in the control group which is a positive result in favour of the exam wrapper tool.

The exam wrapper was further developed as a tool to promote metacognition in college students by Lovett (2013) and colleagues at Carnegie Mellon University in the United States (see Appendix 3.1 for an example). Their exam wrapper was used across four different maths and science courses over a semester. Students completed them for at least one course with the most courses being three. The exam wrapper consisted of three main elements:

1. Preparing for the exam
2. Looking at the types of error made in the exam
3. Considering changes to preparation for an exam

The exam wrapper intervention requires students to complete it after their exam and then have it returned to them when it is time to prepare for their next exam. It is about

teaching metacognitive skills in an ecologically valid situation e.g. college examinations. The exam wrapper was demonstrated to work best when students had completed them for two or three different courses. These students had improved self-reported ratings of their individual metacognitive strategies, measured by looking at the difference in ratings of different strategies at the beginning of the semester and at the end once they had been engaging in the exam wrapper intervention. Lovett (2013) hypothesised that the improvements were seen because these students were thinking metacognitively in multiple disciplines which helped to promote the usefulness of these skills. It is not mentioned whether any of the pupils had any additional educational needs.

The exam wrapper has also been researched with students aged between 17 and 53 for a single course at a community college by Soicher and Gurung (2017). The mean age of the participants was 21 years and 6 months and there were 86 participants. To test for improvements the researchers used the Metacognitive Awareness Inventory (MAI: Schraw & Dennison, 1994) but unfortunately there were no significant differences in exam score, final grades or metacognitive ability. Only 25 of the 86 participants completed all three of the exam wrappers. The exam wrappers were not returned to the participants in this study which seems at odds with one of the fundamental aspects of this intervention. Not all of the participants took the final exam either, so the study is perhaps too small for finding statistical significance. The researchers stated that they would have liked to have gathered qualitative information from the students about their use of the exam wrappers as they speculate that some of the students may have improved their study habits even though the data suggests the exam wrapper was not effective.

The last piece of exam wrapper research with college students was conducted by Gezer-Templeton et al. (2017). The students were completing a food science and human nutrition course. There were 83 participants and 88% completed three exam wrappers.

Qualitative information was also collected from the students. Some reported a desire to change their study habits but had not tried to put anything new into practice. The exam wrapper tool was rated with a Likert scale questionnaire and suggested that most of the students would use this approach in the future. There was a similar finding to Thompson (2012) in that those with poor exam performance had overestimated their scores when asked to predict. Gezer-Templeton et al. (2017) suggest that those who would benefit the most from the exam wrapper tool are those who are expected to and are receiving middle grades.

Positive benefits have been found from the use of self-reflection tools to promote metacognitive self-knowledge. The most effective methods found were repeated use and returning them to students to enable further reflection.

2.7 Gaps in the literature

Several studies call for more research to be conducted to establish evidence-based school interventions for ADHD (Daley & Birchwood, 2010; Moore et al., 2017), interventions that focus on developing strategies with adolescents to improve real-world usage of executive functioning (Langberg et al., 2013) and to investigate the general functioning of secondary school pupils with ADHD (DuPaul et al., 2011). There is also little research into study strategies for those with special educational needs (Dunlosky et al., 2013).

2.8 Research aims and questions

I therefore propose to develop the exam wrapper idea with a small group of adolescents at secondary school, some of whom have a diagnosis of ADHD, to support the development of their metacognition skills. Rather than focussing on exam performance it will be developed for use in independent class work.

This research project sought to answer the following questions:

1. How can I develop a tool to support adolescents with ADHD in strengthening their metacognition skills?
    - What strategies and approaches worked well with the participants?
    - Do the participants differ and in what way?
2. How did the young people experience the intervention?

Chapter 3: Methodology

This chapter seeks to explain my philosophical position, explore the reasons behind my choice of methodology and discuss the validity and reliability of my research. There will also be an explanation of my research design, how the participants were recruited, the pilot study, a description of each data collection session and discussion of the data analysis technique used, namely template analysis.

The research project described sought to collaborate with adolescents with a diagnosis of ADHD to support their metacognitive skills, specifically for when completing independent work at school. It was hoped that we could develop a version of the exam wrapper tool that was suitable for secondary school pupils and focussed on independent work. The idea was not to create and test a tool that could definitely be used with other pupils with a similar profile, but to develop a tool and evaluate the development process to inform future research and generate theory.

3.1 Personal values

I wanted to conduct research with young people and not on them (Litt, 2003). From the reading I completed for the literature review, there was a lack of pupil voice for those with a diagnosis of ADHD, so I wanted my participants to be involved in shaping the intervention and to have a say around the results and my interpretation of them. These values meant that I needed a methodology that allowed me to be transparent with my participants and one that was flexible to allow the project to evolve without fixed outcomes. This led to the selection of action research as my methodological approach.

3.2 Initial intervention idea

At the outset of this research project I wanted to develop the exam wrapper (Lovett, 2013) intervention for use with secondary school pupils and their independently completed English work. The intervention was to involve the participants coming out of their English lesson with their work books, looking through their books to find some independent written work and then reflecting on this work using the adapted exam wrapper, or thinking skills tool as it was re-named. The thinking skills tool contained questions that supported the three elements of metacognition: planning, monitoring and evaluation. I then wanted the participants to make suggestions on how the thinking skills tool could be developed for the next week, whether that be changing some of the questions, having multiple choice answer options or the presentation of it. I thought it was likely that each participant would end up with their own individual thinking skills tool.

3.3 Action research

Action research is primarily conducted by researchers who work in a field such as teaching or nursing, as a means to improve their practice or bring about organisational change (Kagan et al., 2008). A key element is critical self-reflection as action research positions the researcher as a participant (McNiff, 2013). It also respects the knowledge of the participants (Rowell & Long, 2018 as cited in Percy-Smith et al., 2019).

Action research is generally run as a cyclical process of planning, acting, evaluating, observing and reflecting (Kagan et al., 2008; McNiff, 2013) although some refer to it as a spiral (Tekin & Kotaman, 2013) and others see more variation of cycles, combinations and flow-diagrams (Drummond & Themessl-Huber, 2007). The researcher has been described by Poonamallee (2009) as an insider-outsider due to them engaging in the process and then reflecting on their engagement. McAteer (2013) talks about the researcher being at the centre

of both the research and the practice. Drummond & Themessl-Huber (2007) describe action research as becoming friends with the problem throughout the cyclical process.

3.3.1 Alternative methodologies

As discussed in Cassell and Johnson (2006), it is important to consider possible alternative methodologies to demonstrate the robustness in choosing action research. It could have been possible for me to devise an exam wrapper tool (see Box 3.1) and use it with a much larger population to see if it led to better self-reported metacognitive awareness as per the study in Lovett (2013), using quantitative methodology. However, being able to create the controlled environment in a school that would be necessary for conducting thorough quantitative research would be very difficult (Avramidis & Smith, 1999). I wanted to see if the exam wrapper could be adapted for more general use. The idea therefore evolved into supporting secondary school students with their independent class work which is something which occurs more frequently than an exam. As there was no evidence to suggest the exam wrapper approach would work with adolescents aged between 12 and 15 or for independent work rather than supporting exams, I believed it would be more beneficial to first develop a tool with those who might use it to investigate what elements of metacognition (such as planning, monitoring or evaluation) they would find to be the most useful. The project is at the stage of development and not testing.

Box 3.1: Exam Wrapper refresher

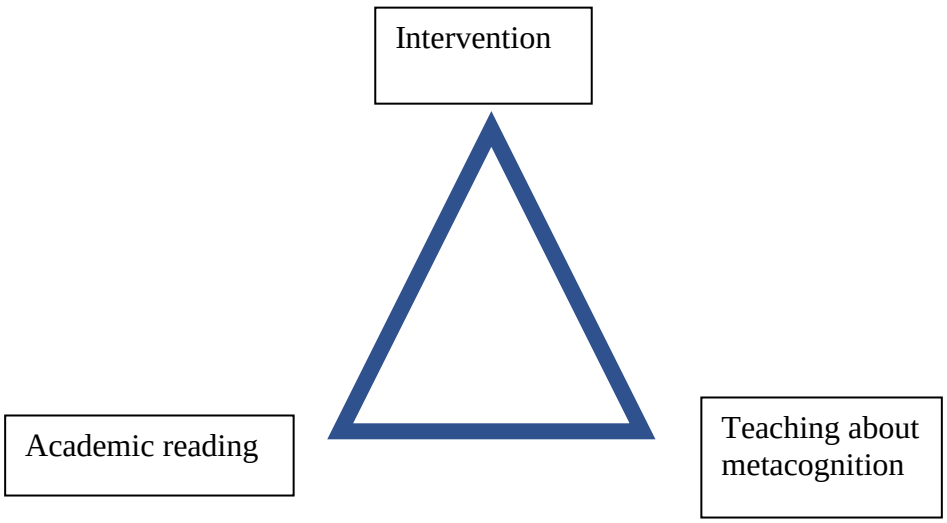
The exam wrapper idea was developed by Lovett (2013) at Carnegie Mellon University in the United States of America. It was devised as a tool to support college students with their metacognition, particularly around preparing for and learning from exams.

Mixed methods is a methodology I considered as it allows for the collection of both quantitative and qualitative information which would be useful when evaluating an intervention as there would be numerical impact data and qualitative experience data. The intervention I was looking at developing was not established so it felt unsuitable for mixed methods. Therefore, action research presented itself as an opportunity to develop a tool/intervention with young people which would be difficult to approach with mixed methods. I wanted to investigate the benefits of collaborating with those who are currently experiencing education as this is one of my personal values, which corresponds with action research.

3.3.2 Why action research?

There is plenty of theory around executive function deficits in pupils with a diagnosis of ADHD, of which metacognition is an element, but this research aspires to develop a practical tool that supports the participants to develop their metacognition and encourages them to practise it. Lewin (1946) talks about a triangle of action, training and research which in this study would be the intervention and tool development, teaching about metacognition with the participants and the class teachers, and my academic reading to support tool development (see Figure 1).

Figure 1 Triangle of action, training and research



Action research appealed due to its collaborative nature. I am not a practitioner in the setting trying to improve my own practice, but I felt action research was suitable for this project because tool development requires a methodology that allows the participants' voices to be heard and acted upon. The incorporation of self-reflection also appealed as it allows the researcher to be honest about how they have shaped the research project. Action research seeks to produce knowledge that is practical and useful in people's everyday lives (Reason & Bradbury, 2013). It is less traditionally scientific (McNiff, 2013) and can be seen as controversial as it does not adhere to methodical standards that scientific (i.e. positivist) research dictates (Drummond & Themessl-Huber, 2007). However, action research has several positive attributes: it is ecologically valid, open, and dynamic (Tekin & Kotaman, 2013). Each attribute will be discussed in relation to this research.

3.3.2.1 Ecologically valid

We will be developing a tool in an ecologically valid setting (e.g. a familiar setting to the participants and an intervention that is related to schoolwork being conducted at the time) as described below:

1. work that the participants have completed as part of their Year 9 English curriculum
2. intervention sessions during the school day
3. adaptations made to the tool that reflect what the students need at that time

The participants will know what the tool looks like once data collection has ended; it will not be changed after the last session regardless of whether I have read some additional informative literature or after reflecting on the development process. The school will also have copies of the tool should they wish to continue using it or implement it with different

year groups; the results will have a practical value (Tekin & Kotaman, 2013). Lewin (1946) states, “Research that produces nothing but books will not suffice” (p. 35).

3.3.2.2 Open

As the tool is developed with the participants there is no analysis being conducted that they will not know about. I will be sharing my thoughts and theme ideas each week and inviting comments. Elliott (1978) describes obtaining feedback from the participants about interpretations in an action research study as “integral” to the process. This supports my ethical and personal values that the participants should be aware of what is happening each week of the project and should have a say in how I interpret the data. Action researchers believe in equality (McNiff, 2013).

3.3.2.3 Dynamic

The process of inviting thoughts and comments from adolescents and then acting upon them is dynamic compared with other research methodologies. Action research is also dynamic in that it is flexible to allow for changes to an intervention.

3.3.3 Problems with action research

One potential difficulty with action research is that the researcher may profess to be conducting the research collaboratively while imposing their own ideas on the participants (Cassell & Johnson, 2006). Being aware of self-indulgence can be another difficulty (Marshall, 2001 as cited in Poonamalle 2009). I need to be mindful of these potential difficulties due to the amount of literature I have read around metacognition and executive function deficits in those with an ADHD diagnosis. I want to be using the literature to support the participants and not to force my agenda on them.

As much as action research strives to reduce power imbalances, I am clearly an adult and the majority of my participants are adolescents so there is a distinction in our social

positions, which can be problematic for developing a trusting research relationship (Chabot et al., 2012). Further criticism of action research is that there can be an absence of theory building once the research is completed (Dick, 2004). This conclusion was made after Dick (2004) reviewed a variety of books and journals to look for current trends and themes in action research.

3.4 Philosophical position

I understand ADHD as a diagnosis given to a child who displays a certain set of behavioural characteristics relating to attention, hyperactivity and impulsivity that are not in line with cultural and social expectations of behaviour in children. The process of diagnosis is often instigated by a school and/or parents who have concerns that a pupil's behaviour is more difficult to manage than others in the class or family. The diagnosis of ADHD is often accepted by other people such as teachers and parents although the existence of ADHD is still contested in the research community (e.g. Visser & Jehan, 2009; Wheeler, 2010). I believe that a diagnosis of ADHD does not offer a full description of a pupil's needs but that there are people who believe that it does. My understanding of ADHD is that it is often seen as a within-child difficulty without fully considering environmental and psychosocial factors around the child that are also influencing their behaviour.

In order to recruit participants, I have accepted that a diagnosis of ADHD describes a set of needs relating to attention, hyperactivity and impulsivity which is aligned with a realist perspective. I am unconvinced of the usefulness of a diagnosis of ADHD in supporting children with their learning, so I wanted to work alongside those with a diagnosis to raise their voice in line with the aims of critical theory (Cassell & Johnson, 2006) and critical realism. Roy Bhaskar is one of the key figures in critical realism and he was interested in human emancipation (Williams et al., 2017). The accommodation of different values and

attempting to understand other people's perspectives is an underlying theme in action research (McNiff, 2013).

Traditionally, action researchers view knowledge as something that we generate from our experiences of living and learning (McNiff, 2013) which is how knowledge was produced in this research. I worked with a small group of Year 9 pupils where information was gathered from our interactions, whether that be my reflections on the intervention sessions or what the participants said or wrote during the sessions. The participants' interactions were sometimes in response to me and at other times in response to each other. For example, conversations they had amongst themselves that were not about the intervention were used as information to help me understand how the participants functioned together socially and how they might present in the classroom.

Together we constructed knowledge about working with pupils with an ADHD diagnosis or similar difficulties, both in general and with supporting the development of their metacognitive skills. For me to further understand ADHD I have needed to work and interact with pupils with this diagnosis on a frequent and intensive basis. This understanding will be disseminated in this research but also in my future interactions with pupils, schools and families where there are children with a diagnosis of ADHD or similar difficulties.

This action research project is aligned with a critical realist philosophy with a subjective epistemology and objective ontology (Cassell & Johnson, 2006). A subjective epistemology acknowledges that knowledge has a socially constructed nature and can be the product of how our minds have interpreted events (Morton, 2006). Through the research process I have gained new knowledge from my interactions with the participants. An objective ontology positions the researcher as someone who believes that there is a real world

beyond their own beliefs (Maxwell, 2005). Regardless of my views, as an educational psychologist I will continue to encounter pupils with a diagnosis of ADHD.

3.5 Trustworthiness in the research

There are critics who would argue that action research lacks rigour and does not follow the requirements of scientific enquiry (examples in Tekin & Kotaman, 2013) which are positions taken by those who hold positivist epistemologies. However, Cassell and Johnson (2006) and Poonamallee (2009) would counterargue that action research is incomparable with a positivist epistemology because it comes from a different philosophical stance. Poonamallee (2009) uses the term "incommensurability" to highlight that the language used to describe a positivist epistemology when compared with action research is so different that they cannot be compared. To address the arguments around rigour, I have considered the Trustworthiness model developed by Lincoln and Guba (1985) as presented in Table 3 and supplemented by Rehman and Alharti (2016) and Morrow (2005).

Table 3 Terminology relating to trustworthiness in research

Positivistic Research	**Qualitative Research**
Internal Validity	Credibility – is the research believable and do the findings link to reality. How does the researcher communicate their research's credibility.
External Validity	Transferability – generalisation of the findings to the context of the study. Communicating to the reader enough information so they can decide on transferability of the research. A thick description of the research.
Reliability	Dependability – consistent conduct during the research process, could the research be repeated, clearly communicating the research process (audit trail).
Objectivity	Confirmability – research is never objective. Does the research make sense from the data, analysis and findings that are presented.

Authenticity is an additional criterion of trustworthiness for qualitative research that considers issues of power, representation and empowerment (Amin et al., 2020). Following the guidelines in Connelly (2016), I will outline what I did to ensure that my research was trustworthy for the four elements presented in Table 3 plus authenticity.

3.5.1 Credibility

- I followed the standard procedures for action research
- I met with the participants over a period of seven months and weekly during data collection
- Member checks were completed weekly as I trialled the new thinking skills tools based on the participants' comments
- I completed a reflective journal throughout the research process, from awaiting ethical approval until submission
- Action research is by nature, an iterative process

3.5.2 Dependability

- I completed a research diary
- If I was unsure of what a participant was telling me I clarified with further questioning to understand what it was they wanted to change and why
- All field notes and recordings were dated

3.5.3 Confirmability

- I completed a research diary
- My supervisor read some interpretations and looked at some raw data
- Member checking was completed each week during the intervention

3.5.4 Transferability

- A detailed description of the participants, their context and the environment has been provided
- The analysis was shared with the participants so they could provide feedback as the research was going along

3.5.5 Authenticity

- Action research allows for realistic data collection
- Giving the participants options for changes to reduce the power imbalance

3.5.6 Further trustworthiness challenges and obstacles

As per the research by Kornbluh (2015), I have explained how I addressed further challenges and obstacles during this research in a table presented in Appendix 9.1.

3.6 Current research

This research sought to collaborate with a small group of adolescents (a maximum of six participants) in a mainstream secondary school to develop a 'tool' to support their metacognition when completing independent writing during English lessons. The intervention took place on a weekly basis during an English lesson and lasted between 10 and 20 minutes. The initial idea was for the participants to complete an adapted exam wrapper (Lovett, 2013) about some independent English work that they had recently completed and for them then to offer suggestions on how to change the tool for future weeks so that it was beneficial for them.

3.6.1 Participants and recruitment

The selection criteria were as follows:

- Three or four participants with a diagnosis of ADHD

- One or two participants without a diagnosis of ADHD but with similar difficulties
- Between 12 and 15 years old
- The ability to engage in an intervention
- Those who would benefit from an intervention to support metacognition
- Preferably in the same class for a core subject (English, maths or science)

The age range was chosen as this is considered the best time for metacognitive growth (Langberg et al., 2013; Molitor et al., 2019; Stel & Veenman, 2014). I wanted at least one participant without a diagnosis of ADHD as in line with the executive function deficit hypothesis of ADHD it was hoped they would think differently and be able to support the group with different ideas and suggestions but still benefit from the intervention and improve their own metacognition. It also fits with my personal beliefs around equality and that not just those with a diagnosis of ADHD should be part of the research.

I contacted the SENCo at a secondary school with whom I had worked throughout the academic year of 2018-19. The headteacher gave permission for me to approach five participants and a class teacher. With help from the school's SENCo, I recruited five participants from the same English class, of which four gave their consent to take part. The participants were in Year 8 during the pilot study and Year 9 for the tool development phase. There were two males with a diagnosis of ADHD, one female with a diagnosis of ADHD and one female without a diagnosis of ADHD. The SENCo felt that the pupil without the diagnosis would benefit from the intervention.

Table 4 Participant demographics

	ADHD diagnosis	**No ADHD diagnosis**
Male	2	0
Female	1	1

The participants remained in the same English class when they started Year 9, but with a different teacher who had not attended the pilot study with them at the end of Year 8. When I returned in the Spring term of 2020, they had been moved into different classes to create mixed-ability groups so the SENCO and original class teacher ensured that all of the teachers knew when I was coming in and made the pupils available. The secondary school is an academy which educates approximately 850 pupils. They have a higher than average number of pupils who are eligible for free school meals and who have special educational needs.

3.6.2 Pilot study

Via the school, I sent out a questionnaire (see Appendix 2.1) to the participants at their home address prior to meeting them for an informal teaching session and focus group. I created a PowerPoint presentation (see Appendix 7.1) and prepared an activity so that I could demonstrate what metacognition skills were. These were delivered in a classroom during school time on the last week of term before the summer holidays. Their current Year 8 English teacher was present. The PowerPoint was titled 'Developing a thinking skills tool: action research' and outlined the study, provided some information about what metacognition is, and the types of questions it can involve asking yourself. For example, monitoring questions such as, "Am I on the right track?" or "Who can I ask for help?" I wanted my participants to hear the correct terminology (e.g. 'metacognition' and not only 'thinking skills') and for them to find out why these skills are useful in order to reduce the inherent power imbalance between school pupils and adult-teacher figures (see Appendix 9.1).

As part of the pilot study I prepared an activity which required the participants to make as tall a tower as possible out of uncooked spaghetti and marshmallows. I paused at different stages to encourage their metacognitive thinking (see Appendix 7.1, slide 4). For example, before they began the task, "What do you already know about spaghetti?". This was

to encourage them to think about the properties of spaghetti before they began building a structure rather than just beginning immediately. This activity also offered the opportunity for me to see how they coped with a challenge. Some of them gave up quite quickly when they could not get anything to stand upright while others persevered or found additional materials (e.g. Sellotape) to help them.

The focus group element of the pilot was to gather the participants' opinions about an original exam wrapper (see Appendix 3.1) and a prototype thinking skills tool that I had developed (see Appendix 7.2) which I felt was more reflective of what the participants do during independent work in class. I provided each participant with a paper copy of the exam wrapper and thinking skills tool, so they wrote comments over them or scribbled things out that they did not like. I also asked them individually what they did and did not like about them to inform my planning for the intervention (see Appendix 7.3 for comments). The learning from the pilot activity is discussed further in section 3.6.2.2.

3.6.2.1 Taking Control of My Own Learning (Learning Tactics List)

This questionnaire is taken from the Psychology in Education Portfolio: Learning Style and Metacognition (Cameron & Reynolds, 1999). It has 21 questions relating to how pupils approach their work, what they do during the completion of tasks and what they do once they have completed work or received feedback. The purpose of this questionnaire was to establish the approach the participants currently had towards their work to see if there were any commonalities to inform the development of the prototype thinking skills tool. The participants completed it at home, thinking about how frequently they used each strategy at present (not doing at all, occasionally, often, most of the time). There is no reliability data for this questionnaire, so it has been used qualitatively as suggested by the authors. It is deemed suitable for secondary-aged pupils. The authors suggest that the pupils also complete the questionnaire thinking about what strategies they would like to use in the future.

All questionnaires were completed, although participant 4 only completed the second page during week 3 of the intervention. There were five statements where the four participants rated them as ‘not doing at all’ which were:

1. I spend time working out a plan before I begin a task
2. I work out a rough time schedule for the task (or parts of the task)
3. When I have finished my work, I ask myself the question: 'What is good about it and how could I have done better?'
4. When I have completed a task, I congratulate myself and feel good.
5. I keep a portfolio of my best work and occasionally have a look through it.

This suggests a lack of planning or opportunity to plan and that the participants do not look at their work again after it is finished. These are key elements of the original exam wrapper (Lovett, 2013) that the participants reported they were not doing. There was one statement which three participants rated as doing ‘often’: ‘I highlight important words or phrases in my resources book or my notes.’ This is a study technique that is frequently used by students but is only effective if used purposefully (Dunlosky et al., 2013). One participant for statement five above said that they did this for art as it is a requirement, but not for other subjects.

As the questionnaires were completed by the participants at home, I was unable to monitor how and when they completed them. They may have been sitting with a parent and talked through the questions which would be likely to influence their responses particularly if a parent did not agree with what the pupil had selected. I have not used the questionnaires as a statistical baseline measure and more as a snapshot of their approach to learning, so although they may not be entirely accurate reflections, I have deemed them acceptable for this study.

3.6.2.2 Changes made to the intervention because of the pilot study

Using the data, I amended the pilot thinking skills tool ready for the start of the intervention (see Appendix 3.2). One participant expressed a preference for multiple choice answers, so I included these where appropriate. Two participants preferred a thinking skills tool with pictures, so I added some that were relevant to the questions being asked to also act as a visual prompt.

After the pilot study I could see a difference between the participants in how they approached the metacognition task of building a tower. Some of them needed encouragement from myself or their class teacher to persevere. They were able to respond to me pausing during the task and to offer suggestions around what knowledge they already had which might support them to build a structure. They felt the original exam wrapper was too complicated and wordy so I could see that information needed to be presented clearly to them.

3.6.3 Research questions

From the pilot the participants seemed to enjoy having a practical task to do. They were honest with critiquing the original exam wrapper and the one I had adapted for the pilot study. They engaged with the planning, monitoring and evaluating questions that I put to them for the practical task.

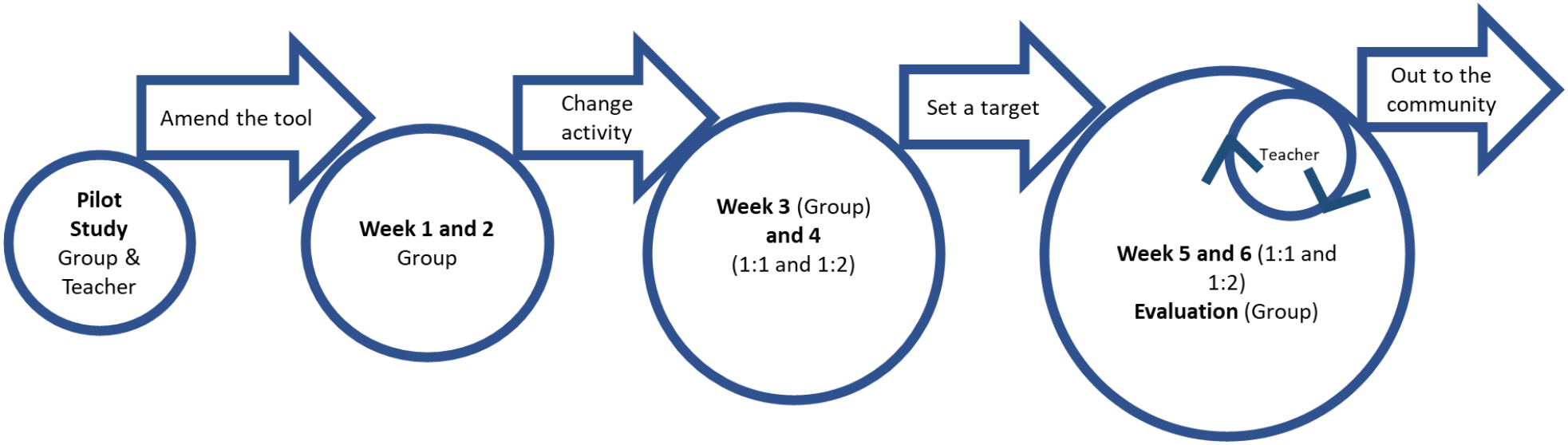
3.7 Design

The weekly interventions followed an action research cycle as illustrated by Figure 2. Data from each session informed the next session. Sometimes this resulted in small changes for example between week 1 and 2, and sometimes it was larger changes for example between week 2 and 3. Each circle represents a cycle of action research with the arrow representing a change to the intervention. Within the final cycle there is a mini loop which

represents the session where I spoke with the class teacher. The intervention did not change after this meeting, so it is within the larger loop. Most of the sessions were audio recorded.

Three questionnaires were used throughout the research project. The first was the Learning Tactics List (Cameron & Reynolds, 1999) completed as part of the pilot study in order to establish how the participants approached their work and managed feedback. The second was the Mindset Profile (Mindset Works Inc., 2012) which was completed during session five out of six of the main intervention sessions (see Table 5) in order to investigate their views around intelligence and effort when encountering difficult work. The final questionnaire was completed during the evaluation session.

Figure 2 Cycles of action research



3.8 Questionnaires

Three questionnaires were completed by each participant over the duration of the project as described in Table 5.

Table 5 Description of each questionnaire used

Questionnaire	Description
Learning Tactics List (Cameron & Reynolds, 1999)	• 21 questions • Questions relating to planning, monitoring and evaluation • Rated on a Likert scale 'Not at all', 'Occasionally', 'Often' or 'Most of the time'
Mindset Profile (Mindset Works Inc., 2012)	• 8 questions • Questions relating to intelligence, hard work and effort • Rated on a Likert scale 'Disagree a lot', 'Disagree', 'Disagree a little', 'Agree a little', 'Agree' or 'Agree'
Project evaluation	• 8 questions • Questions about their experience of the evaluation, its usefulness and how to improve it • Mixture of Likert scale answers and written open-ended answers

The Learning Tactics List (Cameron & Reynolds, 1999; Appendix 2.1) is simple to understand with generally short statements or examples provided where necessary. The statements are positively phrased. Some of the participants wrote on their questionnaires which suggests that some statements were difficult to rate precisely. The reasons for its use are given in section 3.6.2.1 above.

The Mindset Profile (Mindset Works Inc., 2012; Appendix 2.2) questionnaire is quick to administer and alternates between a positively phrased statement and a negatively phrased statement, to ensure a robust conclusion can be made from the score at the end. Some participants found the wording confusing for some of the statements but as I was with them when it was administered (which is described in the next section), they could ask for clarification if needed.

The evaluation questionnaire (Appendix 2.3) was written by me to gather the participant's views about their experience of the research project. It allowed for the participants to write open-ended responses for some questions. As I wrote the questionnaire, it reflects what elements of the research project that I felt could be commented on and not necessarily what elements the participants would have chosen to evaluate.

3.9 Method

The intervention took place once per week during an English lesson in a classroom that was neighbouring where the participants were being taught. The first six sessions all took place on the same day of the week. Their programme of study for the duration of the project was Shakespeare's Macbeth. During each session they brought their English workbooks to look through them for any independent work they had completed in the past week and then used the thinking skills tool to reflect on their work. After week 5 their target and strategies sheet was stuck in their textbook so they could refer to it during the week while I was not there. Table 6 outlines each week's activities.

Table 6 Data collection timetable

Week	Activity
1	Used the Thinking Skills Tool version 1 (Appendix 3.2) Obtained feedback on the questions.
2	Recap of action research, metacognition and the research aims. Shared themes from week 1. Participants looked at answers on Thinking Skills Tool version 1 and completed version 2. (Appendix 3.3) Obtained feedback.
3	Share themes from week 2. Learning Tactics questionnaire – what would you like to use? Sort metacognition questions into ones they think would be useful for them. (Appendix 3.4)
4	Share themes from week 3. Had two participants as a pair and one individually. One was on holiday for weeks 4 and 5.
5	Share themes from week 4. Mindset assessment profile questionnaire. Selecting a target for beginning, middle or end of a task. Selecting two to three strategies to try out over the next two weeks.
5+	Catch up with one participant – as Week 5 description. Met with current Year 9 class teacher – shared the targets and what the participants were working on.
6	Shared mindset assessment profile interpretation. Shared themes matrix. Had two participants as a pair and the other two individually. Amended or kept target and strategies the same.
7	Evaluation. Completed an individual questionnaire but together as a whole group. Class teacher completed a questionnaire.

The thinking skills tool used in weeks 1 and 2 contained questions relating to the three main elements of metacognition: planning ("Have you done similar work before?"), monitoring ("What did you do when you were stuck?") and evaluating ("What will you do differently next time you have some independent writing to do?"). For week 2 I colour-coded the questions to the three areas to make it more obvious though I did not include a key which one participant thought would have been helpful (Appendix 4 line 82). I had hoped that by

the participants engaging in reflection and evaluation of their work they might make a change to their approach to work during the week when I was not there.

In week 3 I gave the participants a set of questions relating to planning, monitoring, and evaluating (Lauchlan & Carrigan, 2013) and asked them to choose questions they would like for their own thinking skills tool. After three sessions it became apparent that the participants were not working well together as a group. There was conflict between participants 1 and 3 each week which distracted all the participants. Participant 2 was very quiet, and they got on with using their thinking skills tool but were not particularly vocal when it came to be responding to whole group questions. Participant 4 was incredibly easy to distract when the group were noisy. At the end of week 3 I asked if they would like to meet me individually or continue as a group. The decisions are presented in Table 6.

Table 7 Would you like to work individually next week?

Participant	Decision
1	No
2	Not bothered
3	Not bothered
4	Yes

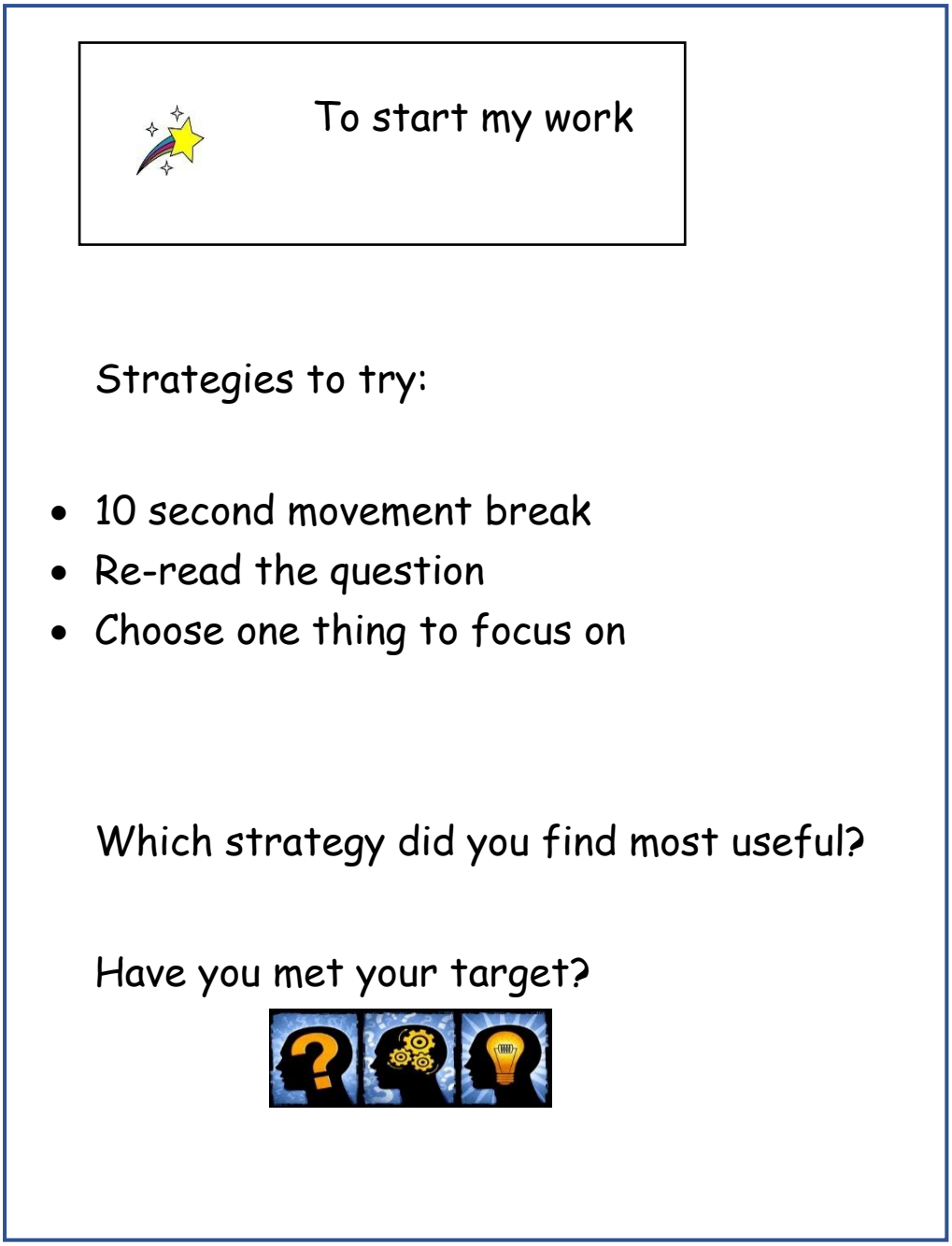
In week 4, participants 1 and 2 were grouped together and 3 was individual as 4 was on holiday. Changing the group size worked very well. The quiet participant significantly increased their contribution to the research sessions and working individually supported participant 3 to engage with some self-reflection. The participants were also less distracted during the week 4 session. For this session I had typed up their questions from the previous week and they again looked at some work they had completed in class. For participant 3 I had added some visuals to the text to see if this helped him to use the tool (see Appendix 3.5.8).

After week 4 of the project it was increasingly evident that the participants were struggling to identify elements of metacognition to work on and the work in their books did

not always match the questions they had selected for their thinking skills tool, for example making notes from a film of Macbeth. The participants were using their thinking skills tools quite passively, so it felt appropriate to investigate their motivation and beliefs about learning. Therefore for week 5, after discussion with my research supervisor, I administered the Mindset Assessment Profile (Mindset Works Inc., 2012) questionnaire to see how the participants viewed themselves as learners, particularly around effort leading to perceived increased intelligence. They completed these in the classroom while I was there.

Additionally, I also simplified the thinking skills tool to be a target with two to three strategies to support meeting the target as shown overleaf in Figure 3. The intervention had now changed significantly to encourage the participants to be more active and to take ownership of the skills they wanted to develop. I shared ideas for targets with the participants, based upon the statements they had sorted in week 3. Also, I had suggestions for strategies which they could choose from as they had found this task quite challenging in previous weeks (see Appendix 3.6.6). I talked through some of these strategies if they were struggling so they could understand more about how to use them. These target sheets were stuck in the participants' books so they could refer to them in class.

Figure 3 Freddie's target sheet



During session 5+ when I met with the participant who had been on holiday, I also met separately with their class teacher so that they were aware of what the pupils were meant to be working on regarding the targets and strategies they had chosen. It was hoped that by having the teacher prompt the participants, rather than relying on them to do this themselves, they would engage in the strategies more and begin to see some benefits.

There was a gap of nearly four weeks for three of the participants between session 5 and session 6 due to half term and wanting to give them to time to try out their chosen strategies. Unfortunately, their class teacher had been absent the week of session 6 so the participants would not have had any additional prompt to look at their target.

The evaluation session was completed with all four participants together but with them completing an individual questionnaire which asked about their experience of the intervention and whether they had found it useful (Appendix 2.3). The class teacher completed a questionnaire too but via email which covered questions about any impact they had seen from the intervention (Appendix 2.4). At the end of the project, after the evaluation session, the participants were given their original thinking skills tools from throughout the project and their original Learning Tactics (Cameron & Reynolds, 1999) questionnaires to act as a reminder of the project and the skills we were trying to develop. Formal feedback to school and parents is planned to happen over the summer.

3.10 Data analysis methods

3.10.1 Data analysis procedure

After each data collection session, I wrote a reflection on the session then read through any comments the participants had written on their Thinking Skills tools or I had written down. I also listened to the recordings of sessions where available and then transcribed parts of the recording which I felt were most salient to the research questions. I

wrote down three or four themes which I felt summarised the data from each week – I checked these themes with the participants. If new themes appeared each week, then these were noted and labelled. I created a themes matrix (see results chapter) which was shared with the participants during session 6 as part of my trustworthiness criteria discussed in Appendix 9.1.

I relistened to the recordings while looking at my original notes and wrote down any additional quotes that were pertinent to the research questions. I highlighted quotes that I had used for codes so that I could look at the unhighlighted text to see if there was anything missing that could be an additional theme.

3.10.2 Template analysis

Template analysis is a form of thematic analysis which has been previously used to analyse data from organisational and management research (Brooks et al., 2015). It is a structured analysis technique but is also flexible (Brooks et al., 2015; King, 2012). A template of codes is created from a subset of the data and then this template is applied to subsequent data (Williamson et al., 2010). It follows an iterative process of analysis as the template is revised and refined (Brooks et al., 2015). Template analysis can be used with a range of epistemologies (Brooks et al., 2015; Forrest-Bank et al., 2015) as it can be approached in different ways. This method allows for a priori selection of themes based upon previous research and the literature read, which lends itself to a realist epistemology, but as themes do not have to be chosen beforehand, template analysis is not specific to realist methodologies (Waring & Wainwright, 2008). The systematic way in which analysis is conducted (King, 2012) suits how I collected my data through action research via a weekly intervention.

The majority of studies which informed my reading utilised verbatim transcriptions of any interviews or focus groups (Forrest-Bank et al., 2015; Rechten & Tweed, 2014; Williamson et al., 2010), however my recorded data is not structured like a focus group or interview. Instead I wrote descriptions and reflections and drew on participant quotes from the recordings that I felt to be pertinent to the research questions in analysis but also my quotes in the sessions (see Appendix 4). I also used my reflections on the sessions, text that the participants had written on their thinking skills tools and their answers to the questions as data. King (2012) explains that themes are chosen by looking for recurrent and repetitive features in the data that the researcher feel are relevant to the research question(s), a disciplined approach to data analysis. The themes are not independent of the researcher but this is acknowledged. There can be lateral links made between themes and not just hierarchical ones so for example, sub-themes from different main themes can be linked if the data suggests this.

Disadvantages of template analysis can be the time-consuming nature of developing the template which may lead to more focus on that than the actual data. As stated by Brooks et al. (2015), the template is not the analysis but is used to understand and make sense of the data. They warn that novice researchers need to take care to not lose sight of the research aims. It is important to read through the data again once the template is complete to make sure that nothing has been missed (Forrest-Bank et al., 2015).

3.10.3 Template analysis procedure

The text to be analysed needs to be coded in order to organise the data into topics or codes ready for analysis (Crabtree & Miller, 1999). I used the following procedure taken from Crabtree and Miller (1999).

1. Create a code manual or scheme
2. Code the text
3. Sort segments to get similar text in one place
4. Read the segments and make connections
5. Complete the interpretive process by representing the account in prose

The initial template was derived from data collected during sessions 1, 2 and 3. This included quotes from the recordings from either myself or the participants and my reflective notes. This initial template was then applied to the data from sessions 4, 5 and 6 and also the data from the thinking skills tools answers from all of the sessions.

3.11 Ethical considerations

This research project was given ethical approval by the University of Sheffield's ethics board (Appendix 1.1). As it was an intervention during school hours, the project was planned to minimise disruption to the lesson and the participant's learning. Written consent was obtained from the school (Appendix 1.2), the class teacher (Appendix 1.3), the parents/carers of the participants (Appendix 1.4) and the participants (Appendix 1.5). Verbal consent was also obtained from the participants. Due to their age it is likely they would have chosen not to leave the lesson if they did not want to take part in the intervention which was demonstrated by one of the invited participants choosing not to give consent after the pilot study.

The intervention was something new to the participants hence the lengthy pilot study session which introduced the ideas of metacognition and why developing skills in this area is useful for independent work. It gave us all an opportunity to meet each other and for me to see which participants were most forthcoming with suggestions. I did not feel that the intervention would cause any physical harm. The intervention took place in their school so therefore familiar surroundings. It was in a classroom which was next to their English lesson so there were no lengthy transitions in getting to and from the rooms. The SENCo or the SENCo's administrative assistant collected them from class each week. The classroom had several windows including on the door so both researcher and participants were always visible.

Researcher bias could be a problem due to my heavy involvement with the tool development process. Action research methodology allows for this by encouraging reflection and reflexivity. I reminded the participants each week that they did not have to agree with my thoughts. More detail is given in Appendix 9.1.

3.12 Generalisability

Although the findings of this research will only apply to the participants involved, it is hoped that the learnings can inform future research that involves collaborating with adolescents, particularly those with a diagnosis of ADHD. This research aims to add to the literature and to develop theory around developing metacognitive skills and collaborating with young people.

Chapter 4: Results

Following on from the methodology chapter, the results chapter seeks to discuss the process of template analysis on the collected data. The data was collected on a weekly basis for six weeks from the thinking skills tool intervention, which ended with an evaluation questionnaire. More details of the intervention will be given in this chapter.

Template analysis was performed on data from the following sources: the recorded intervention sessions, the thinking skills tools or questionnaires, and my researcher notes. An initial template was created from data from the first three intervention sessions and was then applied to the rest of the data. Amendments were made to the initial template to include more aspects of the data that had subsequently emerged. The Results chapter includes details on the creation of the template, analysis of the whole data set and then a more detailed analysis of each individual participant including a personalised thematic map. The individual data included the participants' Learning Tactics (Cameron & Reynolds, 1999) and Mindset Profile (Mindset Works Inc., 2012) questionnaires in addition to their quotes and responses to the thinking skills tools throughout the project and their evaluation comments.

"All research involves struggle and challenges, and when you take your research and its implications into the real world, the challenges multiply." (Dweck, 2019, p. 23)

4.1 Types of data collected

There was an initial pilot study in July 2019, six intervention sessions between September and November 2019 followed by a group evaluation in November 2019. The intervention sessions involved meeting with the participants in various group compositions for approximately 15 minutes per week. Within the session the participants either:

1. answered a thinking skills tool which required them to reflect on their approach to a piece of independent work they had completed in their English lessons
2. developed their own thinking skills tool from a set of given questions
3. set themselves a target and strategies to try to meet this target

There was an evaluation session with all the participants together where they completed a questionnaire. Additionally, I met with the participants individually in February 2020 to discuss their individual journeys through the project and to share my analysis with them. I have based my analysis upon a variety of data collected throughout the project which will be discussed in turn below: reflective journal, recorded sessions with the participants, questionnaires, notes during sessions and finally the thinking skills tools.

4.1.1 Reflective journal

I utilised a reflective journal for the duration of the research project. My reflections were supported by the five-part typology of reflection by Ghaye and Ghaye (1998, pp.24) which was developed to support teachers to reflect on their practice. Due to the nature of the sessions being an informal teaching environment and about supporting students to reflect on their work it felt a suitable approach. The five parts are as follows: Descriptive, Perceptive, Receptive, Interactive and Critical. I used the five parts as a prompt for my reflections. My reflections are presented in Appendix 5.1.

4.1.2 Recorded sessions

Four of the intervention sessions with the participants were recorded: 2, 3, 4 and 6. Session 1 was not recorded as there was a participant present who had returned but not signed the consent form. They decided the following week that they no longer wanted to take part, so all of their data was removed. Session 5 was when I was supporting the participants to

select targets and I did not feel there would be lengthy comments from them to require me to record it; their targets and strategies were the data alongside my reflection. The evaluation session was not recorded as they were completing an individual questionnaire. Due to the difficult relationships some of the participants had with each other, a focus group approach would not have worked as there would have been too much bickering and low engagement with the questions.

The sessions were not typed up verbatim. Instead I listened to the recordings and wrote down phrases and sentences (verbatim) which I felt were pertinent to the research questions. On subsequent listens I recorded additional notes for things I had missed the first time. For the unrecorded sessions I revisited my reflections and the participants' written data.

4.1.3 Questionnaires

Three questionnaires were completed by each participant: Learning Tactics List (Cameron & Reynolds, 1999; Appendix 2.1), Mindset Profile (Mindset Works Inc., 2012; Appendix 2.2) and my self-written evaluation form (Appendix 2.3).

The participants' English teacher also completed an end of project evaluation written by me (Appendix 2.4). Data from the Learning Tactics List (Cameron & Reynolds, 1999) was quantitatively analysed by giving each participant a total out of 84 and by counting the number of statements that the participants ranked similarly. Qualitative analysis has been used to describe their individual profile of responses by looking at specific statements. The Mindset Profile (Mindset Works Inc., 2012) was analysed quantitatively by giving each participant a score with a qualitative description. The Evaluation questionnaire has been used qualitatively as part of each participant's individual profile described in section 4.4.

4.1.4 Notes during sessions

I wrote down some phrases that the participants said, writing them either on the paper they were working on or in my reflective journal book. These were not written down in a formal manner as per the reflective journal description but were the actual words used by the participants or my immediate thoughts, rather than considering the model of reflection (Ghaye & Ghaye, 1998) described in section 4.1.1.

Notes were also taken when I met with the participants' English teacher, two weeks after three of the participants had set a target with strategies to try in session 5 (half term was in between). There was still another ten days until I was meeting with them again to review their target so I wanted to let their teacher know what we had been doing so that they could monitor this and perhaps give them a gentle reminder to look at their selected strategies as they had not been doing this earlier in the project (this class teacher had unfortunately not been present during the pilot study). I did not record this meeting as it was largely an information giving session, as they had not attended the pilot session in July 2019. I did receive written consent for their data to be recorded but felt it was more natural to have a conversation and write notes.

4.1.5 Thinking skills tools

Data was collected each week from the thinking skills tools as outlined in Table 8.

Table 8 Data collected from thinking skills tools

Week	Topic of Session	Data Collected
1	Using the thinking skills tool modified after the pilot study	• Responses to the tool. • Participant comments during the session.
2	Using the thinking skills tool modified after last week's session.	• Responses to the tool. • Participant comments during the session (audio recorded).
3	Creating their own thinking skills tool from the Lauchlan and Carrigan (2013) statements	• Chosen statements. • Participant comments during the session (audio recorded).
4	Using their own thinking skills tool created last week	• Responses to the tool. • Participant comments during the session (audio recorded).
5	Completing the Mindset Profile (Mindset Works Inc., 2012). Selecting a target for an aspect of metacognition (e.g. planning, monitoring or evaluating work) and two or three strategies to try out to meet this target.	• Targets and strategies. • Participant comments during the session. • Questionnaire responses.
6	Discussing their target and strategies and changing them if they wanted to.	• Targets and strategies. • Participant comments during the session (audio recorded).

4.2 Data analysis: initial template

I will define the following terminology that will be used throughout the results chapter in Table 9.

Table 9 Description of commonly used terms throughout the Results chapter

Term	Description
Code	Salient phrase or sentence spoken by the participants or myself or written down in my reflective journal.
Theme	An overarching label for a group of codes.
Sub-theme	A more detailed and descriptive label for a group of codes within a theme.

To create the initial template, I looked at the data from the first three intervention sessions. This data included the recorded sessions, reflective journal entries and notes from the sessions. Template creation involved making verbatim notes of phrases from the recordings that stood out to me, and were related to the research questions, as discussed in the methodology chapter, that were said by the participants or myself. For example, “They all sat at the same table and I sat with them and moved round” (Appendix 4.1 Line 83) for Research Question 1 about how to support them. In addition, I re-read my reflective notes from each session. I wrote down words, phrases or full sentences onto post-it notes (these were my initial codes) then grouped them into themes as per Table 10 (see Appendix 4.3 for full diagram). This template was developed for later thematic-type analysis.

Table 10 Themes and sub-themes from the initial template

Main Theme	**Individuals**	**Changing the Tool**	**Working as a group**	**Focus**
Sub-theme layer 1	I	Personalised	Similarities	Shouting
	Personalised		Peer conflicts	Stories
Sub-theme layer 2	Positive	Strategies		
	Negative			
	Strategies			

Themes and sub-themes were chosen to represent parts of the data when similarities emerged across the participants. A theme or sub-theme became defined once there were several supporting codes for it.

A description of the initial template which was derived from data collected during sessions 1 to 3 is given below. Sub-theme layer 1 refers to additional themes that are within the main theme. Sub-theme layer 2 are themes that are within one of the sub-themes in layer 1, but still remain part of the main theme.

4.2.1 Individuals

I noticed that there were many statements that began with “I” so felt it was important to have this as part of the template. During the sessions it soon became apparent that the participant’s thinking skills tools needed to be highly personalised, so this was a theme too. Within the “I” statements were a range of themes from being positive or negative about the tool or themselves, or regarding strategies to enable self-reflection (e.g. pausing during a work task to reflect whether they are on the right track).

4.2.2 Changing the tool

By session three the participants were wanting quite different things from their thinking skills tool and had designed their own tool for the following week, none of which were the same (Appendices 3.5.1, 3.5.4 and 3.5.7). Strategies remained as a sub-theme as the tool asked them to consider a new strategy for the next time they were doing independent work.

4.2.3 Working as a group

The ‘similarities’ sub-theme related to most of the participants finding their lessons boring, not knowing what to do if they were stuck and being easily distracted from the task. Early on there were some peer conflicts particularly between two of the participants which led to the intervention composition changing to pairs and one-to-one so that they could focus on the project and not be distracted by each other. Working as a group was not productive for any of the participants or me.

4.2.4 Focus

At times the participants were difficult to keep focussed on the task and this was particularly prevalent when they were a whole group. Distractions included bickering with each other and talking about random things (e.g. swimming lessons, caravans,

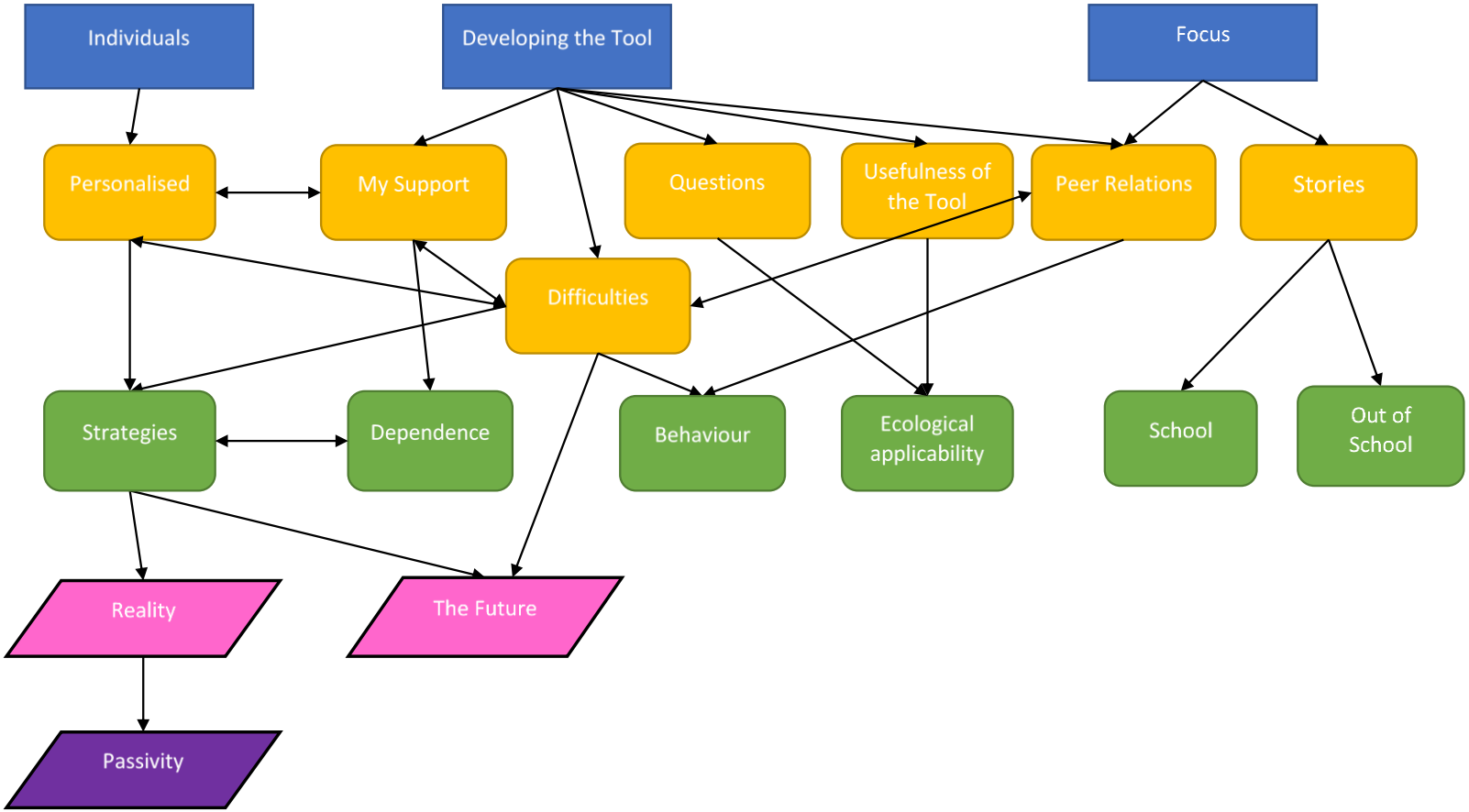
marshmallows). In general, having the whole group was quite distracting for all of the participants in terms of managing the noise.

4.3 Final template

I used the initial template to look at the data from the subsequent intervention sessions, adding more post-it notes to the initial data groupings. Additionally, I then included all the data from their thinking skills tools as described in 4.1.5: the questions and their answers; which questions they chose when creating their own tool; their targets and strategies from their "final" tools.

After a second listening of the recorded sessions I added further data. I had also highlighted any data in my reflective journal that had been included in the template. Finally, I looked at the data that had not been included in the template to see if there was anything of significance related to the research questions that had been missed. This additional data led to the template, or thematic map, being amended as per Figure 4.

Figure 4 Final Template



The final main template themes are: Individuals, Developing the Tool and Distraction. These were determined once all data as outlined in section 4.1 had been considered.

As with the analysis for the initial template, I grouped codes together if they shared a similarity. If there were several codes grouped together then these became a sub-theme. Once all the data had been reviewed, I gave the groups a best-fit descriptive label. I thought about how the data had arisen to contextualise it to inform my labelling decisions, for example were comments made humorously or with exasperation. My initial analysis was shared with my supervisor to see if my labels matched the data collected. One research question asked about how to support the participants, so the themes and particularly sub-themes aimed to reflect this. Another research question was about how the participants differed, so again I wanted to capture this in the themes and sub-themes.

Figure 5 describes my data analysis and interpretation strategy.

Figure 5 Data analysis and interpretation strategy

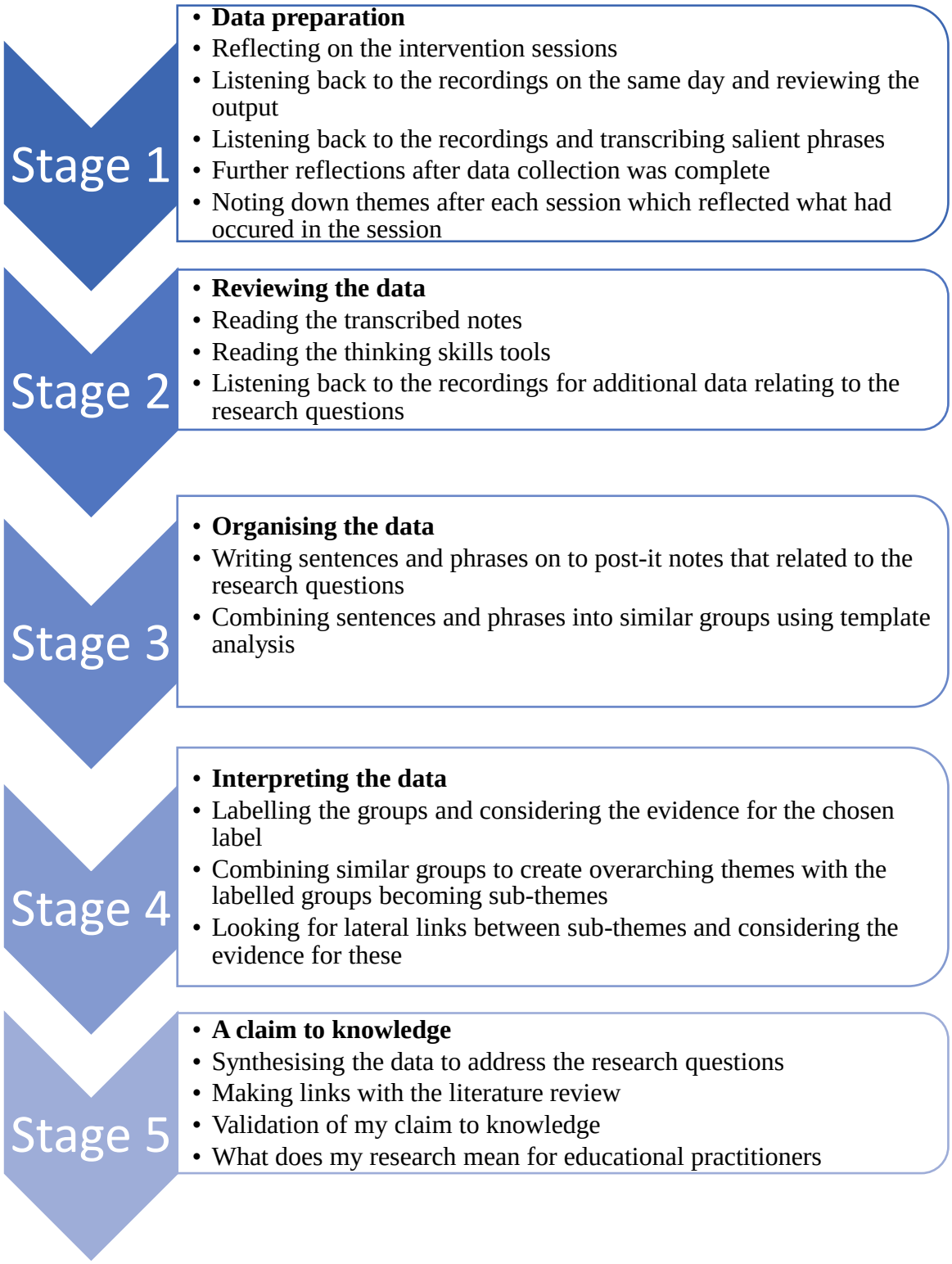


Figure adapted from Truelove (2014) page 96.

4.3.1 Data interpretation process

To illustrate my data interpretation process, I will talk through stages 3 and 4 as depicted in Figure 4 for the final main theme of 'Individuals.'

4.3.1.1 Organising the data

I read through the data and wrote down salient phrases or sentences that related to the research questions on to post-it notes. I initially focussed on statements that began with 'I' due to their high frequency, so these were all grouped together. I then re-read the 'I' statements in this large group and looked for differences and commonalities amongst the statements to create smaller groups in order to better represent the data. I read through the rest of the post-its and added them to the 'I' groups if they were related in context and content. Once all the data was included, there were smaller groups that did not contain 'I' statements.

4.3.1.2 Interpreting the data

I re-read the smaller groups of statements and identified a common theme. For example, the 'Personalised' sub-theme contains statements which relate to changing how the sessions ran, offering choice to the participants and adaptations for participants (Appendix 4.1, Lines 20-24) which I interpreted as providing a personalised approach to the tool development intervention. The other small groups were labelled as: 'Strategies', 'Reality', 'Passivity' and 'The Future'. These five sub-themes and the remaining 'I' statements were grouped as one main theme of 'Individuals' to reflect the individuality of the participants in their responses and how I changed my approach to the sessions to best support them to think metacognitively. Some of the 'I' statements were moved to a different theme as they were not related to individuals for example, "I am trying a more structured thinking skills tool" (Appendix 4.1 Line 81) was more suited to 'Developing the Tool.'

Lateral links were found between ‘Personalised’, ‘My support’ and ‘Difficulties’ and between ‘Strategies’ and ‘Dependence.’ The data in each sub-theme was explained by its label, but there was a relationship between the sub-themes too. For example, with ‘Personalised’ some of the data fitted with being due to ‘My support’ as I supported their understanding of the session task or changed how I explained something, “Today sit by each of them to answer questions” (Appendix 4.1 Line 21). Some of the data fitted with ‘Difficulties’ as personalising the intervention meant giving them choice over creating a thinking skills tool which for some of the participants required extra thought as to how they could get the most out of their tool, “With 3, find some images which might provoke thoughts to support their metacognition – verbal responses?” (Appendix 4.1, Line 24).

The subsequent sections contain a description of the themes and sub-themes from the final template. As demonstrated in Figure 4 there are some arrows that link between sub-themes that are from different main themes e.g. ‘Difficulties’ and ‘Personalised’. These lateral links will be discussed under the relevant theme and sub-theme below. Some of them are bi-directional indicating that they influence each other. The majority are in one direction indicating they are a sub-section of the theme from where the arrow originates.

4.3.2 Individuals

The over-arching feeling about this theme was that as much as the literature describes general difficulties that pupils with a diagnosis of ADHD may have, they are still individuals with differing strengths and needs. They all needed a different approach and level of support from myself to engage with the project. This theme is elaborated upon further in section 4.4 during the individualised descriptions for each participant.

4.3.2.1 Personalised

Each participant had different preferences about how the sessions were run and how they liked to use their tool. For example, participant 2 really liked writing and was able to get on with self-reflecting without support whereas participant 3 preferred to talk through their answers with me and needed support to start. The theme of 'Individuals' was woven throughout the data which led to the creation of personalised templates and analysis for each participant which will be presented and discussed later. I put a bi-directional arrow between 'Personalised' and 'Difficulties' (which originates from the 'Developing the Tool' main theme) to reflect that each participant found different things difficult and that difficulties with the group dynamic was also different for each participant. A bi-directional arrow between 'Personalised' and 'My Support' reflected that the participants needed my support to personalise their thinking skills tools and that each participant needed personalised support depending on their needs.

4.3.2.2 Strategies

From analysing sessions one to three, the strategies theme arose from the strategies the participants felt they were already using in class (e.g. asking a friend if stuck, re-reading their work at the end, writing a plan before starting). Later in the project, once the thinking skills tool had become a self-selected target (sessions 5 and 6) this included the strategies the participants had chosen to help them achieve their target. There are lateral links with 'Dependence' due to the reliance on me to provide them with strategies and also with 'Difficulties' which is similar in that some of the participants often found it difficult to think about strategies independent of my prompting and support.

4.3.2.3 Reality and The future

The 'Reality' sub-theme relates to their responses to the early thinking skills tools and responding to what they had done to try and meet their target on the later tool. Sometimes the

reality was positive (Participant 1 “I changed a spelling mistake” – Appendix 4.1 line 49) and at others it was negative (Participant 3, “I’ve forgotten for what they were even for.” – Appendix 4.1 line 51). An additional subtheme of ‘Passivity’ was created to reflect the number of “I don’t know” responses that were offered throughout the project by the participants, as they initially presented as not wanting to engage in deeper self-reflective thinking and their responses suggested they were reluctant to ask somebody for help in class if they needed it, so they were behaving passively rather than actively (Appendix 4.1 *Passivity*). ‘The Future’ contains the data for the participants’ intentions of strategy use (e.g. look at similar work I have completed) next time they had independent writing to do.

4.3.3 Developing the tool

The whole research project was about developing the tool but there were specific codes that leant themselves to the tool itself hence it being a main theme. There were five sub-themes and several lateral sub-theme links.

4.3.3.1 My support

The participants required varying degrees of my support, from a prompt to being given a strategy to try out.

4.3.3.2 Difficulties

The group situation did not work as I had hoped. The aim was for the group to work together and bounce off each other’s ideas but there were too many conflicts within the group to make this possible. The second aim of the whole group situation was that the pupil without a diagnosis of ADHD would be a positive influence on the others in terms of suggestions for making a useful thinking skills tool. This participant was unfortunately one who engaged in disputes with a different participant. There is a lateral link between My Support and Difficulties which reflects that I felt some participants were too reliant on me to select

strategies to try out to meet their target. Choosing a target was difficult for one of the participants. So, my support was required to alleviate difficulties, but my support in itself was a difficulty for some participants in preventing them from being independent with their strategy and target choices.

4.3.3.3 Questions

The participants often asked questions about the tool and what they were expected to be doing. These were generally earlier in the project while they were getting used to the intervention sessions. The questions suggested that they initially needed help in understanding the objective of the intervention. When I provided feedback of the interpretation of their Mindset Profiles (Mindset Works Inc., 2012) the participants who were in a pair asked some questions about why someone else's score was "higher" (Appendix 4.1 line 116), implying they felt that a higher score was "better".

4.3.3.4 Usefulness of the tool

The data for this sub-theme was largely from my own reflections around whether the tool questions were reflecting what was actually happening during their lessons. During some sessions we looked through their English workbooks to find work that they could reflect on but there were not many long pieces (half a page or more) of independent writing. One week their most recent task had been copying from the board[1] which was not suitable for using the Thinking Skills Tool.

4.3.3.5 Peer relations

As alluded to in 'Difficulties' the peer relations of the four participants prevented the intervention from working as a group. Those who were kept in a pair had a much better relationship where they were able to be themselves even if they didn't agree about something

[1] This was at the beginning of the lesson before they met with me so they may well have been writing independently afterwards so is not meant as a judgement on the teaching approach.

(Participant 2 shared their Shakespearean insult with participant 1, “I don’t think that’s funny” (1), “Well I do.” (2) Appendix 4.1 line 140). Those in the one-to-one situation were able to focus on the intervention. This theme also reflects positive peer relations which meant the intervention became more effective from session 4 onwards.

4.3.4 Focus

The overarching feel of this theme was how easily the participants were distracted but also how they perhaps needed some distraction. For example, one participant always came into the room and started talking to another participant about things that had annoyed them and were not related to our sessions or the lesson they had just left. It felt as though they needed some to time to “vent” and then they could concentrate on the task.

4.3.4.1 Peer relations

During the second session two of the participants were irritating each other for no reason which meant they were unable to listen to me and distracted the other two. On a separate occasion a student not part of the project walked past the classroom and started talking to one of the participants who got out of their seat to speak with them; this was highly unusual and only occurred once. There is a bi-directional arrow between ‘Peer Relations’ and ‘Difficulties’ because when the peer relations were fractious it made the sessions difficult. Conversely, difficulties with knowing what to do or expect in the earlier sessions perhaps also led to poor peer relations as a distraction.

4.3.4.2 Stories

As mentioned briefly above, one participant would often launch into a story about something that was bothering them or was on their mind: a swimming trip, a peer who had irritated them in class or events at the weekend. Other participants talked about marshmallows on several occasions (due to them being part of the pilot study activity) and

during sessions 2 and 3 they talked about their teachers, sometimes disagreeing. I added two further subthemes of ‘School’ and ‘Non-school’ to the Stories theme as there was evidence of codes for both.

4.4 Individual templates

While creating the template I felt that the personal and individual stories were getting somewhat lost amongst looking for similarities. Each participant had their own journey through the research project, their own strengths and difficulties, such that I felt it necessary to look in more detail at their individual data. The data sources were as described in section 4.1.

To create each participants’ individual template, I started with the main template and looked at the data that was provided by each individual participant. If none of the codes used for each sub-theme related to a specific participant, then this sub-theme was removed and faded out for this participant. Additionally, each participant had a sub-theme added to their personalised template to reflect something unique about their journey through the research project. This additional sub-theme came from my reflections on the participant and the types of comment that they frequently made. This unique sub-theme was checked with the participants in February 2020 alongside the data that I felt supported it.

I informed the participants at the beginning of the study that they would be able to choose a pseudonym to represent their data; they chose them during the evaluation session. Two of the participants chose ones which were unusable as they identified other participants and were offensive, so theirs were chosen by me and checked with the participants when I shared the results with them individually in February 2020. The rest of this sub-section contains a description of each participants’ individual template. All the participants were selected by the school’s SENCo as presenting with executive function difficulties within the

classroom context. I have added some further detail of their presenting difficulties during my meetings with them.

4.4.1 Participant 1 – Spock

Spock does not have a diagnosis of ADHD. During the intervention sessions she presented as being preoccupied with her social relationships outside of the group. She was quick to react emotionally when one of the other participants appeared to deliberately upset her. She marked 15 out of 21 statements on the Learning Tactics List (Cameron & Reynolds, 1999) as being 'Not at all' which suggests that they are not taking time to reflect on their work and are just getting it done. Her score was 28 out of a possible 84 which suggests many 'not at all' and 'occasionally' answers; the lowest out of the four participants. She was able to make a link between keeping a portfolio of work and her art lessons, stating that she only did this for the specific lesson that required it. A technique she rated as 'Often' was highlighting important information. She demonstrated a difficulty with believing praise from a teacher writing, "but cuz it's bad and I think their are off their head" [sic]. The additional written responses and the high frequency of 'Not at all' responses, suggest that Spock has a negative view of her own abilities. Having worked with her, I would suggest she is more skilled and capable than she believes herself to be.

Spock had a score of 25 on the Mindset Profile (Mindset Works Inc., 2012) which gave them the following description, "You are unsure about whether you can change your intelligence. You care about your performance and you also want to learn, but you don't really want to have to work too hard for it." They agreed with this description.

4.4.1.1 Spock's template

Spock was less reliant on my support to write down strategies once the tool had developed to a target. Once they understood what they needed to do they were able to get on

with the task, whether that be answering the initial tool questions or creating their own from a given selection. The sub-themes that were removed from the final template for Spock were: My Support, Dependence and Ecological Applicability.

Looking further at their data I added an additional sub-theme of ‘Sarcasm’ which was only applicable to Spock. For example, for ‘Individuals’ “I’m perfect, I don’t really need to do anything” (Appendix 41 line 1) and for ‘Distraction-Stories-School’, “[wearing more than one earring per ear] ...apparently it disturbs the learning.” (Appendix 4.1 line 142) Sarcasm has been described as a form of verbal irony which enables the expression of negative emotions in an amusing manner (Huang et al., 2015).

Spock features heavily within the Distraction main theme in both Peer Relations and Stories sub-themes. They were quite riled by one participant when the sessions consisted of all four participants; “Don’t!! Shut up!!” (Appendix 4.1 line 132) which was in response to having a pen thrown at them or the other participant just talking nonsense. When Spock was in the pair with participant 2, they still engaged in stories and talking about things outside of the classroom, but they were able to engage in conversation rather than argument. For example, with participant 2 they discussed what was most important out of plants, trees and oxygen in response to the work they had been doing in class about ‘The Great Chain of Being’ (BBC, 2020). These two participants did not necessarily agree but they did not argue or get aggressive as a pair.

Spock often asked, “Can we spend the rest of the lesson in here?” (Appendix 4.1 line 128 & 129) even if there was still 20-30 minutes of the lesson left. They talked about, “Shakespeare is starting to bore me.” (Appendix 4.1 line 141).

When selecting strategies to meet their target, I suggested to Spock about having a verbal prompt from a teacher and they said that, “...would get on my nerves” (Appendix 4.1

line 52). When they were devising their own thinking skills tool in session 3 they had a neat layout for their statements (Appendix 3.5.1) and during session 6 they were able to articulate that they had applied a strategy, "...I changed a spelling mistake [in response to using the strategy of talking to a friend]." (Appendix 4.1 line 49).

Spock's target chosen during session 5 was 'To pause during a task to check if I am on track' (see Appendix 3.6.1). They selected two strategies from the list of options. It did not take them long to choose a target, but strategy selection was more difficult.

When looking at the themes matrix, Spock used a key similar to when they were appraising the exam wrapper and thinking skills tool during the pilot study. They highlighted as yes: changing behaviour, boredom in class, boredom, distraction-off topic, overwhelmed, boredom/lack of focus. Their maybes were: changing behaviour (week 2) and change in routine. They put no for both requiring prompts (Appendix 3.7).

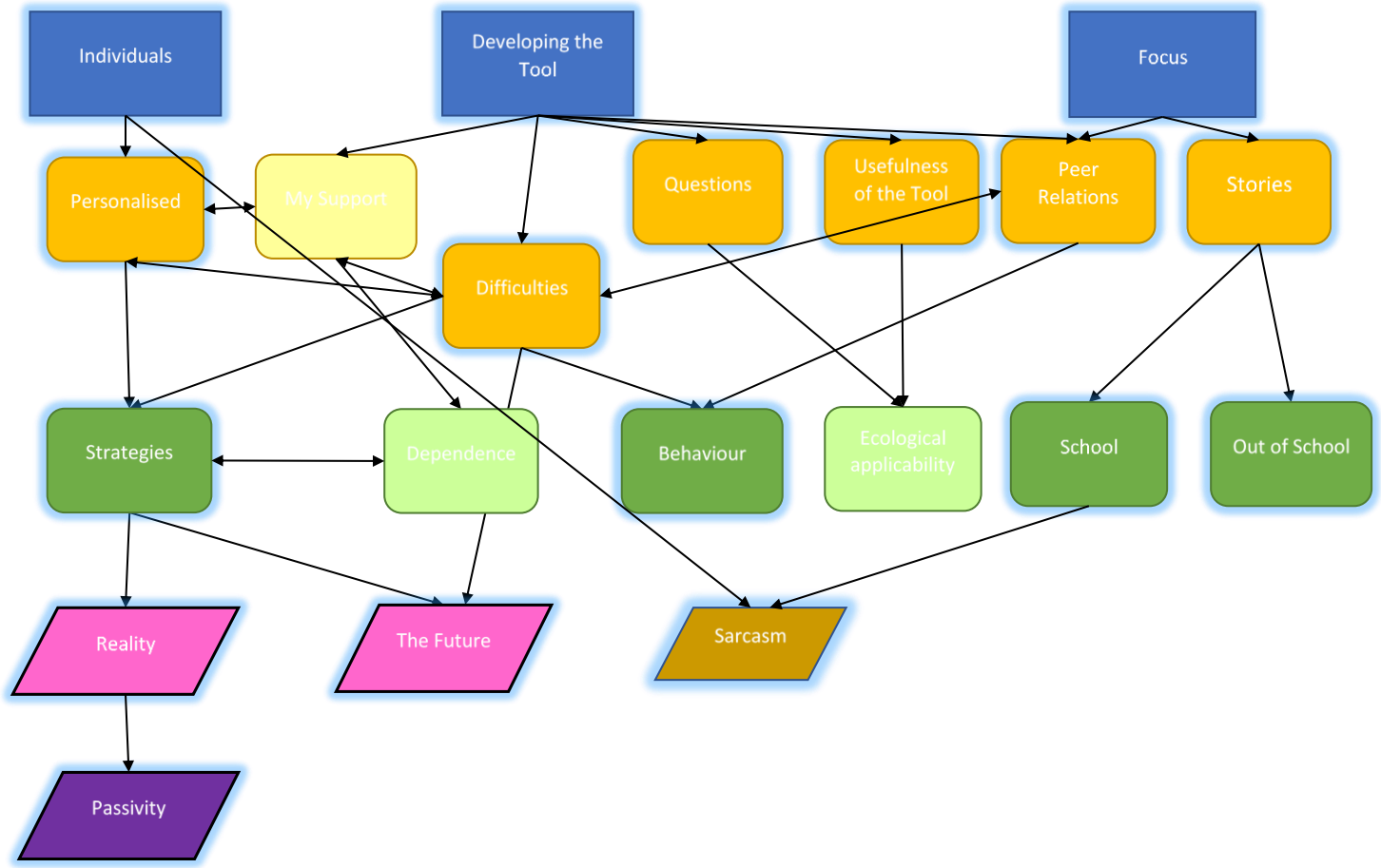
Their evaluation was positive, and they said it was likely they would use the tool in the future. They would have liked more sessions and were the only participant to verbally say thank you for the marshmallows and chocolates I brought along to the evaluation session (as a mirror to the pilot study – they didn't have to make towers this time though).

Finally, for each participant I have created an executive function and metacognition skill profile table. Executive function skills have been included because it felt appropriate to acknowledge strengths and difficulties relating to other cognitive behaviours for each participant as there is believed to be a dynamic relation between these skills and metacognition (Reflection Sciences, 2018). The strengths and difficulties reported in Tables 11-14 were decided by me after reflecting on the participant's journey and how they approached the sessions and also by looking at their responses to the questionnaires.

Table 11 Spock's executive function and metacognition skill profile

Strengths	**Difficulties**
Able to try strategies without prompting	Emotional regulation
Transferability of skills	Negative view of own skills in the Learning Tactics List (Cameron & Reynolds, 1999)
Able to create a neatly presented flow diagram (Appendix 3.5.1) which suggests planning and monitoring skills	Lack of confidence in her abilities

Figure 6 Spock's individual template



4.4.2 Participant 2 – Bob the Frog

I will refer to this participant as Bob for brevity. She has a diagnosis of ADHD. During the intervention sessions she was more reserved than the other participants. She found on the spot decision making difficult and on one occasion this was a bit distressing for her. Bob started on tasks quickly but found it difficult to talk about her approach to work. I sensed that she had her way of completing work and just stuck with it, regardless of whether it was always effective. On the Learning Tactics List (Cameron & Reynolds, 1999) she rated nine out of twenty-one statements as 'Not at all' suggesting that they are sometimes able to reflect on their work. She had a total score of 35 out of 84. She wrote a comment by some statements such as "...depending what it is" [I think about how good I will feel when I have completed my work] or "...depending on what topic" [When starting off a task, I ask myself what I know already about the topic or subject]. She indicated between 'Not at all' and 'Occasionally' for 'I ask for help if I have been trying unsuccessfully to do or understand something two or three times.' To indicate a change of mind she drew an arrow [Sometimes, I ask a friend (or my parents) to read through my written work and comment on it or ask me questions about what I have revised]; this was changed from 'Often' to 'Occasionally'. She rated the evaluation items as 'Not at all' which suggests several possibilities: once her work is completed she no longer thinks about it, that there is not enough time for her to evaluate her work in class or she has not thought to do this previously and perhaps does not know how to do it.

For the Mindset profile (Mindset Works Inc., 2012) Bob scored the highest out of the four participants with 39. This was interpreted as "You believe that your intelligence is something that you can increase. You care about learning and you're willing to work hard. You do want to do well, but you think it's more important to learn than to always perform well." Bob agreed with this paragraph.

4.4.2.1 Bob's template

The sub-themes that were removed for Bob's template were: Usefulness of the Tool, Ecological Applicability, Behaviour, and Out of School. An additional sub-theme was added to the Individual thread: Individual-Personalised-Strategies-Reality-**Knowledge of Strategies**. I found that over the course of the project, Bob struggled the most to think of strategies to support herself.

Under the Individual theme she made comments such as "I write a lot" (Appendix 4.1 line 26) and "I need to write number 2 as I am number 2" (Appendix 4.1 line 9). During session 6 we were working together to think of strategies to meet their target (Appendix 3.6.3) and she constantly clicked her pen which I had not noticed in previous sessions. Their main strategy was writing, "I enjoy writing...it's GCSEs, you need to make notes" (Appendix 4.1 line 30). During the early sessions when answering questions about what strategies they had used she frequently wrote or circled, "I don't know" (Appendix 4.1 lines 62-66). Writing also appeared frequently in responses to the thinking skills tools in weeks 1 and 2 – first thing I did when starting work, how I know when I'm finished ("When I don't write anymore"), spent most of my time...writing (Appendix 4.1 lines 41, 47 and 36 respectively).

For Developing the Tool, I wrote a reflection, "I'm pleased I separated them [the group] because participant 2 was more vocal about using the tool." I felt they were quite dependent on my support as demonstrated by me giving some strategies when they were setting targets at the end of the project; "I don't know, errrrr" (Appendix 4.1 line 66). They were reliant on adult support to select a target and strategies to try. For Distraction-Peer Relations they would converse with participant 1, particularly when they were a pair. They had good peer relations with participant 1 so I have removed the arrow that connected 'Peer Relations' to 'Difficulties' as this link was not demonstrated by Bob.

Bob's thinking skills tool from session 3 was created as a book. Once reading through it after the session, they had selected statements which asked similar questions (Appendix 3.5.5) and they had not been stuck into the 'book' in a logical order. For example, statements that were time specific (e.g. about the beginning or end of a task) were placed throughout.

During session 5 they chose 'To pause during a task to check that I am on track' as their target. This was the same target as Spock, and they were in the session together. They struggled to select strategies and I ended up choosing at least one of them. At the end of this session they seemed confused and said they should have chosen a different target. I suspect they chose the same target as Spock because they were unable to decide for themselves. I checked back in with Bob when I met with participant 4 for their catch-up session 5; she was now happy with what she had chosen.

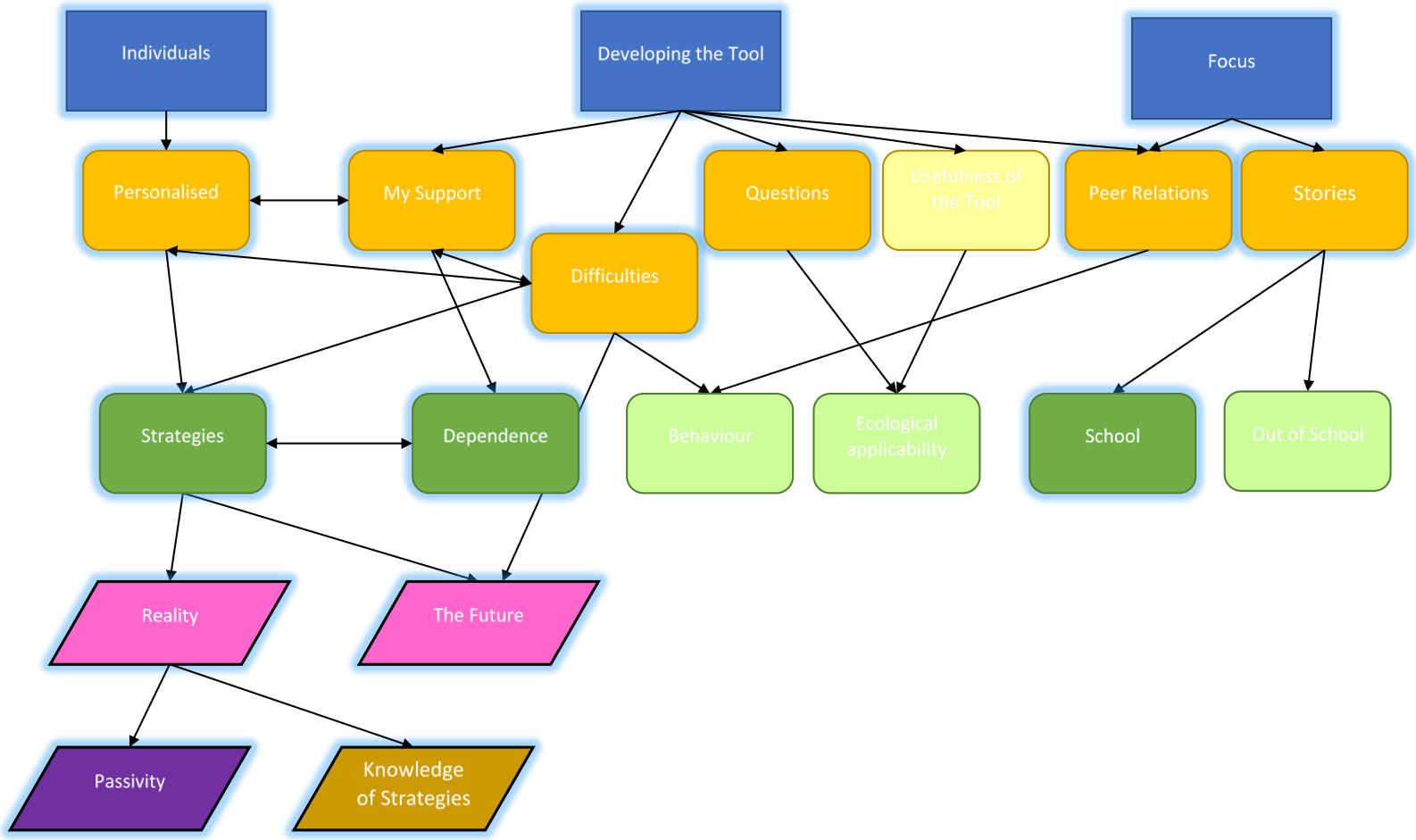
When looking at the themes matrix, Bob just highlighted themes they were drawn to: changing behaviour, boredom in class, distraction-off topic, being independent, overwhelmed, difficulties in choosing strategies, boredom/lack of focus and requiring prompts (Appendix 3.7).

Their evaluation was positive, and they expressed a preference for the paired sessions. Again, they would have liked more sessions but would not have changed anything.

Table 12 Bob's executive function and metacognition skill profile

Strengths	**Difficulties**
Task initiation	Changing behaviour
Motivation to succeed	Monitoring performance
	Selecting strategies to meet a goal
	Not able to evaluate their performance

Figure 7 Bob the Frog's individual template



4.4.3 Participant 3 – Freddie

Freddie has a diagnosis of ADHD. I met with him one-to-one for sessions four to six as he had not expressed a preference for being in a group. During the intervention sessions he provoked one of the other participants quite frequently. When he was by himself, he was honest about what he found difficult and he talked about difficulties such as not knowing where to start or not being able to listen to whole set of instructions when in the main classroom. He enjoyed not being in the main lesson. From the Learning Tactics List (Cameron & Reynolds, 1999) they ranked ten out of twenty-one statements as 'Never' which means they are not giving themselves time to reflect on their work and just getting it done. Having gotten to know this participant it is likely that he was not seeing the value in reflection either as this would be viewed as extra and perhaps unwanted work. They had a total score of 34 out of 84. They ranked three statements as 'Often':

- I break the work I do into sections and complete these one by one
- I highlight important words or phrases in my resource book or my notes
- When told that my work is 'good', I think about why the teacher said this

Their Mindset profile (Mindset Works Inc., 2012) score was the lowest out of the four participants at 20. This score has the following description, "You lean toward thinking that your intelligence doesn't change much. You prefer not to make mistakes if you can help it and you also don't really like to put in a lot of work. You may think that learning should be easy." Freddie agreed with this description.

4.4.3.1 Freddie's template

The following sub-themes were removed from the main template: Questions, Usefulness of the Tool, Ecological Validity and Out of School. An additional sub-theme was added to the Individual theme, Individual-Personalised-Strategies-The Future-**Motivation** as

through our one-to-one discussions, motivation came out as a primary difficulty for Freddie. During session 6 we were talking about the target and strategies that had been set during session 5, “Dunno haven’t even tried it yet” (Appendix 4.1 line 50).

Under the Individual theme there was sometimes resistance to the activities, particularly during session 3 when they were presented with the statement ideas to choose from, “I am not doing this, I don’t know how to do it” (Appendix 4.1 line 5). I spoke with Freddie after this comment to explain it a bit more and they chose two statements then coloured in some paper, “I like colouring. It makes me relaxed” (Appendix 4.1 line 8).

Notes on Participant 3: 10.10.2019

With 3, find some images which might provoke thoughts to support their metacognition – verbal responses?

Freddie demonstrated a lot of passivity either as a verbal response, “I get bored I just sit there” (Appendix 4.1 line 61) or as a response to the initial Thinking Skills tools, “...nothing [What did you do when you had finished?]” (Appendix 4.1 line 57). A recurring comment from Freddie was related to beginning their work, “To be honest it’s getting started” (Appendix 4.1 line 13) which relates to Individuals because it was specific to him. For the theme Developing the Tool-My Support, Freddie required explicit instructions from myself to reflect on their work, “Can you read it to me?” (Session 4 – Appendix 4.1 line 85); “Re-reading helped to remind you what you’d done” (Session 6 – Appendix 4.1 line 92).

Under Distraction and Peer Relations Freddie engaged in argumentative behaviour with Participant 1. They threw a pen at participant 1 which naturally annoyed them which led to them being shouted out; Freddie did not look bothered by this. In session 6 they talked about classroom distractions, “Someone is telling me about what happened at lunch...I’ll forget [what to do in lesson]” (Appendix 4.1 line 53). In session 3 they were trying to teach me a new slang word.

Freddie chose ‘To start my work’ as their target. They did not need to look at my suggested targets as he knew this was what he struggled with. Selecting strategies was far more difficult though and Freddie needed my support to do so. I talked through some suggestions based on my observations of them during sessions e.g. about movement and focus. During session 6 they continued their target, but I suggested another strategy to support focus which was about listening out for one key word in an instruction. We had a lengthy discussion about strategies, I even drew some ideas out, but Freddie rejected them. He seemed afraid of failure as demonstrated by his resistance to change and when looking at the themes matrix, Freddie was drawn to overwhelmed and boredom/lack of focus (Appendix 3.7).

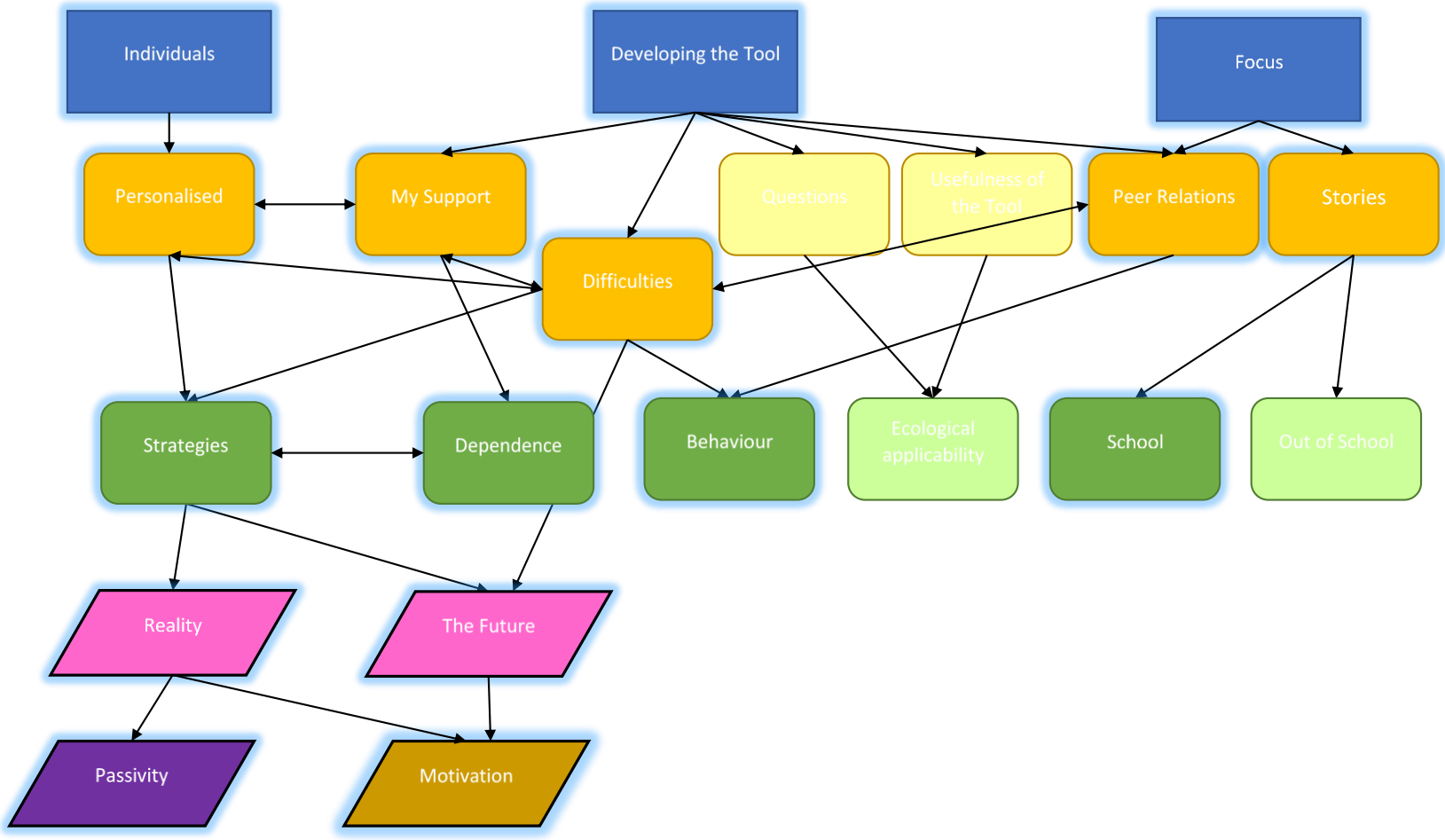
Freddie’s evaluation was a mixture of positive and negative responses. He circled that the project had been ‘Not at all useful’ and then wrote “I enjoyed it” as the final comment. He circled all the responses when the question said about the researcher listening to their ideas and was unable to tell me why he had done this. The evaluation was completed as a group of four which is likely to have impacted on his ability to concentrate.

Freddie reported finding it difficult to begin a task and with the Learning Tactics List responses, he selected ‘Not at all’ for two of the planning items, ‘Occasionally’ for three items and an ‘Often’ for one. His tactic of breaking work into sections is a good approach, particularly if he struggles to remember what to do. From our discussions I do not believe he does this in class, or he is not supported to do this in class, and that this is perhaps an at-home working strategy.

Table 13 Freddie's executive function and metacognition skill profile

Strengths	**Difficulties**
Awareness of difficulties	Task Initiation
Can remember tasks when supported to look through work	Motivation
Is aware that breaking tasks into small chunks is a good tactic.	Wanting learning to be easy

Figure 8 Freddie's individual template



4.4.4 Participant 4 – Matthew

Matthew has a diagnosis of ADHD. He was on holiday for sessions 4 and 5 so we had a catch-up session as soon as they were back. They therefore had five sessions, two of which were one-to-one. He presented with behavioural difficulties in school and had been in isolation for the day on two of the sessions. During our meetings he knew his own mind and was not inhibited in saying what he thought, such as freely offering suggestions on how to improve the thinking skills tool. He presented as being quite thoughtful but having difficulties in applying strategies even if he believed they would be useful. From the Learning Tactics List (Cameron & Reynolds, 1999) they rated five out of the twenty-one statements as 'Not at all' and had three statements as 'Most of the time':

- I work for a period of time which I have set for myself before I think of taking a break.
- I ask for help if I have been trying unsuccessfully to do or understand something two or three times.
- When I have completed a task, I congratulate myself and feel good.

They rated seven statements as 'Often' (see Appendix 2.1). Their answers were quite different to the rest of the participants with more positivity. They had a total of 51 out of 84 which is much higher than the others (28, 34 and 35 respectively).

For their Mindset profile (Mindset Works Inc., 2012) they scored 26 so had the same description as participant 1: "You are unsure about whether you can change your intelligence. You care about your performance and you also want to learn, but you don't really want to have to work too hard for it." Matthew agreed with the paragraph.

4.4.4.1 Matthew's template

Matthew was able to articulate the difficulties they have at school and they responded well to the one-to-one sessions. The sub-themes that were removed from the main template were: Usefulness of the Tool, Ecological Applicability, Behaviour, Dependence and Passivity. An additional sub-theme of Self-aware was added: Individuals-Personalised-**Self-aware**. This was to capture the statements that they made: "If I don't get it I won't start" (Appendix 4.1 line 31) and an unrecorded anecdote about if a peer had bothered them earlier in the day he can take this out on his teachers but does not mean it. For session 6 and the evaluation Matthew had been in isolation.

Under 'Individuals' there were personal comments such as "My brain always goes 100mph" (Appendix 4.1 line 6) or "I am in a bad mood" (Appendix 4.1 line 3). For Developing the Tool, they had lots of suggestions, particularly during sessions 1 and 2:

- Questions where you have to think (Session 1 – Appendix 4.1 line 76)
- A key might have been helpful (Session 2 – Appendix 4.1 line 82)
- Round the edge e.g. too simple (Session 1 – Appendix 4.1 line 77)

With My Support Matthew was able to read through some work and spot a mistake (Appendix 4.1 line 89). They often asked questions about logistics such as the where and when of the subsequent sessions. This suggests a need to know about routines and what is clearly expected of them.

During session 5 they chose 'How do I know I am doing well?' as their target. Thinking of strategies was difficult for them and similarly to Freddie, I offered suggestions based on what I had seen of them during the sessions e.g. needing a brain break or movement break to refocus. During session 6 we looked at the work they had just been completing and by re-reading it a spelling mistake was spotted. To re-read was a strategy they had chosen,

but whether they would have done that without my prompt is unknown – I predict it would have been unlikely to happen.

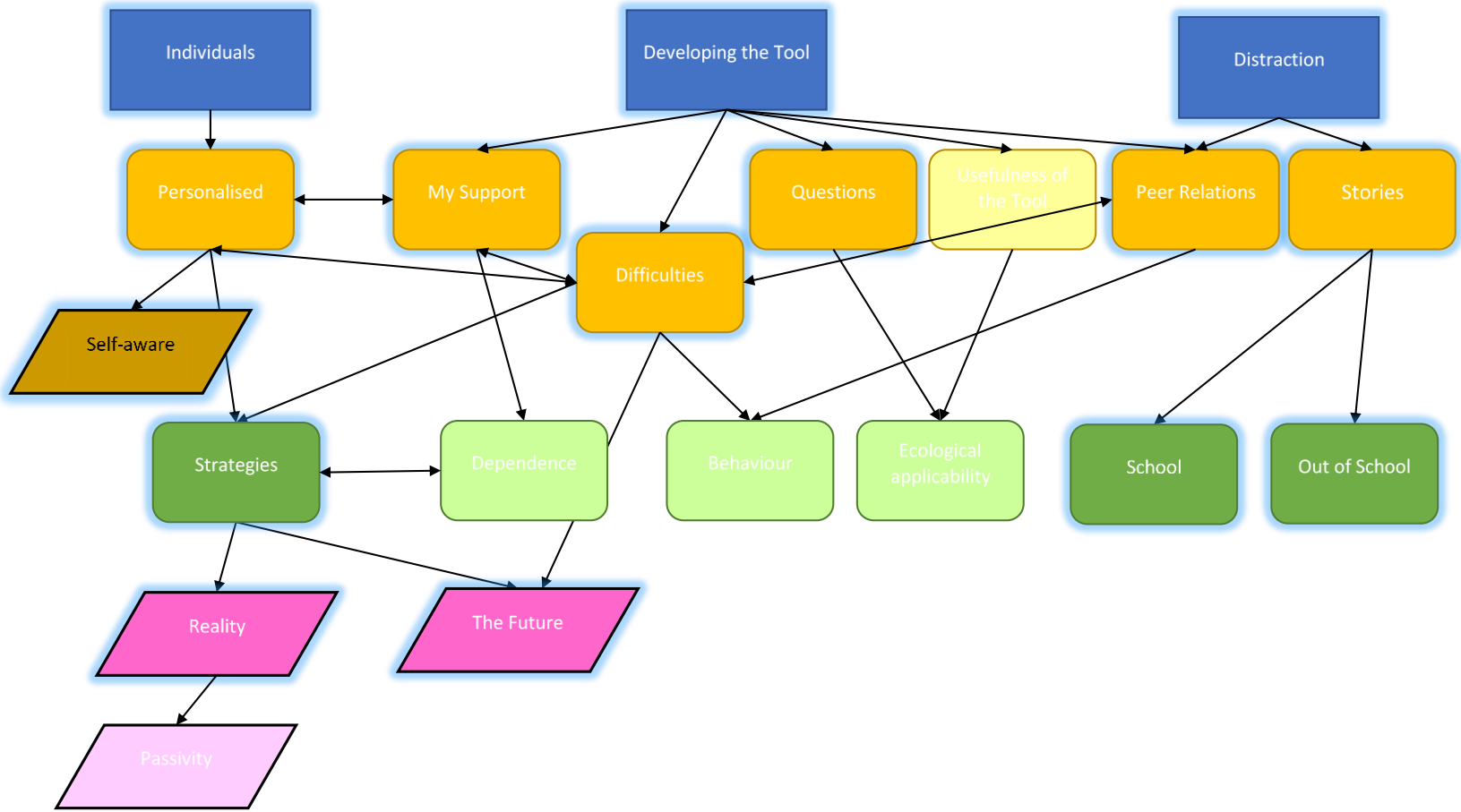
Their evaluation was positive, and they felt it could be applied in all subjects except for P.E. They would have liked more sessions and preferred the "solo sessions."

Matthew completed the second page of the Learning Tactics List during week 3. I believe he took care when selecting his answers. His responses suggest a willingness to ask for help and wanting to understand new ideas. Regarding the planning aspects of the questionnaire, he reported not planning how to approach his work or making a rough time schedule. When we talked one-to-one, he mentioned about there being no time to re-read your work before the end of the lesson which perhaps also suggests less time being available for planning.

Table 14 Matthew's executive function and metacognition skill profile

Strengths	**Difficulties**
Awareness of difficulties.	Impulsive behaviour which means they spend time in isolation.
Can remember tasks when supported to look through.	Not wanting to work too hard.
Highest Learning Tactics (Cameron & Reynolds, 1999) score suggesting they try different strategies.	Not planning their work.

Figure 9 Matthew's individual template



4.4.5 Teacher's evaluation

The teacher felt that the participants were quite engaged and said that they had made positive comments about the project. They felt there had been a moderate effect for a positive influence on the pupils' learning but that some of the pupils still struggled to self-regulate. They felt there had been an overall neutral effect on the participants' ability to work independently as some of the participants were now more likely to take risks and were more willing to work independently but some were not.

4.5 Final member checks

In February 2020 I met with the participants individually during an English lesson on our usual intervention day. I showed them the final template and their individual ones and talked through the themes, sub-themes and arrows. I was interested in what the participants hoped for their futures so asked them about this too.

Participant 1. The first question I asked resulted in a sarcastic comment, so we immediately talked about their personal sub-theme of sarcasm. Spock went a little pink when I read out some of the quotes they had said that matched this. I reassured them that no-one would be able to identify them. They agreed it was an appropriate sub-theme. They did not know what they wanted to do once they left school.

Participant 2. I talked through the diagram with Bob and they agreed that it represented them. I asked about their plans for the future and Bob said they wanted to go to university and become either a chef or a P.E. teacher. They were looking forward to doing their Duke of Edinburgh Gold award once they were in sixth form.

Participant 3. Freddie immediately said the diagram was confusing with all of the lines. We ended up talking about distractions and how they have a fidget cube at home which works well. At school Freddie has something which you can bend and manipulate but it gets

stuck on his fingers which ends up distracting him further. Freddie did not recall the unusable name they had written during the evaluation. Similarly, they could not recall the "brain damage" (Appendix 4.1 line 18) quote but thought it was funny. In session 6 we had talked about the future with my prompting. Freddie could see himself having a house and a job and thought a more practical job was most likely for him.

Participant 4. Matthew read out the themes himself, following the arrows and we talked about them. He agreed he was self-aware regarding his difficulties; he was in isolation again today. He did not know what he wanted to do when he finished school and was just going to wait and see what GCSE results he got.

4.6 Revisiting the themes matrix

After reflecting on each session and listening back to the recordings (when this was possible), I wrote down some themes which I felt had emerged from the data. These themes were not written down after in-depth analysis but were "gut-feeling" themes that I felt described the session once I had reflected on it and recorded this in my journal as per action research protocol. I did not collect any codes to support these themes, they were just words or phrases that I felt best described the sessions. As seen from the results chapter some of these themes remained and were supported by evidence from the collected data after an in-depth analysis, but some were not. I presented these to the participants each week and then as a final grid in session 6 as shown in Table 15.

Table 15 Matrix of themes from my journal

Week	Theme	Theme	Theme	Theme
1	Being stuck	Changing behaviour	Boredom in class	
2	The usefulness of the thinking skills tool	Changing behaviour	Boredom	Change in routine
3	Teachers	Distraction – off topic	Boredom	
4	No strategies for when stuck	Being independent	Overwhelmed	Requiring prompts
5	Difficulties in choosing strategies		Boredom/lack of focus	Requiring prompts

Looking back at the themes matrix above it appears that the theme of boredom did not explicitly make it into the final template. The concept of boredom can relate to not knowing what to do or being afraid to try in case of failure which does relate to the theme of Focus and the data that made up some of the Reality sub-theme. The theme from the matrix of Changing Behaviour was also not explicitly part of the final template. This theme related to difficulties with considering a change in how they approached independent work the next time the participants were asked to do so in class. One of the questions on the thinking skills tool in both weeks 1 and 2 asked what they would do differently next time, and some of the participants found this difficult to consider. This was perhaps alluded to through the data which supported the 'My Support' and 'Dependence' sub-themes.

Being Stuck. This theme came out of the first week when I got a sense that the participants did not really know what to do if they were stuck with their work. This theme developed into difficulties with choosing strategies.

Change in routine. This theme had come from my sense that our sessions were initially causing some disruption to their usual routines. It also related to them having a new

English teacher this academic year as I felt that they were still adjusting to this even in October.

Teachers. This was a topic of conversation over several weeks with the participants, not just their current English teacher but other members of staff and not just English teachers. This has been captured in the Distraction-Stories-School thread.

Overwhelmed. This came after week 4 which was the session when they looked at the tool they had created. Participant 2 "got in a flap" at the end of session 5 thinking that they should have chosen a different target. When I returned for the catch-up session with participant 5, who had been on holiday, I spoke with participant 2 to see if they still wanted to change it but they were fine with it now. Participant 3 agreed with the theme of 'overwhelmed' when we looked at the themes matrix in session 6, in terms of how he felt during lessons.

Requiring prompts. All of the participants needed a prompt of some description throughout the sessions, particularly when it came to independent thinking around choosing a target and strategies. I did see this as a role of mine as the research was not about the participants doing something or having something done to them, but about collaboration and trying to understand the participants.

Boredom/lack of focus. The main theme of Focus descends from here and a more descriptive sub-theme of Motivation was given for Participant 3.

4.7 Summary

Template analysis was performed on the data from the first three intervention sessions to create an initial template. This template was applied to the remaining data and was amended to reflect this additional data. Three main themes were found: Individuals, Developing the Tool and Focus. There were several sub-themes which have offered more

description about the main themes and there were also lateral links demonstrated between certain sub-themes. Each participant had their own thematic map. How the data addresses the research questions will be addressed in the Discussion chapter that follows.

Chapter 5: Discussion

This chapter aims to address the research questions in turn using the data collected and presented in the Results chapter. It seeks to explore how I made various decisions which shaped the research process, such as changing the intervention from a structured multi-element metacognition questionnaire to a single self-selected target with strategies. I will discuss my reflections on the action research experience as both a practitioner and a researcher and relate my findings to the literature. Towards the end of the chapter I discuss the implications of my findings on the role of educational psychologists. Finally, I will discuss the limitations of the project and make suggestions for future research.

5.1 The thinking skills tool project

My intentions at the beginning of this action research project were to work alongside adolescents, some of whom had a diagnosis of ADHD, and discover how to support them with developing their metacognition skills (e.g. planning, monitoring or evaluating). I wanted to adapt the 'Exam wrapper' intervention (Lovett, 2013) for use with adolescents to support them with self-reflecting on their independent English work. There was a gap in the literature around school-based interventions with adolescents with ADHD and involving their voice, so I aimed to add knowledge and theory to this area.

The intervention ran for six weeks and was initially an adapted version of the exam wrapper (Lovett, 2013) appropriate for Year 9 pupils. It then evolved into the participants creating their own thinking skills tool after sorting a variety of metacognitive statements (Laughlan & Carrigan, 2013). The final development had the participants choosing a target that either focussed on planning, monitoring or evaluating their work, and then selecting two or three strategies to try out in order to meet this target (Appendix 3.6). Action research does

not necessarily result in a final or end product but is the process of learning from a living situation.

5.2 Claim to knowledge: Addressing the research questions

5.2.1 Research question 1 'How can I develop a tool to support adolescents with ADHD in strengthening their metacognition skills?

From this research, effective practice to support the participants with their metacognition skills included offering strategies, trying the strategies out, giving reminders and prompts, reducing distractions, simplifying the task, offering support over a period of time and the application of strategies to work completed as part of their normal curriculum. Both Freddie and Matthew were able to reflect on their work when I was with them one-to-one, looking back at work they had already completed and getting them to read their work out loud. With Freddie it was about getting him to recall what he had been asked to do. For him to do this he needed to re-read what he had done (Appendix 4.1 line 144). With Matthew he read a piece of writing to me and was able to spot a mistake (Appendix 4.1 line 89).

Simplification was another "how" that emerged from the research. When the intervention changed to the participants selecting a target and strategies to try in order to meet the target, it felt much simpler, but better for this. Even with the one target it was still difficult to support the participant's self-reflection skills. Spock, Freddie and Matthew were able to select their own target with Freddie choosing one that was not on the ideas sheet I provided (Appendix 3.6.3). Bob however selected the same target as the peer they were working with and struggled to consider different strategies that were presented to her, even with detailed explanation from myself. Bob, Freddie and Matthew all had at least one strategy that was chosen by me as they presented as having low awareness of strategies. The idea of simplification is supported by the suggestions from Konrad et al. (2014) around setting clear targets using language that the students understand.

The initial ‘Exam Wrapper’ idea ended up being too complex for the participants to get anything beneficial from it. They were just completing the questionnaire as a passive activity and not engaging with it, for example not giving much thought to trying to change their current approach to classwork. The questions asked them to consider different elements of their independent work; what they do at the start of, during and after independent work. Some of these behaviours may well be automatic and the participants had not been required previously to think about them. Lovett (2013) discusses that repeated use of the exam wrapper supported students to build the habit of reflection on work and study strategies. They also suggest streamlining the exam wrapper once it has been used several times to encourage the students to take more responsibility for engaging in self-reflection which is partially mirrored with my findings about simplification.

There were further similarities with the Lovett (2013) research in that the students in their research were also not using a good repertoire of study skills before the intervention. Having the academic skills to be accepted to study at college implies a good level of independent learning skills but the authors suggest that these students had been successful at high school despite not having developed effective learning strategies. They state that the students needed to understand that their learning was not effective before being able to try new approaches. However, this was not how I approached the intervention with my participants. During the pilot study I had shared information about how “thinking well” leads to better learning performance, regardless of academic ability (Darling-Hammond et al., 2020; Ohtani & Hisasaka, 2018; Appendix 7.1, slide 3). There was no direct critique of what they were currently doing which had been ascertained by the completion of the Learning Tactics questionnaire (Cameron & Reynolds, 1999). The intervention was about encouraging the participants to self-reflect on their English work and to begin to promote metacognitive

thinking and evaluation in order to manage their own learning, rather than whether their work was deemed to be good.

Visiting the participants weekly worked well, in that the intervention was fresh in their minds each week. I had only planned for the intervention sessions to be 5-10 minutes in length, but they were longer than this. From the audio recordings, weeks 2 and 3 were approximately 15 minutes long. Once the group compositions were amended, the time I spent with these smaller groups became approximately 10 minutes each; the reduction in group size made the intervention more efficient. The participants needed quality time and input from myself to get the most out of the intervention. Changing my style of delivery helped with me being less instructor-like (e.g. sitting down with the participants rather than standing at the front); there had not been a conscious decision to stand like this in the first two sessions.

Another key finding was how difficult the participants found it to contemplate making a change in their behaviour. Identifying a difficulty or target was slightly easier but consideration around changing something they were doing in order to address this target was more difficult. Maybe considering strategies to use is too abstract and the participants would have benefitted from trying out the strategies with me during the sessions so that they could experience if they were useful for them or not, which is discussed by Kuhn (2000) regarding raising meta-level awareness of strategies.

Reducing the distractions for the participants, by changing the group composition, was another "how" that supported the intervention. On reflection this was a surprise situation as I had not fully considered the social aspect before the project began. The peer interactions were a significant element of the intervention as whole group collaboration was impossible. Due to their needs it is perhaps not surprising though that distractions needed to be reduced to support their engagement.

Self-reflecting on the participants' actual work from their English lesson supported the ecological validity of the research, though the work they were completing did not always lend itself to developing their metacognition. Some work they had completed included copying from the board, writing notes from a film, or completing a sentence rather than an extended piece of independent writing. The EEF (2018) report recommends that metacognitive strategies should be taught with specific tasks and not just in a generic manner.

My claim to knowledge encompasses several methods that worked with the participants in this study which included reducing distractions, meeting with them over a period of time, simplifying the intervention in response to their engagement and basing the intervention on work they were completing as part of their everyday curriculum.

5.2.2 What strategies and approaches worked well with the participants?

Research by Butler (2003) suggests that pupils with a learning need require support to select strategies, which is in alignment with my findings. Spock found the use of a peer supportive and was able to recall using the strategy of looking at a neighbour's work (Appendix 4.1 line 49) when I asked how she had got on with her target of pausing to see if she was on track. This was in relation to changing a spelling mistake which is not necessarily about being on track, but it demonstrates that she was able to try out a strategy and improve her work. The others needed adult prompting to engage in a strategy, for example to re-read their work. If I asked Freddie a question such as, "Tell me what you did in this lesson?" or to read the title of the work this did not trigger his memory retrieval process. However, when I asked him to re-read what he had written he could then expand on what had been written, as this had triggered the retrieval process from his long-term memory. Freddie needed adult support to do this as he was not doing it independently. My questioning technique was to model the metacognitive strategy chosen by the participant, which in this case was about re-reading. During the statement sort activity in week 3, Freddie was quick to respond with not

being able to do it (Appendix 4.1, line 5) which fits in with an idea from Klassen (2010) who states that a bodily feeling of frustration can be interpreted as incompetence and therefore results in less motivation and engagement with an activity. Another EEF (2018) report recommendation is about encouraging metacognitive talk in class between teacher and pupil but also between pupil and pupil. This can be presented as explicit instruction or as challenge that builds on previous learning.

Matthew engaged in re-reading when I asked him explicitly to do this. He knew this was a good strategy but did not seem able to engage with it independently as he felt they did not always have time in a lesson to do so. He had other things on his mind relating to an unwell relative which combined with a diagnosis of ADHD is not going to support concentration in class and motivation to engage in metacognitive thinking. These factors mean that Matthew finds it difficult to focus in the light of external events. Environmental factors are discussed in Darling-Hammond et al. (2020) in that they need to be recognised by schools and teachers and the pupil supported to manage these if they are to engage in effective learning.

A point that struck me about the research was whether children and young people, particularly those at secondary school, are asked about their learning and how they like to learn. Are they able to set their own targets? The participants found idea generation difficult and I felt that different strategies for monitoring their task performance were not being explicitly taught at school. If they have not been shown different ways to reflect on their work, how can they have a bank of strategies to choose from? This research suggests that students require explicit instruction with adult prompting to utilise metacognitive strategies in class. It is likely it would take at least a school term before pupils were using strategies independently. If they were to be taught these strategies in a small group outside of the

classroom, as per the intervention described here, then they would require adult prompting to transfer the skills to their whole-class teaching sessions and across different subjects.

My claim to knowledge is that direct questioning or asking the participant to apply a metacognitive strategy on their own work supported them to engage in the intervention and begin to develop these skills. The participants in this study are likely to require continued adult prompting to engage in utilising a strategy so that they can develop meta-level awareness of goals and strategies to meet them as discussed in Kuhn (2000). For these participants in the future, they are likely to need to be shown strategies and not just asked to use one. It is not a simple claim to knowledge as there are individual differences to consider which will be discussed further in the next section.

5.2.3 Do the participants differ and in what way?

I will mainly focus on the three participants who had a diagnosis of ADHD to emphasise the differences between them: Bob, Freddie and Matthew. Differences included how much support they required from me to reflect on their work and work style, whether they were able to independently identify a target to work on and whether they could consider strategies that could support this. A commonality amongst the participants was regarding the inability to independently identify strategies (e.g. re-read the question) to support them with their metacognition. The strategies were either chosen by the participants from a list I had created or chosen by myself using my knowledge of the participant and what they wanted to achieve with their target, because they were unable to choose for themselves.

The more time that I spent with the participants the more it became apparent that they each had their own profile of needs and strengths relating to metacognition skills, which has been suggested by research such as Molitor et al. (2019) and Toplak et al. (2008). Bob was able to begin tasks quite quickly but had difficulties with monitoring what she was writing

and being able to change her approach to work. It felt like writing as a strategy was an internalised script for her; 'If I write a lot, I will have completed my work well.' Bob had the highest mindset profile score suggesting she believes working hard can lead to improved intelligence and that work can be difficult but that this is good.

Freddie found beginning a task hard, demonstrating difficulties with his working memory and attention skills as described by Orban et al. (2018). He did not recognise work being hard as a good thing. He was able to talk about his work with some prompting and was aware that he found task initiation difficult. Matthew was similarly quite aware of what he found difficult, particularly around his behaviour. His Learning Tactics (Cameron & Reynolds, 1999) questionnaire was the most positive out of the four participants. He was keen to do work but equally from the Mindset Profile (Mindset Works Inc., 2012) he would have preferred easier work, so these two questionnaires perhaps suggest that Matthew has his strategies for how he approaches work but is unlikely to put in effort to learn new ones. Klassen (2010) discussed how beliefs about learning (in being able to regulate your own learning) are particularly important during adolescence because this age-range can be seen as a time of declining motivation due to various factors such as greater awareness of academic competition and hormonal changes. Similarly, there are increased demands on adolescents who want more autonomy and independence which can make their ADHD symptoms worse (Barkley, 2006). Bob the Frog talked about her mind wandering during tasks which is a difficulty discussed by Sanger and Dorjee (2016). Bob may have some executive function difficulties or deficits, but she has a more flexible outlook on learning and intelligence which should benefit her. She was the only participant who could tell me what they wanted to do once they had taken their GCSEs which shows she is motivated and ambitious which should be beneficial to her succeeding academically (Haimovitz & Dweck, 2017).

Returning to discuss all four participants, they each benefitted from an individual approach. Spock always needed time at the beginning to talk about whatever was bothering her which was more a conversation with Bob than with me. Bob could get started but would need support and direction when it came to think about what she could do in a future English lesson when engaging in independent work. Freddie openly spoke about struggling to start something and he was able to better self-reflect with my support and questioning. Matthew was similarly quite open about what he found difficult at school and benefitted from working one-to-one so that there were no other distractions.

My claim to knowledge is that understanding an individual's strengths and difficulties is necessary for planning effective interventions (Martinussen & Mackenzie, 2015). The ADHD label seems to disguise individual differences that are key to learning in these participants. As part of the action research cyclical process this knowledge can be passed on with the suggestion that differentiation within class could also be focussed on metacognition skills for planning, monitoring and evaluation so that these pupils can be explicitly taught new strategies to develop the skills they find difficult.

5.2.4 Research question 2 'How did the participants experience the intervention'

The evaluation questionnaires they completed at the end of the project did not really offer a particularly insightful snapshot into the participants' experiences of the project. They were fairly generic answers and positive overall, which made me concerned that they still felt there was an inherent power imbalance between us and therefore rated the intervention positively. To answer this question, data collected from the sessions feels more suitable and accurate.

All the participants seemed happy to come to the intervention – I partially attribute this to getting to leave their English lesson and not because they really wanted to reflect on

their work. When I returned for member checks, Freddie told me he was glad I was there as he did not want to go to his lesson today. Spock asked a few times if she could stay for the whole lesson. Again, this could be partially explained by not wanting to be in class in that perhaps my sessions were "easier" or less boring than the work they were doing in class.

There were more questions during the earlier sessions indicating that the participants wanted to know more about what was happening and what was expected from them. They were also getting to know me and what the expectations were of them. By week 3 Freddie was asking questions about my "job" (possibly to distract from completing the task but equally he did not have to ask me) which suggests he was feeling more comfortable in my presence.

Each week all the participants were able to complete and engage in an activity that was constructive and relevant to the intervention. During week 3, which was the statement sorting week to create their own individual thinking skills tool, Freddie and Matthew were not overly keen. Matthew had not completed the second page of the Learning Tactics (Cameron & Reynolds, 1999) questionnaire from the pilot study so he was happy to do this instead. I tried to engage him in a conversation about which of the statements on the questionnaire he would like to work on, but this was trickier. Freddie was able to choose two statements once I had talked to him individually about the purpose of the task. He then engaged in colouring in on some spare paper and did not bother anyone else in the group demonstrating his need for short focussed tasks which are supported by an adult, followed by a brain break. Morsink et al. (2017) talked about the delay-aversion theory of ADHD and avoidance of perceived slow and boring tasks which is perhaps how the male participants viewed the statement sort activity. I had given them choice over how they could approach this week's activity which is a factor in increasing motivation as discussed by Pintrich et al. (1994).

Feedback was gained from the participant's English teacher via a questionnaire. It highlighted the individual nature of the participants as the teacher felt some were becoming more likely to try new things, but others were not. With hindsight I felt that I could have gained more useful information by giving the teacher an individual questionnaire for each participant or conducting the evaluation as a face-to-face interview.

As I was personally delivering the intervention, I got to understand the holistic experience of the participants in receiving the intervention. For example, I could see that initially they were not fully aware of the purpose of the project and that six questions on the first and second thinking skills tool was too many for them to manage at a deeper learning level. When they were a group of four, I could sense the tension between some of them so separating them helped to create a better atmosphere that was more conducive to learning. Changing the group composition worked well and changed the direction of the project, giving the young people the opportunity to express their opinions about the intervention and to develop it into something meaningful. Through rapport building, the participants had decided to trust me and engaged in the activities I was supporting them with to develop their metacognition. Tangney (2014) discusses that learning is an emotional activity and that perhaps activities which empower students and improve their confidence and self-belief do not occur enough in the classroom. A pragmatic humanist approach to working with young people would incorporate understanding the psychology of pupils in terms of their motivation and cognitive strengths and weaknesses (Stevick, 1982, as cited in Gadd, 1998, p.225), which aligns with my findings.

My claim to knowledge is that the experience of the intervention improved over time, for both the participants and I as the researcher, as we got to know each other and to understand the research better, which led to increased engagement. Improvements included

the quality of my discussion and more bespoke support for the participants, and a more relaxed atmosphere during the intervention sessions.

5.2.5 Summary of my claim to knowledge

To summarise, this research suggests that the following are important for developing adolescents' metacognition:

1. Simplification of the task led to better engagement by the participants.
2. Modelling of metacognitive strategies via direct and specific questioning supported the participants' use of the strategies.
3. Understanding of the participants' individual strengths and needs relating to executive function and metacognitive skills helped me to support them individually.
4. Reducing distractions for the participants increased engagement.
5. Engagement increased over time as all parties understood the research better.

This research adds to the theory around the complexity and challenges of working with adolescents with ADHD and similar needs.

5.2.6 Generalisability

This project only involved four participants, three of whom had a diagnosis of ADHD, so I cannot claim that all pupils in Year 9 with a diagnosis of ADHD would respond in the same manner to the intervention. However, I would suggest that these main findings are applicable to other secondary school pupils and not just those who took part in the intervention as they reflect sound advice for delivering group interventions. Additionally, the findings provide those who read them the opportunity to reflect on similar situations of group interventions and they also contribute to theory regarding working with adolescents with ADHD.

5.2.7 Implications for adults supporting pupils with a diagnosis of ADHD

Several of the findings from this research can be utilised by adults who work directly with pupils in schools who have a diagnosis of ADHD. I have listed some prompt questions in Table 16 which can be used by an adult with the pupil.

Table 16 Prompts for adults working with pupils with a diagnosis of ADHD

Prompts
Have distractions been reduced for the pupil? E.g. facing the board, access to fiddle toy, noise cancelling headphones
Has an adult checked that they understand what they need to do? Does the task need chunking into smaller parts?
What does this pupil find difficult? E.g. starting work, staying on task, finishing on time, staying on topic
Where are their strengths?
Has an adult modelled a strategy for them to use?
Regarding motivation and mindset, does the pupil expect to be able to improve their performance by putting in effort or making changes to their approach to work?

5.2.8 Wider outcomes of the research

There were several pieces of learning that I acquired from conducting this action research project that were not directly related to developing metacognition.

5.2.8.1 Group dynamics

The group dynamic was an unexpected challenge which needed action to address. For this research I was able to change the group dynamic but that is not possible in the whole classroom setting. The difficulties arose between two participants who did not get along socially. The influence of this social dynamic lead to poorer work output and reduced concentration for all the participants. This is a factor to be mindful of when I work with groups of children in the future.

5.2.8.2 Motivation and mindset

When observing children in my practise as a trainee educational psychologist, I do look out for activities and tasks that they find more motivating and engage in more readily. However, I had not fully considered the implications of motivation and mindset on the attitude towards work tasks and learning new skills. From the Mindset profile questionnaires (MindSet Works Inc., 2012) some of the participants wanted their work to be easy and did not want to put in effort to learn something new. This must be difficult for a class teacher to manage, particularly when they may not be fully aware of how their students view learning and effort. This mindset can manifest as challenging behaviour if the pupil perceives the work to be too difficult, so understanding their motivation and perceptions of "intelligence" would be useful for teachers to know. In my future role as an educational psychologist, motivation and mindset are constructs I would like to explore further with the pupils I work with.

5.2.8.3 Engagement

The two factors above both impacted on engagement with the research. Each week the participants were able to complete a relevant activity but how engaged they were with the activities varied by week and participant. There were several "I don't know" responses when they were using the thinking skills tool, which I attributed to being 'Passive.' I understood their responses to be a desire to not want to think too much about the questions and only wanting to answer easy questions. The Mindset profile (MindSet Works Inc., 2012) findings would support this for some of the participants. For others, the "I don't know" responses could have been due to a lack of knowledge of strategies or experience with self-reflective thinking which also impacted on engagement with trying out something new. I will aim to reflect on and further explore "I don't know" or shrug responses when working with children in the future.

The wider learning from the research relates to the impact of social relationships on the ability to work and think effectively, how a pupil's motivation and beliefs around learning impact on their willingness to try new things and how the combination of these impacted on engagement with the research intervention.

5.3 Validation of my claim to knowledge: Trustworthiness of the data

5.3.1 Credibility

I adhered to the action research process by reflecting on how each intervention session had been and what I had learned from it. I then made changes to the next week's session to echo this. For example, after week 1 there was little discussion about metacognition so I colour-coded the exam wrapper to represent the three areas: planning, monitoring and evaluation (see Appendix 3.3) and added in a brief metacognition recap at the beginning of session 2. I asked my participants if there were any changes they wanted to make and incorporated these where possible, for example the group structure for the intervention sessions.

It was a lengthy intervention period from July 2019 to February 2020, with the main sessions being in the Autumn term of 2019. During the final member check the participants all agreed with their individual templates and did not offer any thoughts for changes. Being reflexive, I wondered if this was because the participants still felt that there was a power imbalance in our research relationship. I kept a reflective journal throughout the project until the submission date.

The procedures for Template Analysis as outlined in Crabtree and Miller (1999) were systematically followed when analysing the data after the intervention had finished.

5.3.2 Transferability

The situational context of the participants has been described in the Methodology chapter. I created a themes matrix (Table 15) which was a table of the themes I picked out from the data each week. These themes were not created by analysing the data in depth but were developed on my instinct after reviewing my notes and the recordings once.

5.3.3 Dependability

I have detailed how I conducted the research in the Methodology chapter and believe that someone else could reproduce the content of each intervention session. How I analysed the data is also described in the Methodology and Results chapters.

5.3.4 Confirmability

I shared my initial template with a critical friend, looking at the data that I had collected which informed this. They suggested changing one of the main themes from 'Distractibility' to 'Focus' as it felt like a better description.

5.3.5 Authenticity

The data collected reflected the participants in each session. During the final member check in February 2020 they all agreed with their individual templates and unique additional theme.

5.3.6 Value of the research

This project began with wanting to develop a tool to support adolescents with a diagnosis of ADHD with their metacognition skills when completing independent work during English lessons, with input from the participants. By the end it had narrowed in scope and became about supporting the participants to identify difficulties with their independent writing relating to planning, monitoring and evaluation, and supporting them to try out different strategies to address this.

I see this research as the necessary groundwork for a larger action research project to develop the metacognitive skills in adolescents with a diagnosis of ADHD and those without a diagnosis but who present with similar difficulties. From Figure 2 it can be seen that I completed four micro-cycles of action research which can now be fed back to school and the research community.

The participants were provided with an opportunity to talk about their work in a different way to what happens in a typical classroom. There was no discussion about whether they had achieved the success criteria for a lesson, and they did not have to rectify any "mistakes", unless it was a specific strategy. The intervention was encouraging them to reflect on what they had done, how they had done it and if they could try a different approach next time in order for them to reflect independently when I was not present.

5.3.7 Challenges

The pupils were difficult to work with at times due to their attentional difficulties, their readiness to engage with learning (or lack of) and the participants' absence of explicit experience of thinking metacognitively. Initially the most challenging aspect was the management of the group so that they could engage with the intervention. I had wanted the intervention to be a group process where they could learn from each other but by the second session it became apparent that this was not going to be possible. The group worked better during week 3 when they had a longer activity that required them to be more cognitively active, but it still felt the right decision to split them into pairs and individuals, depending on their preference. Once the group structure had changed it became easier to engage and converse with the participants about the intervention.

The next challenge was the difficulty in getting them to create their own exam wrapper or thinking skills tool. Bob's had far too many questions, many of which were

repeated. When she used her self-designed thinking skills tool on some work she had recently completed there were several "don't know" answers suggesting that it was not appropriate (e.g. How could I do this better next time? "don't know" – Appendix 3.5.6). Spock's was more coherent but again the statements she had chosen did not apply fully to the work she had completed in the week (e.g. What did I find easy about this task? "all of it, we only coppied of the bored [sic]" – Appendix 3.5.5). This suggests that the intervention was not having the impact it could have done because the work was not suitable for the questions. It also demonstrates the challenge of not having involved the class teacher more with the intervention so that I was aware of what work they would be doing each week and they were more aware of what I was asking the participants to do. Freddie had only chosen two statements which I had embellished with a visual prompt and Matthew was on holiday so did not make his own thinking skills tool. After a discussion with my supervisor we felt it would be appropriate to investigate the participants' views about intelligence and working hard and to change the thinking skills tool to a target with strategies that was monitored on a weekly basis.

As the participants' class teacher was not as involved as originally planned, there were practical constraints relating to the use of strategies and engaging in self-reflection when I was not there. One of the participants talked about there not being time to re-read work which is a difficulty not just necessarily related to the lesson planning but the length of the lesson. Teachers are expected to cover the curriculum in the time allocated so allowing time for teaching metacognition may unnerve some teachers and schools if they do not understand the long-term benefits that teaching these skills can have.

Another challenge that appeared later in the project was the difficulty in selecting a target and then strategies to try out in order to meet this target. I provided suggestions that they could try (see Appendix 3.6.3) but it was still difficult. There was perhaps resistance to

having to change something they were doing or to try a new behaviour that was not yet proved to be beneficial or worthwhile. It required them to be active in the intervention. The work they were completing in class did not always lend itself to self-reflection as it was quite short e.g. writing a definition or copying information from the board. There were few opportunities for an extended piece of writing which would be better suited to the metacognition skills I was wanting to instil which will have impeded the research outcomes to a marked extent. The thinking skills tool will have been less useful at times when the participants were only able to reflect on work that was quite brief or not very independent, for example copying from the board, notes written from a film or completing a pre-started sentence. During week 6 I followed up with the participants as to whether they had tried any strategies and only one participant had which highlights how important it is for there to be an adult to support them with these skills in situ.

5.3.8 Addressing the problems with action research

Finally, in looking at the trustworthiness of the data collected I will return to the methodology chapter section 3.3.3 ‘Problems with action research’ and discuss the problems posed in terms of the data collected.

Imposing own ideas. Alongside discussion with my supervisor I made the decision to change the thinking skills tool to a target which is a change that had not been explicitly requested by the participants. This change had been made because they were not learning from the thinking skills tool and it was not supporting them to consciously utilise metacognitive strategies. From the reading I had completed I knew that metacognitive skills were important for learning and that those with a diagnosis of ADHD are thought to find them more difficult to acquire whilst also perhaps thinking they are more proficient in the skills than they actually are (Steward et al., 2017). My research demonstrates similar findings

in that the participants needed explicit support and modelling to try out a strategy. I kept changing the approach to how the participants were exposed to these skills.

Reducing the power imbalance. I used the participants' comments to shape the following week's session on most occasions. I spoke with the participants explicitly about metacognition on two separate occasions to support their understanding of the project. I also shared my theme ideas with them to see what they thought. From week 3 onwards I sat down at the same table as the participants.

5.4 Implications for educational psychology practice

This action research project has provided me with useful knowledge for my future work as an educational psychologist. I will continue to meet with pupils on a one-to-one basis throughout my career, so I have taken some valuable learnings from the project. The participants each had an individual profile of needs which is supported by the executive function deficit model of ADHD (Barkley, 2000; Holmes et al., 2000 etc.), but their areas of weakness did differ for example whether it was flexibility to try out a new strategy when completing independent work or initiation of a task (planning) or task monitoring (monitoring) and knowing if what they were doing was addressing the learning objective for the lesson (monitoring and evaluation). Educational psychologists can take from this that metacognitive skills can be broken down into small steps which is perhaps the best way for schools to support pupils to develop these skills; choosing one element at a time to focus on (planning, monitoring or evaluation) and then breaking this element down even further as per learning theories about scaffolding and management of a pupil's zone of proximal development (Vygotsky et al., 1978; 1986). The explicit teaching of study skills is another consideration when making recommendations to schools.

The group dynamic was interesting to manage. For a one-off session it perhaps would not matter so much about the group relationships but if delivering a long-term intervention (e.g. therapeutic story writing) then the group composition needs to be considered to ensure it runs effectively. There is also the consideration of the whole class group and its dynamics, as a class teacher does not have the luxury of teaching the pupils in several small groups, away from pupils who distract each other or where there are poor relations. Darling-Hammond et al. (2020) discuss the idea of classroom learning communities as part of their developmental systems framework for effective learning. These learning communities seek to promote respectful relationships for all members of the classroom and can be facilitated by teaching skills in how to work well in a group, how to have respectful discussions and how to resolve conflicts when necessary.

All the participants needed the strategies to be explained to them and some benefitted from being told to choose a specific strategy. This research only looked at one context, that of work produced in English lessons, so it is likely that strategies would need to be modelled in different subjects rather than assuming that pupils will just transfer these skills. This has vindicated how I write reports in that I will specify if an adult needs to model a strategy to a pupil and support them to use it, until they are more independent. When educational psychologists give advice for supporting children and young people with their metacognition skills, we need to be mindful that we ensure strategies are explained and modelled to them so that they can be used.

Most of the participants struggled to think of strategies that could be used to meet a target. I feel this was a combination of having to make an effort to change something and genuine lack of knowledge or conscious thought about strategies to use to meet a target. Some of the participants were more resistant to making an effort while some lacked the knowledge of ways to approach certain tasks. This resistance to effort suggests a fear of

making a mistake and that they feel effort has not led to reward in the past, so it is not associated with good things. This fits with the Growth Mindset literature (Haimovitz & Dweck, 2017; Seaton, 2018 etc.) in that having a fixed mindset means someone does not believe they can improve with effort and that failure demonstrates the limits of their abilities.

Schools are not easy places in which to work. We can plan our work as best we can but there still might be something hindering what we would like to do in a best-case scenario, for example, pupils being in isolation or on holiday, or changes of class teacher which is disruptive for pupils. Before this project I had not fully considered that at secondary school, pupils must manage several transitions at once, what with generally having a different teacher for each subject. These teachers can also change from year to year which means that there is a settling-in period for both pupils and teachers while adjusting to a new class. This research required me and the participants to get to know each other and it did feel like there was an adjustment period at the beginning as we got used to each other. I have learned that the changing of teachers is quite frequent at secondary school and that pupils can take time (in this research's case, half a term) to adjust to new staff. This could have implications for working with and observing pupils in September as they will still be managing the transition which might impact the behaviours seen.

The thinking skills tools from sessions 1 and 2 were too broad for the participants to gain meaningful learning about developing their metacognition. It proved to be a passive tool rather than one that creates future action. Once the 'tool' was simplified to one target it was more manageable suggesting that too many targets and skills to work on can be overwhelming unless there is adequate support for the pupils to address these targets.

In summary, the implications for educational psychology practice are:

- Grouping children together by a perceived need is not necessarily the most effective way to work; consideration of group dynamics is good practice.
- Executive function skills are individual, regardless of a diagnosis.
- Modelling, explanation and explicit teaching of strategies is necessary in developing independent skills.
- Adjusting to a new teacher can take time.
- Consideration of how many targets a child has at once.

5.5 Personal learning journey

5.5.1 My practice as an educational psychologist

As a former primary school teacher, predominantly in Key Stage One (ages 5-7), I have always felt more comfortable in the primary school setting compared with secondary. Before the research project began, I had conducted secondary school casework (e.g. classroom observations, one-to-one work) and worked alongside another trainee educational psychologist with groups of Year 11 pupils on study skills and managing exam stress. Therefore, this was my first independent prolonged experience with a group of pupils over the age of 11. As I got to know the participants, I became more comfortable interacting with them. When the group logistics changed, there was much less bravado from the participants, and I was able to offer them more individual attention.

I utilised my teaching skills in the planning of sessions, in having back-up activities and being attuned to who was on or off task. These skills also helped when it came to the devising of possible targets and strategies that would be suitable for self-reflecting on written work, alongside the guidance from Lauchlan and Carrigan (2013) and learning theories mentioned briefly above (Vygotsky et al., 1978; 1986). The outcome of the project has

influenced my own practice too in that when recommending that a child or young person would benefit from support to develop their metacognition, I suggest choosing one area from planning, monitoring or evaluating until they are ready to move on.

Since completing this project, I have learned more about the functioning of secondary schools. When I did the pilot in the summer term the pupils had the same teacher, but they were not going to be having this teacher the following academic year. It was also unknown whether they would be in the same class. Thankfully when it came to arrange the start of the intervention, they were in the same class (but with a new teacher) which made the logistics much easier. When I returned for the member checks in the spring term, there had been a whole year group shake-up of English classes and two of the participants had been moved to two different classes. I only found out information about classes when I asked or was arranging a visit; as EPs we need to request this sort of information in advance of a visit to ensure we make effective use of our time. The possibility of a change of teacher part way through a year also has implications for psychological formulation, as many of the children and young people that EPs work with find change difficult to manage and need additional transition support.

5.5.2 My practice as a researcher

My self-efficacy to develop the project grew over time. After the pilot study I was confident that the right group of pupils had been chosen and they seemed willing to give the intervention a go. After the first group intervention session in September I was less confident that the research was going to be successful as I felt the session had not been productive because some of the participants found it difficult to contemplate making a change to how they approached their work and there was conversation unrelated to the task. They did not appear to take their time with the questions to really think about how they had approached the piece of work they were reflecting on.

I had hoped that myself and the participants would be able to produce a useful and usable thinking skills tool by the end of the project. My second hope was that the group would work together and be able to bounce ideas off each other to develop the tool. Neither of these came to fruition. Initially, this was difficult to process as it felt like a personal failure rather than a combination of factors:

- Personality clash amongst some of the participants
- Me being an unfamiliar adult to them
- Being asked questions they were unfamiliar with
- Participants not fully understanding the purpose of the intervention

Once I started to make the sessions more like group work than a lesson and giving them more control, my confidence in my own efficacy increased. The simple action of sitting with them at a table rather than standing at the front significantly improved how the sessions went. This all aligns with action research allowing and even encouraging flexibility. The more I read about action research, the more I realised the project is meant to evolve.

Action research is about conducting research in real-life situations. Schools can be unpredictable places: people off sick, timetables changing, staff being available one week and not the next etc. My previous research experience had been predominantly quantitative in nature or had involved interviewing people, so I had no experience of collaborating with young people on a project. It felt liberating to actually listen to what the young people wanted and to have time to interpret their responses to the intervention. I could then shape the intervention so they could get the most from it. Butler (2003) discussed findings where teachers felt they were able to identify personalised strategies for their pupils when they really listened to them.

To summarise, I have learned about the benefits of a flexible methodology, about being a "human" researcher and that being both reflective and reflexive is valid in research.

5.5.3 My understanding of ADHD

Before starting my educational psychologist training, I understood ADHD as a behavioural difficulty. I believed that the impulsivity and attention difficulties described by the DSM-V (APA, 2013) and ICD -11 (WHO, 2019) were expressed physically through the pupil's actions. Having now worked intensely with a small group of adolescents with a diagnosis of ADHD, I can see that these difficulties also impact on their cognition. Impulsivity was seen in their immediate decision to not try an activity. Inattention was seen in the difficulties with knowing how to start a task, requiring adult support to engage or choose a strategy, and benefitting from a small group setting in a quiet classroom.

From my understanding, taking medication for ADHD can lead to a reduction in the most visible behavioural difficulties but it does not necessarily lead to improvements in cognitive functioning (Swanson et al., 2011). Schools and teachers need to be aware that a diagnosis of ADHD also means the pupil has difficulties with effective thinking which will disadvantage their learning. The definitions and criteria for diagnosing ADHD (see appendices 6.1 and 6.2) focus mainly on behavioural symptoms, which neglects to acknowledge the presence of cognitive difficulties.

In contrast to the realist discussion above, the participants in this research were quite diverse. They had varying motivation, presented with an individual profile of strengths and needs, and responded differently to the group situation and the activities during the sessions. These differences cause me to question whether the label of ADHD can be used accurately to describe a child's difficulties with attention, impulsivity, and hyperactivity. Can those with a diagnosis of ADHD really be seen as the same when the three participants in this study

presented with a diversity of needs? Equally, can those without a diagnosis be assumed to not have difficulties with attention, impulsivity, and hyperactivity? The diagnosis of ADHD provides someone who believes the diagnosis exists a set of pre-conceived ideas of how the pupil may behave and interact, which do not necessarily describe the pupil's needs accurately. In the future I will be mindful of this when schools and families are discussing pupils with a diagnosis of ADHD.

5.6 Limitations

The rationale for including a pupil without a diagnosis of ADHD was to have a member of the group whose skills in this area (if using the executive function deficit hypothesis of ADHD) were less impaired and would therefore be a positive influence on the others in the group, but I had not approached the project as per Plumer and Stoner (2005) where the peer coach was given a specific task to support a classmate which is perhaps one reason why this did not work. As the intervention group composition changed from session 4 onwards, it became a redundant idea. It would have felt ethically wrong to now exclude this pupil from the research, so they were kept as a valued participant. I could see the differences in their thinking at times, for example, they were able to independently articulate using one of their chosen strategies whereas those with a diagnosis of ADHD were not.

The school, and specifically the class teacher, were not as involved as I had planned. There was a change of teacher over the summer holidays which meant the class teacher for the duration of the intervention had not attended the pilot session which contained information about metacognition; what it is, why it is important and what it looks like in class. The work they were completing in class was not always conducive to using the thinking skills tool. For example, copying from the board is not writing that can be self-reflected upon in a meaningful manner.

Due to the intervention evolving beyond the thinking skills tool which had been initially planned, it would have been useful to have more time to monitor the targets set by the participants and which strategies they were able to try out. I think the next evolution or micro-cycle would have been to involve the teacher further in monitoring the pupil's use of strategies and using the intervention sessions with me to go through strategies with their work. This would likely have required an additional six weeks to begin to embed the learning.

The participants had not voluntarily chosen to be invited to take part in the research, they were purposively selected by their SENCo from my criteria. This meant that there was not necessarily a motivation to engage with the project and make changes to their approach to independent work as they had not chosen to take part. Equally, if I had selected participants who wanted to take part, I may have found different results and not established the key elements for implementing a metacognition skills intervention with more reluctant participants.

5.7 Conclusion

The thinking skills tool intervention sought to collaborate with adolescents with an ADHD diagnosis to support their development of metacognition and self-reflection skills. The gaps in the literature related to research with the adolescent age-range and interventions that were ecologically valid e.g. conducted in the education setting with work they were completing in school regardless of the intervention taking place. The thinking skills tool intervention aimed to improve the executive function skills of the participants in a real-life situation (Langberg et al., 2013). In order to do this the intervention was monitored and adapted over time.

The thinking skills tools used early in the study were too complicated and did not encourage much metacognitive thinking amongst the participants. It was therefore simplified to be a self-selected target with strategies to try out to meet this target.

The approach that worked best with the participants was to sit with them individually with their book while they looked through the work they had completed. Asking them specific questions or giving them a task (e.g. re-read the title/sentence) helped to support their metacognitive thinking. Simplification was another approach that worked to support the intervention. Supporting the participants to engage in using different strategies aligns with the growth mindset research (DeBacker et al., 2018; Haimovitz & Dweck, 2017) in encouraging them to try something new so that they can begin to see the benefits. It was important to support the participants' self-efficacy too as per the Zimmerman (2000) study, particularly for those who had adverse emotional reactions to activities they felt they could not do.

The participants all had an individual profile of strengths and weaknesses, regardless of the fact that they had a diagnosis of ADHD which supports the findings of Toplak et al. (2008), which was specific to an ADHD population. There were general metacognitive difficulties, but an individual approach was needed for each participant; whether that was the group arrangements or how I engaged with them.

The group dynamic was a key contributing factor to supporting the intervention. Having chosen action research as my methodology I was able to be flexible and change the group dynamics to support the participants with engaging in the intervention. Including myself as part of the group dynamic, it was essential that I developed positive relationships with the participants, as per the findings from the Moore et al. (2017) study. By changing the group composition, I was able to show them that I was wanting to improve their learning environment and not allow the participants to irritate each other.

The data collected for this project suggests that there was little self-knowledge of metacognition, as shown by the participants requiring extensive support from an adult to use a strategy and the difficulties in choosing strategies to try. Kuhn (2000) discusses the need for pupils to develop meta-level awareness of strategies so that they are able to choose the most appropriate ones dependent on the task. The development of this awareness requires explicit teaching and modelling in specific contexts (EEF, 2018). The research project described in this thesis adds to the knowledge of the complexity and challenges of working with adolescents with a diagnosis of ADHD or similar difficulties.

5.8 Ideas for future research

It would be interesting to conduct an action research project on a whole class or subject group, looking at explicitly teaching metacognitive strategies to the pupils. From my research experience this could take the form of focussing on one strategy (e.g. re-reading work) for a half term before moving onto another strategy. Time to explicitly model this strategy would be planned in and some pupils (likely to be those with an ADHD diagnosis or similar needs) would need to be prompted and have this strategy modelled several times. Each half term the strategies could be reviewed by pupils meaning they would be exposed to six different strategies over the course of a year.

This research suggests that the participants did demonstrate difficulties with metacognitive thinking which is likely to be affecting their achievement at school. More research into finding beneficial ways of working with challenging pupils, including those with attentional difficulties, would be useful for educational psychologists and education practitioners.

References

A disorder for everyone! (2020). *Dave Traxson*. http://www.adisorder4everyone.com/bio/dave-traxon/

Achacoso, M. (2004). Post-test analysis: A tool for developing students' metacognitive awareness and self-regulation. *New Directions for Teaching and Learning*, 2004(100), 115-119.

Alvarado, J., Puente, A., Jiménez, V., & Arrebillaga, L. (2011). Evaluating reading and metacognitive deficits in children and adolescents with Attention Deficit Hyperactivity Disorder. *Spanish Journal of Psychology*, 14(1), 62-73.

American Psychiatric Association. (2013). *Diagnostic and statistical manual of mental disorders* (5th ed.). Arlington, VA: American Psychiatric Publishing.

Anderson, P.J., Lee, K.J., Roberts, G., Spencer-Smith, M.M., Thompson, D.K., Seal, M.L., Nosarti, C., Grehan, A., Josev, E.K., Gathercole, S., Doyle, L.W., & Pascoe, L. (2018). Long-Term Academic Functioning Following Cogmed Working Memory Training for Children Born Extremely Preterm: A Randomized Controlled Trial. *The Journal of Pediatrics*, 202, 92-97.e4.

Antshel, & Nastasi. (2008). Metamemory development in preschool children with ADHD. *Journal of Applied Developmental Psychology*, *29*(5), 403-411.

Apter, B. (2012). Do computerised training programmes designed to improve working memory work? *Educational Psychology in Practice*, 28(3), 257-272.

Avramidis, E., & Smith, B. (1999). An introduction to the major research paradigms and their methodological implications for special needs research. *Emotional and Behavioural Difficulties*, 4(3), 27-36.

Baddeley, A. (2003). Working memory: looking back and looking forward. *Nature reviews neuroscience*, *4*(10), 829.

Bar-Ilan, R., Cohen, N., & Maeir, A. (2018). Comparison of Children With and Without ADHD on a New Pictorial Self-Assessment of Executive Functions. *American Journal Of Occupational Therapy*, 72(3), 1-9.

Barkley, R.A. (2000). Genetics of Childhood Disorders: XVII. ADHD, Part 1: The Executive Functions and ADHD. *Journal of the American Academy of Child & Adolescent Psychiatry, 39*(8), 1064-1068.

Barkley, R. A. (2006). Attention-deficit hyperactivity disorder: A handbook for diagnosis and treatment (3rd ed.). New York: Guilford Press.

Barkley, R., Shelton, T., Crosswait, C., Moorehouse, M., Fletcher, K., Barrett, S., Jenkins, L., & Metevia, L. (2000). Multi-method Psycho-educational Intervention for Preschool Children with Disruptive Behavior: Preliminary Results at Post-treatment. *Journal of Child Psychology and Psychiatry, 41*(3), 319-332.

Beck, S. J., Hanson, C. A., Puffenberger, S. S., Benninger, K. L., & Benninger, W. B. (2010). A Controlled Trial of Working Memory Training for Children and Adolescents with ADHD. *Journal of Clinical Child & Adolescent Psychology, 39*(6), 825-836.

BBC. (2020). *The great chain of being*. BBC Bitesize KS3. https://www.bbc.co.uk/bitesize/guides/zmjnb9q/revision/2

Brooks, J., McCluskey, S., Turley, E., & King, N. (2015). The Utility of Template Analysis in Qualitative Psychology Research. *Qualitative Research in Psychology*, 12(2), 202-222.

Buitelaar, J. (2017). Optimising treatment strategies for ADHD in adolescence to minimise 'lost in transition' to adulthood. *Epidemiology and Psychiatric Sciences*, 26(5), 448-452.

Butler, D. (2003). Structuring Instruction to Promote Self-Regulated Learning by Adolescents and Adults With Learning Disabilities. *Exceptionality, 11*(1), 39-60.

Cameron, R.J., & Reynolds, A.R. (1999). Learning style and metacognition. In Frederickson, N., & Cameron, R.J. (Eds.) *Psychology in Education Portfolio.* London: GL Assessment Limited.

Cassell, C., & Johnson, P. (2006). Action research: Explaining the diversity. *Human Relations,* 59(6), 783-814.

Chabot, C., Shoveller, J.A., Spencer, G., & Johnson, J. L. (2012). Ethical and Epistemological Insights: A Case Study of Participatory Action Research with Young People. *Journal of Empirical Research on Human Research Ethics: An International Journal*, 7(2), 20-33.

Chaimaha, N., Sriphetcharawut, S., Lersilp, S. & Chinchai, S. (2017) Effectiveness of therapeutic programs for students with ADHD with executive function deficits, *Journal of Occupational Therapy, Schools, & Early Intervention*, 10:4, 436-456, DOI: 10.1080/19411243.2017.1359131

Connelly, L.M. (2016). Trustworthiness in qualitative research. *MEDSURG Nursing*, 25(6), 435-436.

Crabtree, B., & Miller, W. L. (1999). Using codes and code manuals. A template organizing style of interpretation. In. B. Crabtree & W.L. Miller (Eds.), *Doing qualitative research* (2nd ed.) (pp. 163-177). Thousand Oaks, California; London: SAGE.

Daley, D., & Birchwood, J. (2010). ADHD and academic performance: Why does ADHD impact on academic performance and what can be done to support ADHD children in the classroom? *Child: Care, Health and Development, 36*(4), 455-464.

Darling-Hammond, L., Flook, L., Cook-Harvey, C., Barron, B., & Osher, D. (2020). Implications for educational practice of the science of learning and development. *Applied Developmental Science, 24*(2), 97-140.

Debacker, T., Heddy, B., Kershen, J., Crowson, H., Looney, K., & Goldman, J. (2018). Effects of a one-shot growth mindset intervention on beliefs about intelligence and achievement goals. *Educational Psychology, 38*(6), 711-733.

Dick, B. (2004). Action research literature: Themes and trends. *Action Research,* 2(4), 425-444.

Dovis, S., Van der Oord, S., Wiers, R., & Prins, P. (2015). ADHD Subtype Differences in Reinforcement Sensitivity and Visuospatial Working Memory. *Journal of Clinical Child and Adolescent Psychology, 44*(5), 859-85974.

Drummond, J., & Themessl-Huber, M. (2007). The cyclical process of action research: The contribution of Gilles Deleuze. *Action Research,* 5(4), 430-448.

Dunlosky, J., Rawson, K., Marsh, E., Nathan, M., & Willingham, D. (2013). Improving Students' Learning With Effective Learning Techniques: Promising Directions From Cognitive and Educational Psychology. *Psychological Science in the Public Interest,* 14(1), 4-58.

Dunning, D., Holmes, J., & Gathercole, S. (2013). Does working memory training lead to generalized improvements in children with low working memory? A randomized controlled trial. *Developmental Science,* 16(6), 915-925.

Dupaul, G., Weyandt, L., & Janusis, G. (2011). ADHD in the Classroom: Effective Intervention Strategies. *Theory Into Practice, 50*(1), 35-42.

Dweck, C. (1986). Motivational Processes Affecting Learning. *American Psychologist*, 41(10), 1040-1048.

Dweck, C. (2015). Growth. British Journal of Educational Psychology, 85(2), 242-245.

Dweck, C. (2019). The Choice to Make a Difference. Perspectives on Psychological Science, 14(1), 21-25.

Education Endowment Foundation. (2018). *Metacognition and self-regulation*. https://educationendowmentfoundation.org.uk/evidence-summaries/teaching-learning-toolkit/meta-cognition-and-self-regulation/

Elliott, J. (1978). What is Action-Research in Schools? *Journal of Curriculum Studies,* 10(4), 355-357.

Flavell, J. (1979). Metacognition and cognitive monitoring: A new area of cognitive–developmental inquiry. *American Psychologist,* 34(10), 906-911.

Forrest-Bank, S.S., Nicotera, N., Anthony, E.K., & Jenson, J.M. (2015). Finding their Way: Perceptions of risk, resilience, and positive youth development among adolescents and young adults from public housing neighborhoods. *Children and Youth Services Review,* 55, 147-158.

Gadd, N. (1998). Towards Less Humanistic English Teaching. *ELT Journal, 52*(3), 223-234.

Gezer-Templeton, P., Mayhew, E., Korte, D., & Schmidt, S. (2017). Use of Exam Wrappers to Enhance Students' Metacognitive Skills in a Large Introductory Food Science and Human Nutrition Course. *Journal of Food Science Education*, 16(1), 28-36.

Ghaye, T., & Ghaye, K. (1998). *Teaching and learning through critical reflective practice*. London: David Fulton.

Gioia, G.A., Isquith, P.K., Guy, S.C., & Kenworthy, L. (2000). *BRIEF - Behaviour Rating Inventory of Executive Function*. Lutz, FL: Psychological Assessment Resources.

Guare, R., Dawson, P., & Guare, C. (2013). *Smart but scattered teens*. The Guilford Press: New York.

Haimovitz, K., & Dweck, C. (2017). The Origins of Children's Growth and Fixed Mindsets: New Research and a New Proposal. *Child Development,* 88(6), 1849-1859.

Holmes, J., Gathercole, S., Place, M., Dunning, D., Hilton, K., & Elliott, J. (2010). Working memory deficits can be overcome: Impacts of training and medication on working memory in children with ADHD. *Applied Cognitive Psychology, 24*(6), 827-836.

Hopkinson, C., Lifvergren, S., Huzzard, T., & Hellström, A. (2015). Using poetry in a critically reflexive action research co-inquiry with nurses. Action Research, 13(1), 30-47.

Imhof, M. (2004). Effects of color stimulation on handwriting performance of children with ADHD without and with additional learning disabilities. *European Child & Adolescent Psychiatry, 13*(3), 191-198.

Huang, L., Gino, F., & Galinsky, A. (2015). The highest form of intelligence: Sarcasm increases creativity for both expressers and recipients. *Organizational Behavior and Human Decision Processes,* 131(C), 162-177.

Kagan, C., Burton, M., & Siddiquee, A. (2008). Action Research. In C. Willig & W. Stainton-Rogers (Eds), *The SAGE handbook of qualitative research in psychology* (pp.32-53). UK: Sage Publications Ltd.

Karhu, A., Närhi, V., & Savolainen, H. (2018). Inclusion of pupils with ADHD symptoms in mainstream classes with PBS. *International Journal of Inclusive Education, 22*(5), 475-489.

King, N. (2012). Doing template analysis. In G. Symon & C. Cassell (Eds.), *Qualitative organizational research* (pp. 426–50). London, Sage.

Klassen, R. (2010). Confidence to manage learning: the self-efficacy for self-regulated learning of early adolescents with learning disabilities. *Learning Disability Quarterly, 33*(1), 19-30.

Kohls G., Herpertz-Dahlmann B., & Konrad, K. (2009). Hyperresponsiveness to social rewards in children and adolescents with attention-deficit/hyperactivity disorder (ADHD). *Behavioral and Brain Functions, 5*(1), 20-20.

Konrad, M., Keesey, S., Ressa, V., Alexeeff, M., Chan, P., & Peters, M. (2014). Setting Clear Learning Targets to Guide Instruction for All Students. *Intervention in School and Clinic, 50*(2), 76-85.

Korkman, M., Kirk, U., & Kemp, S. (1998). *NEPSY: A Developmental Neuropsychological Assessment: Manual*. San Antonio, TX: Harcourt Assessment.

Kornbluh, M. (2015). Combatting Challenges to Establishing Trustworthiness in Qualitative Research. *Qualitative Research in Psychology,* 12(4), 1-18.

Krieger, V., & Amador-Campos, J. (2018). Assessment of executive function in ADHD adolescents: Contribution of performance tests and rating scales. *Child Neuropsychology, 24*(8), 1063-1087.

Kuhn, D. (2000). Metacognitive Development. *Current Directions in Psychological Science*, 9(5), 178-181.

Langberg, J., Dvorsky, M., & Evans, M. (2013). What Specific Facets of Executive Function are Associated with Academic Functioning in Youth with Attention-Deficit/Hyperactivity Disorder? *Journal of Abnormal Child Psychology,* 41(7), 1145-1159.

Lauchlan, F & Carrigan, D. (2013). *Improving learning through dynamic assessment: A practical classroom resource*. London: Jessica Kingsley.

Lewin, K. (1946). Action Research and Minority Problems. *Journal of Social Issues*, 2(4), 34-46.

Liegghio, M., Nelson, G., & Evans, S. (2010). Partnering with Children Diagnosed with Mental Health Issues: Contributions of a Sociology of Childhood Perspective to

Participatory Action Research. *American Journal of Community Psychology*, 46(1-2), 84-99.

Lincoln, Y., & Guba, E. (1985). *Naturalistic inquiry*. New York: Sage.

Litt, I. F. (2003). Research with, not on, adolescents: Community-based participatory research. *Journal of Adolescent Health, 33*(5), 315-316.

Lovett, M.C. (2013). Make exams worth more than the grade: Using exam wrappers to promote metacognition. In Kaplan, M., Silver, N., Lavaque-Manty, D., & Meizlish, D. (Eds.), *Using reflection and metacognition to improve student learning* (pp.18-54), Stirling, VA: Stylus.

Major, A., Martinussen, R., & Wiener, J. (2013). Self-efficacy for self-regulated learning in adolescents with and without attention deficit hyperactivity disorder (ADHD). *Learning and Individual Differences, 27,* 149-156.

Martinussen, R., & Mackenzie, G. (2015). Reading comprehension in adolescents with ADHD: Exploring the poor comprehender profile and individual differences in vocabulary and executive functions. *Research in Developmental Disabilities,* 38, 329-337.

Maxwell, J. A. (Ed.). (2005). *Qualitative research design: An interactive approach* (2nd ed.). Thousand Oaks, CA: Sage

McAteer, M. (2013). *Action research in education*. India; Sage.

McNiff, J. (2013). *Action research: Principles and practice*, 3rd edition. Cornwall; Taylor and Francis.

Mindset Works Inc. (2012). *Mindset assessment profile tool*. Los Angeles Unified School District.

https://achieve.lausd.net/cms/lib08/CA01000043/Centricity/Domain/173/MindsetAssessmentProfile.pdf

Molitor, S., Oddo, L., Eadeh, H., & Langberg, J. (2019). Executive Function Deficits in Adolescents With ADHD: Untangling Possible Sources of Heterogeneity. *Journal of Emotional and Behavioral Disorders*, *27*(3), 165-177.

Moore, D., Russell, A., Arnell, S., & Ford, T. (2017). Educators' experiences of managing students with ADHD: A qualitative study. *Child Care, Health and Development*, *43*(4), 489-498.

Morrow, S. (2005). Quality and Trustworthiness in Qualitative Research in Counseling Psychology. *Journal of Counseling Psychology*, 52(2), 250-260.

Morsink, S., Sonuga-Barke, E., Mies, G., Glorie, N., Lemiere, J., Oord, S., & Danckaerts, M. (2017). What motivates individuals with ADHD? A qualitative analysis from the adolescent's point of view. *European Child & Adolescent Psychiatry*, *26*(8), 923-932.

Morton, P. (2006). Using critical realism to explain strategic information systems planning. *JITTA : Journal of Information Technology Theory and Application,* 8(1), 1-20.

Murayama, K., Pekrun, R., Lichtenfeld, S., & Vom Hofe, R. (2013). Predicting Long-Term Growth in Students' Mathematics Achievement: The Unique Contributions of Motivation and Cognitive Strategies. *Child Development*, *84*(4), 1475-1490.

National Institute for Clinical Excellence (NICE). (2018). *Attention deficit hyperactivity disorder: diagnosis and management*. https://www.nice.org.uk/guidance/ng87

National Institute for Mental Health (NIMH). (no date). *About NIHM*. https://www.nimh.nih.gov/about/index.shtml

Oberauer, K., Farrell, S., Jarrold, C., & Lewandowsky, S. (2016). What Limits Working Memory Capacity? *Psychological Bulletin*, 142(7), 758-799.

Ohtani, K., & Hisasaka, T. (2018). Beyond intelligence: A meta-analytic review of the relationship among metacognition, intelligence, and academic performance. *Metacognition and Learning,* 13(2), 179-212.

Orban, S., Rapport, A., Friedman, M., Eckrich, D., & Kofler, L. (2018). Inattentive Behavior in Boys with ADHD during Classroom Instruction: The Mediating Role of Working Memory Processes. *Journal of Abnormal Child Psychology, 46*(4), 713-727.

Owens, J.S., Coles, E.K., Evans, S.W., Himawan, L.K., Girio-Herrera, E., Holdaway, A.S., Zoromski, A.K., Schamberg, T., & Schulte, A.C. (2017). Using Multi-component Consultation to Increase the Integrity with Which Teachers Implement Behavioral Classroom Interventions: A Pilot Study. *School Mental Health, 9*(3), 218-234.

Percy-Smith, B., Mcmahon, G., & Thomas, N. (2019). Recognition, inclusion and democracy: Learning from action research with young people. *Educational Action Research*, 27(3), 1-15

Perez-Alvarez, M. (2017). The Four Causes of ADHD: Aristotle in the Classroom. *Frontiers In Psychology, 8*, 928.

Pezzica, S., Vezzani, C., & Pinto, G. (2018). Metacognitive knowledge of attention in children with and without ADHD symptoms. *Research in Developmental Disabilities*, 83, 142-152.

Pintrich, P., Roeser, R., & De Groot, E. (1994). Classroom and Individual Differences in Early Adolescents' Motivation and Self-Regulated Learning. *The Journal of Early Adolescence,* 14(2), 139-161.

Plumer, P., & Stoner, G. (2005). The Relative Effects of Classwide Peer Tutoring and Peer Coaching on the Positive Social Behaviors of Children With ADHD. *Journal of Attention Disorders, 9*(1), 290-300.

Poonamallee, L. (2009). Building grounded theory in action research through the interplay of subjective ontology and objective epistemology. *Action Research,* 7(1), 69-83.

Raggi, V. L. & Chronis, A. M. (2006). Interventions to address the academic impairment of children and adolescents with ADHD. *Clinical Child and Family Psychology Review*, 9, 85–111.

Rapport, M., Alderson, D., Kofler, R., Sarver, M., Bolden, M., & Sims, J. (2008). Working Memory Deficits in Boys with Attention-deficit/Hyperactivity Disorder (ADHD): The Contribution of Central Executive and Subsystem Processes. *Journal of Abnormal Child Psychology*, *36*(6), 825-837.

Reason, P., & Bradbury, H. (2013). *The SAGE handbook of action research: Participative inquiry and practice* (2nd ed.). Los Angeles, California; London: SAGE.

Rechten, F., & Tweed, A. (2014). An exploratory study investigating the viability of a communication and feedback intervention for school children at risk of exclusion: Analysis of staff perspectives. *Educational Psychology in Practice,* 30(3), 293-306.

Rehman, A.A., & Alharti, K. (2016). An introduction to research paradigms. *International Journal of Educational Investigations,* 3(8), 51-59.

Reflection Sciences. (2018). *Metacognition and executive function: a dynamic relationship of cognitive functioning*. https://reflectionsciences.com/metacognition-executive-function/

Rhew, E., Piro, J., Goolkasian, P., & Cosentino, P. (2018). The effects of a growth mindset on self-efficacy and motivation. *Cogent Education,* 5(1), 16.

Riccio, C.A. & Gomes, H. (2013) Interventions for Executive Function Deficits in Children and Adolescents, *Applied Neuropsychology: Child*, 2:2, 133-140, DOI: 10.1080/21622965.2013.748383

Rogers, M., Hwang, H., Toplak, M., Weiss, M., & Tannock, R. (2011) Inattention, working memory, and academic achievement in adolescents referred for attention deficit/hyperactivity disorder (ADHD), *Child Neuropsychology*, 17:5, 444-458, DOI: 10.1080/09297049.2010.544648

Sanger, K., & Dorjee, D. (2016). Mindfulness training with adolescents enhances metacognition and the inhibition of irrelevant stimuli: Evidence from event-related brain potentials. *Trends in Neuroscience and Education, 5(*1), 1-11.

Schraw, G., & Dennison, R. S. (1994). Assessing metacognitive awareness. *Contemporary Educational Psychology*, 19, 460–475.

Seaton, F. (2018). Empowering teachers to implement a growth mindset. *Educational Psychology in Practice*, 34(1), 41-57.

Semel, E., Wiig, E. H., & Secord, W. A. (2003). *CELF-4: Clinical evaluation of language fundamentals: Examiner's manual* (4th ed.). San Antonio, TX: Harcourt Assessment.

Sherman, J., Rasmussen, C., & Baydala, L. (2006). Thinking Positively: How Some Characteristics of ADHD Can Be Adaptive and Accepted in the Classroom. *Childhood Education, 82*(4), 196-200.

Sibley, M., Kuriyan, A., Evans, S., Waxmonsky, J., & Smith, B. (2014). Pharmacological and psychosocial treatments for adolescents with ADHD: An updated systematic review of the literature. *Clinical Psychology Review, 34*(3), 218-232.

Sibley, M., Smith, B., Evans, S., Pelham, W., & Gnagy, E. (2012). Treatment Response to an Intensive Summer Treatment Program for Adolescents With ADHD. *Journal of Attention Disorders, 16*(6), 443-448.

Soicher, R., & Gurung, R. (2017). Do Exam Wrappers Increase Metacognition and Performance? A Single Course Intervention. *Psychology Learning & Teaching*, 16(1), 64-73.

Stel, M., & Veenman, M. (2014). Metacognitive skills and intellectual ability of young adolescents: A longitudinal study from a developmental perspective. *European Journal of Psychology of Education,* 29(1), 117-137.

Steward, K., Tan, A., Delgaty, L., Gonzales, M., & Bunner, M. (2017). Self-Awareness of Executive Functioning Deficits in Adolescents With ADHD. *Journal of Attention Disorders,21(*4), 316-322.

Swanson, H. (1990). Influence of Metacognitive Knowledge and Aptitude on Problem Solving. *Journal of Educational Psychology*, 82(2), 306-314.

Swanson, J., Baler, R., & Volkow, N. (2011). Understanding the Effects of Stimulant Medications on Cognition in Individuals with Attention-Deficit Hyperactivity Disorder: A Decade of Progress. *Neuropsychopharmacology,* 36(1), 207-226.

Tamm, L., Nakonezny, P., & Hughes, C. (2014). An Open Trial of a Metacognitive Executive Function Training for Young Children With ADHD. *Journal of Attention Disorders*, 18(6), 551-559.

Tangney, S. (2014). Student-centred learning: A humanist perspective. *Teaching in Higher Education*, 19(3), 266-275.

Tekin, A. K., & Kotaman, H. (2013). The epistemological perspectives on action research. *Journal of Educational and Social Research*, *3*(1), 81-91.

Thompson, D. R. (2012). Promoting Metacognitive Skills in Intermediate Spanish: Report of a Classroom Research Project. *Foreign Language Annals*, 45(3), 447-462.

Timimi, S. (2017). Non-diagnostic based approaches to helping children who could be labelled ADHD and their families. *International Journal of Qualitative Studies on Health and Well-being, 12*(Sup1), 1298270.

Toplak, M., Bucciarelli, S., Jain, U., & Tannock, R. (2008). Executive Functions: Performance-Based Measures and the Behavior Rating Inventory of Executive

Function (BRIEF) in Adolescents with Attention Deficit/Hyperactivity Disorder (ADHD). *Child Neuropsychology, 15*(1), 53-72.

Trapman, M., Gelderen, A., Schooten, E., & Hulstijn, J. (2018). Writing proficiency level and writing development of low-achieving adolescents: The roles of linguistic knowledge, fluency, and metacognitive knowledge. *Reading and Writing,* 31(4), 893-926.

Traxson, D. (2018, September 28*). C.O.P.E. policy pressure group strives to better safeguard young children from prescribed psychiatric drugs*. British Psychological Society. https://www.bps.org.uk/blogs/guest/cope-policy-pressure-group-strives-better-safeguard-young-children-prescribed

Truelove, E. (2014). *How can I enhance a reciprocal teaching intervention to support the reading comprehension skills of two children with ASC? An action research study*. [Doctoral dissertation, University of Sheffield]. White Rose eTheses Online. http://etheses.whiterose.ac.uk/6786/

Visser, J., & Jehan, Z. (2009). ADHD: A scientific fact or a factual opinion? A critique of the veracity of Attention Deficit Hyperactivity Disorder. *Emotional and Behavioural Difficulties,* 14(2), 127-140.

Vygotskiĭ, L., Cole, M., John-Steiner, V., & Scribner, S. (1978). *Mind in society : The development of higher psychological processes.* Cambridge, Mass.: Harvard University Press.

Vygotskiĭ, L., Kozulin, A., & NetLibrary, Inc. (1986). *Thought and language* [electronic resource] (Translation newly rev. and edited / by Alex Kozulin. ed.). Cambridge, Mass.: MIT Press.

Wall, K. (2008). Understanding metacognition through the use of pupil views templates: Pupil views of Learning to Learn. *Thinking Skills And Creativity*, *3*(1), 23-33.

Wallace, B. (2008). Evaluation of TASC in Schools in the UK. *Gifted Education International*, 24(2-3), 156-159.

Wallace, B., Humphries, W., Evans, K., & Shaughnessy, M. (2019). On demonstrating the development of the Thinking Actively in a Social Context (TASC) problem-solving approach in schools in South Wales (UK). *Gifted Education International*, 35(2), 152-160.

Waring, T., & Wainwright, D. (2008). Innovative developments in the use of template analysis: Two comparative case studies from the field. In *Proceedings of the 7th European Conference on Research Methodology for Business and Management Studies: ECRM2008* (p. 293). Academic Conferences Limited.

Watson, J. (2019). *Drop the disorder! Challenging the culture of psychiatric diagnosis*. PCCS Books: Monmouth.

Wechsler, D. (1974). *Wechsler Intelligence Scale for Children-Revised*. New York: Psychological Corporation

Wechsler, D. (2004). *Wechsler Intelligence Scale for Children – fourth UK edition: Administrative and scoring manual*. London: The Psychology Corporation.

Wheeler, L. (2010). Critique of the article by Visser and Jehan (2009): 'ADHD: A scientific fact or a factual opinion? A critique of the veracity of Attention Deficit Hyperactivity Disorder'. *Emotional and Behavioural Difficulties*, 15(3), 257-267.

Williams, L., Rycroft-Malone, J., & Burton, C. (2017). Bringing critical realism to nursing practice: Roy Bhaskar's contribution. *Nursing Philosophy,* 18(2), N/a.

Williamson, H., Harcourt, D., Halliwell, E., Frith, H., & Wallace, M. (2010). Adolescents' and Parents' Experiences of Managing the Psychosocial Impact of Appearance Change During Cancer Treatment. *Journal Of Pediatric Oncology Nursing*, 27(3), 168-175.

World Health Organisation (WHO). (2019). ICD-11 Version: 04/2019. https://icd.who.int/browse11/l-m/en#/http%3a%2f%2fid.who.int%2ficd%2fentity%2f821852937

Young, S., & Myanthi Amarasinghe, J. (2010). Non-pharmacological treatments for ADHD: A lifespan approach. *The Journal of Child Psychology and Psychiatry*, *51*(2), 116-133.

Zepeda, C., Richey, J., Ronevich, P., & Nokes-Malach, T. (2015). Direct Instruction of Metacognition Benefits Adolescent Science Learning, Transfer, and Motivation: An In Vivo Study. *Journal of Educational Psychology*, 107(4), 954-970.

Zimmerman, B. (2000). Self-Efficacy: An Essential Motive to Learn. *Contemporary Educational Psychology*, *25*(1), 82-91.

Appendix 1

1.1 Ethical approval from the University of Sheffield

The University Of Sheffield.

Downloaded: 07/05/2019
Approved: 03/05/2019

Ruth Thomas
Registration number: 170109987
School of Education
Programme: Doctorate in Educational and Child Psychology

Dear Ruth

PROJECT TITLE: Developing a tool to support metacognition in Adolescents with ADHD
APPLICATION: Reference Number 025654

On behalf of the University ethics reviewers who reviewed your project, I am pleased to inform you that on 03/05/2019 the above-named project was **approved** on ethics grounds, on the basis that you will adhere to the following documentation that you submitted for ethics review:

- University research ethics application form 025654 (dated 26/04/2019).
- Participant information sheet 1058917 version 4 (26/04/2019).
- Participant information sheet 1058918 version 2 (14/04/2019).
- Participant information sheet 1058920 version 2 (14/04/2019).
- Participant information sheet 1058925 version 2 (14/04/2019).
- Participant information sheet 1058926 version 2 (14/04/2019).
- Participant information sheet 1058927 version 2 (14/04/2019).
- Participant information sheet 1059009 version 3 (26/04/2019).
- Participant information sheet 1058929 version 2 (14/04/2019).
- Participant information sheet 1058928 version 2 (14/04/2019).
- Participant consent form 1058921 version 2 (14/04/2019).
- Participant consent form 1058922 version 2 (14/04/2019).
- Participant consent form 1058923 version 2 (14/04/2019).
- Participant consent form 1058924 version 2 (14/04/2019).

If during the course of the project you need to deviate significantly from the above-approved documentation please inform me since written approval will be required.

Yours sincerely

David Hyatt
Ethics Administrator
School of Education

1.2 Head Teacher information sheet and consent form

The University Of Sheffield.

Head Teacher Information Sheet

Dear *Head Teacher*,

My name is Ruth Thomas and I am a Trainee Educational Psychologist in my second year of doctoral training at The University of Sheffield. I am currently based with the Educational Psychology service at *Local Authority*. As part of my training course I am required to carry out a doctoral research project and I am writing to you to request your permission to carry out the project at *name of school*.

I am very interested in finding out more about how we can support students with their metacognition skills. These are the skills that help us to plan our work, monitor what we are doing while working and then to evaluate our own performance after completing a task. I am particularly interested in working with students who have a diagnosis of ADHD as research suggests that they find these skills difficult.

Research also suggests that students who think better perform better and the optimal time period for developing metacognitive skills is between the ages of 12 and 15. I would therefore like to work with a small group of four or five students in the same [subject] class in Year 8, 9 or 10, some of whom will have a diagnosis of ADHD, to collaboratively create a tool to support metacognitive thinking at school. The tool would be based upon an already developed idea called an Exam Wrapper, an example of which I have enclosed with this letter. I would be developing the exam wrapper to support the students with their independent class work and not with exams; it will be referred to as a Thinking Skills tool.

If the class teacher wanted to use the tool with the rest of the class that would be fine, I just would not be able to collect data from the other children as I do not have ethical approval for this.

I have an enhanced DBS check and was previously a Primary School teacher, so I am familiar with working with larger groups of children and young people. The intervention will require some time at the beginning and the end to set up and then evaluate, but once it is up and running would only require a short amount of time out of a lesson. Please see below my proposed timeline with maximum lengths of sessions, as I would aim for shorter. I would work alongside the class teacher of the chosen class to shape the intervention in order to minimise disruption to lesson time.

Week	**Activity**	**Length of session (minutes)**
Pilot/1	Metacognition questionnaire completed at home by pupils. Researcher to explain to the four or five participants what metacognition is. Introduce the thinking skills tool and get some initial feedback. Focus group.	50
2	Discuss first thinking skills tool in relation to a piece of independent work from the last two weeks that has been marked.	10
3	Review previous week's thinking skills tool. Any changes for the new wrapper next week?	10

4	Discuss second thinking skills tool in relation to a piece of independent work from the last two weeks that has been marked.	10
5	Review previous week's thinking skills tool. Any changes for the new wrapper next week?	10
6	Discuss third thinking skills tool in relation to a piece of independent work from the last two weeks that has been marked.	10
7	Review previous week's thinking skills tool.	10
8	Review tool creation process and usefulness of developed tool – questionnaire.	30

I have also enclosed prospective information sheets and consent forms for parents and pupils for your information.

Practical considerations

I would seek to liaise with the class teacher over when a suitable time would be for the intervention to take place. It would ideally be the same lesson time each week and should only last 5-10 minutes once the intervention is running.

Data collection

I intend to collect both quantitative and qualitative data for the study. A metacognition questionnaire will be administered before the intervention. I will ask the young people to feedback their thoughts on the Thinking Skills tool to shape the tool each time they use it. I will be making notes on each session to inform the tool. I was hoping to audio record the sessions so that I do not miss any important information from the feedback. I will provide a questionnaire at the end of the project for the students and class teacher to complete.

Withdrawal, data protection and anonymity

Participants have the right to withdraw from the research at any time until November 25th 2019. All data collected will be kept strictly confidential. It will be kept locked in a secure place and referred to anonymously by code and not by name. Audio-recordings will only be accessed by the researcher and will be destroyed a year after the end of the project.

If you are happy for your school to take part in the research project, then please sign the consent form and return it by email or by post to the details given above.

If you have any queries or questions please do not hesitate to contact me by email or telephone as I would be very happy to discuss the research project with you further: email address or *telephone number*. Should you wish to contact my research supervisor at the University of Sheffield you can do so by email: *XXXX*, email address. You may wish to contact the PEP at *xxxx* by email address or by *telephone number*.

I look forward to hearing from you.

Kind regards,

Ruth Thomas

Trainee Educational Psychologist

Research Project: Thinking Skills project

Head teacher consent form

Researcher: Ruth Thomas

Please tick or initial the boxes you agree with.

☐	I would like my school to take part in the research project.
☐	I have been given information about the project and I know who to contact to ask questions.
☐	I understand that the young people will be able to choose if they want to take part or not.
☐	I understand that all data will be treated confidentially, stored securely and referred to by code and not name.
☐	I understand that participation is voluntary and that children are free to withdraw at any time without giving any reason and without there being any negative consequences. I understand I can contact Ruth Thomas [email address] or her research supervisor XXXX [email address] if I wish to withdraw.
☐	I understand that some activities will be audio recorded for research purposes only. No other use will be made of them and no-one outside the research project will be allowed to access the original recordings. These recordings will be stored securely and destroyed one year after the project is complete.

Please complete in block capitals.

School name:

_____	_____	_____
Name of head teacher	Date	Signature

1.3 Teacher information sheet and consent form

The University Of Sheffield.

Class teacher Information Sheet

Developing a tool to support thinking skills during independent work in class

Dear _____,

I am writing to you with the details of a Thinking Skills project to request your consent for you to take part. Before you decide it is important for you to understand why the research is being done and what it will involve. Please take time to read the following information carefully and discuss it with others if you wish. Contact details are provided at the end should you wish to ask questions or want to find out more information. Thank you for reading this.

1. What is the project's purpose?

My name is Ruth Thomas and I am a Trainee Educational Psychologist in my second year of doctoral training at The University of Sheffield. I am currently based with the Educational Psychology service at *Local Authority*. As part of my training course I am required to carry out a research project and the Head Teacher, XXXX at *School*, had kindly agreed for me to carry this out in your school. The project has received ethical approval from The School of Education at The University of Sheffield. It will last for 8-10 weeks.

I am very interested in finding out more about how we can support students with their thinking or metacognition skills. These are the skills that help us to plan our work, monitor what we are doing while we are working and then to evaluate our own performance after completing a task. I am particularly interested in working with students who have a diagnosis of ADHD as it has been shown that they may find planning work and thinking about what they are doing difficult.

As a professional working within the local authority, I have an enhanced DBS check and have previously worked as a Primary School teacher.

2. Why have I been chosen?

Research suggests that students who think better perform better and the optimal time period for developing metacognitive skills is between the ages of 12 and 15. I would therefore like to work with a small group of four or five students in your Year 8 English class, some of whom have a diagnosis of ADHD, to collaboratively create a Thinking Skills tool to support metacognitive thinking at school. The tool would be based upon an already developed idea called an Exam Wrapper, an example of which I have enclosed with this letter.

I would like to collect your views on how you feel the pupils are responding to the intervention.

3. Do I have to take part?

It is up to you to decide whether or not you take part. If you do decide to take part, you will be given this information sheet to keep (and be asked to sign a consent form) and you can still withdraw from the study at any time, without any negative consequences, up until all the intervention has been completed which is expected to by 25th November 2019. You do not

have to give a reason. If you wish to withdraw from the research, please contact myself, Ruth Thomas at email address or *telephone number*.

4. What will happen to me if I take part? What will I have to do?

The intervention sessions

I will be coming to your English lesson once a week for eight weeks during the Summer/Autumn Term of 2019 to support the small group's use of the Thinking Skills tool and find out what has (not) been useful about it that week. I will ask you how it has gone each week where appropriate. These comments will be used as data for my research to support my evaluation of the tool development process.

The details of the dates and times will be negotiated with yourself. The intervention should only take 5-10 minutes of a lesson but will require a longer amount of time at the beginning and the end. We will work together to make sure this does not impact too much on the pupil's learning. You may want the rest of the class to consider similar questions that are in the Thinking Skills tool, which is fine, I just would not be able to collect their comments.

Quotes

I will be making notes on each session to inform the tool too. I will be audio recording the sessions for research purposes only so that I do not miss any important information from the feedback the young people provide. I will **not** be recording your comments unless you join the group.

Week	Activity	Length of session (minutes)
Pilot/1	Metacognition questionnaire completed at home by students. Researcher to explain to the students what metacognition is. Introduce the exam wrapper and get some initial feedback.	50
2	Discuss first exam wrapper in relation to a piece of independent work from the last two weeks that has been marked.	10
3	Review previous week's exam wrapper. Any changes for the new wrapper next week?	10
4	Discuss second exam wrapper in relation to a piece of independent work from the last two weeks that has been marked.	10
5	Review previous week's exam wrapper. Any changes for the new wrapper next week?	10
6	Discuss third exam wrapper in relation to a piece of independent work from the last two weeks that has been marked.	10
7	Review previous week's exam wrapper.	10
8	Review tool creation process and usefulness of developed tool – questionnaire.	30

5. What are the possible disadvantages and risks of taking part?

I hope that the intervention does not take up too much lesson time. We can negotiate together the best way to make it work.

6. What are the possible benefits of taking part?

I hope that this group of young people will benefit from an intervention focussing on their thinking skills. I will keep you regularly informed of the tool development process and you may choose to use a similar approach with the rest of the class when the small group are

completing their Thinking Skills tools. The rest of the class would not be part of the research project though.

7. Will my taking part in this project be kept confidential?

All the information that I collect will be kept strictly confidential and will only be accessible to members of the research team. You will not be identifiable in any reports or publications. You can choose a pseudonym if you wish.

All data collected will be kept strictly confidential. It will be kept locked in a secure place and referred to anonymously by code and not by name. Audio-recordings will only be accessed by the researcher and will be destroyed a year after the end of the project. Audio recordings will be named by the date so the school and your name will not be known to anybody.

What is the legal basis for processing my personal data?

According to data protection legislation, we are required to inform you that the legal basis we are applying in order to process your personal data is that 'processing is necessary for the performance of a task carried out in the public interest' (Article 6(1)(e)). Further information can be found in the University's Privacy Notice https://www.sheffield.ac.uk/govern/data-protection/privacy/general.

8. What will happen to the data collected, and the results of the research project?

The data collected from your child will be published anonymously as part of my thesis for my training course. The data will be stored in an anonymised form for one year after the project has ended. Audio recordings will be dated and the school will not be identifiable.

At the end of the project I will publish findings in a thesis by August 31st 2020 and possibly in an academic journal a year or two later. I will also present the findings to professional and academic communities. At no time will you, the students or the school be identified by name.

9. Who is organising and funding the research?

The University of Sheffield.

10. Who is the Data Controller?

The University of Sheffield will act as the Data Controller for this study. This means that the University is responsible for looking after your information and using it properly.

11. What if something goes wrong and I wish to complain about the research?

Please note should you wish to make a complaint at any time, you can contact my research supervisor at the University of Sheffield by email: XXXX, email address. If you feel that the complaint has not been handled well, you can contact the Course Director XXXX on email address. You may wish to contact the Principal Educational Psychologist at *Local Authority* by *email address* or by *telephone* if you need to report a serious incident as a result of your child taking part in the research.

If you are concerned about how your information has been used you can find information on how to raise a complaint here: https://www.sheffield.ac.uk/govern/data-protection/privacy/general

12. Contact for further information

If you have any questions about the project, you can contact me by email or telephone as I would be very happy to discuss the research project with you further.

Once the consent form has been signed by all parties you will receive a copy of the signed and dated consent form and any other relevant information. A copy of the signed and dated consent form will be kept by the researcher in a secure location.

If you are happy to take part in the research project, please sign the consent form below and return it to me by Monday 8th July 2019. This reply slip confirms that you give consent to take part.

Summary Box

- I am a trainee educational psychologist and I am carrying out research in school to develop a tool collaboratively with young people to support their thinking skills with independent work
- I am asking for your consent to take part in the research
- You can withdraw at any time without giving a reason. All data will be kept safely and not identified by name.
- If you are happy to take part, please sign the consent form below by xxxx

I look forward to hearing from you.

Kind regards,

Ruth Thomas, Trainee Educational Psychologist

Research Project: Thinking Skills project

Teacher consent form

Researcher: Ruth Thomas

Please initial or tick each box.

☐	I confirm that I have been given information about the project and I know who to contact to ask questions.
☐	I understand that all data will be treated confidentially, stored securely and referred to by code and not name (anonymised). I give my permission for members of the research team to have access to my anonymised responses.
☐	I understand that participation is voluntary and that I am free to withdraw at any time until Friday 22nd November without giving any reason and without there being any negative consequences. I understand I can contact Ruth Thomas [email address] or her research XXXX [email address] if I wish to withdraw.
☐	I understand that some activities will be audio recorded for research purposes only. No other use will be made of them and no-one outside the research project will be allowed to access the original recordings. These recordings will be stored securely and destroyed one year after the project is complete.
☐	I consent to take part in the above research study.

Please complete in block capitals.

_____	_____	_____
Name	Date	Signature
_____	_____	_____
Lead researcher	Date	Signature

Once this has been signed by all parties you will receive a copy of the signed and dated consent form and any other relevant information. A copy of the signed and dated consent form will be kept by the researcher in a secure location.

1.4 Parent information sheet and consent form

Parent Information Sheet

Thinking Skills Project

Dear parent/carer,

I am writing to you with the details of a Thinking Skills project to request your consent for your child to take part. Before you decide it is important for you to understand why the research is being done and what it will involve. Please take time to read the following information carefully and discuss it with others if you wish. Contact details are provided at the end should you wish to ask questions or want to find out more information. Thank you for reading this.

13. What is the project's purpose?

My name is Ruth Thomas and I am a Trainee Educational Psychologist in my second year of doctoral training at The University of Sheffield. I am currently based with the Educational Psychology service at *Local Authority*. As part of my training course, I am required to carry out a research project and the head teacher, *Name* at *School*, has kindly agreed for me to carry out this in your child's class. The project has received ethical approval from The School of Education at The University of Sheffield. It will last for 8-10 weeks.

I am very interested in finding out more about how we can support students with their thinking or metacognition skills. These are the skills that help us to plan our work, monitor what we are doing while we are working and then to evaluate our own performance after completing a task. I am particularly interested in working with students who have a diagnosis of ADHD as it has been shown that they may find planning work and focussing on tasks difficult.

As a professional working within the local authority, I have an enhanced DBS check and have previously worked as a Primary School teacher.

14. Why has my child been chosen?

Research suggests that students who think better perform better and the optimal time period for developing metacognitive skills is between the ages of 12 and 15. I would therefore like to work with a small group of four or five students in Year [x], some of whom have a diagnosis of ADHD, to collaboratively create a tool to support metacognitive thinking at school. The tool would be based upon an already developed idea called an Exam Wrapper, an example of which I have enclosed with this letter. We will not be doing it after any exams but using it for independent classwork that has been completed that week.

Your child does/does not have a diagnosis of ADHD. Their class teacher has suggested that they might benefit from involvement in a study to develop their thinking skills.

15. Do they have to take part?

It is up to you to decide whether or not your child takes part. If you do decide to take part, you will be given this information sheet to keep (and be asked to sign a consent form) and you can still withdraw your child from the study at any time, without any negative consequences, up until all the intervention has been completed which is expected to be by 25th November 2019. You do not have to give a reason. If you wish to withdraw from the research, please contact myself, Ruth Thomas at *email address* or *telephone*.

If you agree to your child taking part in the research, I will also ask for their consent too. I will continue to seek their consent throughout the duration of the study. You and/or your child have the right to withdraw from the research at any time without giving a reason and without negative consequences.

16. What will happen to my child if they take part? What will they have to do?

Pilot study

I would like your child to complete a questionnaire about their thinking skills before I meet them. I will run a focus group with all of the participants who are taking part and talk with them about:

- What thinking skills are
- What do they find difficult about independent class work
- What they think of the original exam wrapper and how they would change it, using the questionnaire for ideas

The intervention/research sessions

I will be coming to your child's lesson once a week for seven weeks during the Summer/Autumn Term of 2019 to support their use of the thinking skills tool and to find out what has (not) been useful about it that week. These comments will be used to develop the tool for next time. It may be that children have their own individual Thinking Skills tool depending on the feedback.

The details of the dates and times will be negotiated with the class teacher and then shared with you as soon as I can. The intervention should only take 5-10 minutes of a lesson but will require a longer amount of time at the beginning and the end. This will be negotiated with the class teacher in advance so that your child does not miss out on their learning.

Questionnaire

I will provide a questionnaire at the end of the project for the students and class teacher to review the tool development process.

Quotes

I will ask your child to feedback their thoughts on the Thinking Skills tool to shape the tool each time they use it. I will be making notes on each session to inform the tool too. I will be audio recording the sessions for research purposes only so that I do not miss any important information from the feedback.

17. What are the possible disadvantages and risks of taking part?

It is possible that this intervention might make your child aware that their thinking skills need improving. As the research is designed to be collaborative, they will have support from myself and their class teacher throughout.

I will be working alongside school staff to ensure that your child's wellbeing is fully protected throughout the study. At any report or sign of distress, I would discontinue working with your child and consult with yourself and school staff about next steps.

This is a research project and not a typical intervention from an Educational Psychologist. The research may inform future professional practice and will hopefully also inform school of subsequent ways to support your child in class as the teacher will be fully knowledgeable of the intervention.

18. What are the possible benefits of taking part?

I hope that your child will benefit from the attention on their thinking skills which will support them when they are completing independent work in class. They will have copies of the Thinking Skills tools in their text books and will also be given a copy of the final version to keep and use in the future if they so wish.

19. Will my child's taking part in this project be kept confidential?

All the information that I collect about your child during the course of the research will be kept strictly confidential and will only be accessible to members of the research team. They will not be able to be identified in any reports or publications. I will not be collecting data such as dates of birth or addresses.

All data collected will be kept strictly confidential. It will be kept locked in a secure place and referred to anonymously by code and not by name. Audio-recordings will only be accessed by the researcher and will be destroyed a year after the end of the project. Audio recordings will be named by the date so the school and your child's name will not be known to anybody.

Your child will be given a number to identify their Thinking Skills tool and their verbal contributions. At the end of the project they will be given the opportunity to choose a pseudonym should any of their quotes be used directly to support my analysis of the findings.

20. What is the legal basis for processing my personal data?

According to data protection legislation, we are required to inform you that the legal basis we are applying in order to process your child's personal data is that 'processing is necessary for the performance of a task carried out in the public interest' (Article 6(1)(e)). Further information can be found in the University's Privacy Notice https://www.sheffield.ac.uk/govern/data-protection/privacy/general.

21. What will happen to the data collected, and the results of the research project?

The data collected from your child will be published anonymously as part of my thesis for my training course. The data will be stored in an anonymised form for one year after the project has ended. Audio recordings will be dated and the school will not be identifiable.

At the end of the project I will publish findings in a thesis by August 31st 2020 and possibly in an academic journal a year or two later. I will also present the findings to professional and academic communities. At no time will your child be identified by name.

22. Who is organising and funding the research?

The University of Sheffield.

23. Who is the Data Controller?

The University of Sheffield will act as the Data Controller for this study. This means that the University is responsible for looking after your information and using it properly.

24. What if something goes wrong and I or my child wish to complain about the research?

Please note should you wish to make a complaint at any time, you can contact my research supervisor at the University of Sheffield by email: XXXX, email address. If you feel that the complaint has not been handled well, you can contact the Course Director XXXX on email address. You may wish to contact the Principal Educational Psychologist at *Local Authority*

by *email address* or by *telephone* if you need to report a serious incident as a result of your child taking part in the research.

If you are concerned about how your child's information has been used you can find information to raise a complaint here: https://www.sheffield.ac.uk/govern/data-protection/privacy/general

25. Contact for further information

XXXX is the main school contact for the project and I am also working closely with XXXX to plan and deliver the intervention so if you have any questions about the project, you can contact either of them. If you have any further queries or questions, please do not hesitate to contact me by email or telephone, as I would be very happy to discuss the research project with you further.

Once the consent form has been signed by all parties you will receive a copy of the signed and dated consent form and any other relevant information. A copy of the signed and dated consent form will be kept by the researcher in a secure location.

If you are happy for your child to take part in the research project, please sign the consent form below and return it to *School* by Monday 8th July 2019. This reply slip confirms that you give permission for your child to take part. In addition, your child will have the opportunity to consent to take part in the research later.

Summary Box

- Your child may benefit from a metacognition/thinking skills intervention.
- I am a trainee educational psychologist and I am carrying out research in school to develop a tool collaboratively with young people to support their thinking skills with independent work.
- I am asking for your permission for your child to take part in the research.
- Your child can withdraw at any time without giving a reason. All data will be kept safely and not identified by name.
- If you are happy for your child to take part, please sign the consent form below by Monday 8th July 2019

I look forward to hearing from you.

Kind regards,

Ruth Thomas, Trainee Educational Psychologist

Research Project: Thinking Skills Project

Parent/carer consent form

Researcher: Ruth Thomas

Please initial or tick each box.

☐	I confirm that I have been given information about the project and I know who to contact to ask questions.
☐	I understand that all data will be treated confidentially, stored securely and referred to by code and not name (anonymised). I give my permission for members of the research team to have access to my child's anonymised responses.
☐	I understand that participation is voluntary and that my child is free to withdraw at any time until Friday 22nd November without giving any reason and without there being any negative consequences. I understand I can contact Ruth Thomas [email address] or her research supervisor XXXX [email address] if I wish to withdraw.
☐	I understand that some activities will be audio recorded for research purposes only. No other use will be made of them and no-one outside the research project will be allowed to access the original recordings. These recordings will be stored securely and destroyed one year after the project is complete.
☐	I give permission for my child to take part in the above research study and I understand that my child can choose whether they wish to take part.

Please complete in block capitals.

Child's name_____

_____	_____	_____
Name of parent/carer	Date	Signature
_____	_____	_____
Lead researcher	Date	Signature

Once this has been signed by all parties you will receive a copy of the signed and dated consent form and any other relevant information. A copy of the signed and dated consent form will be kept by the researcher in a secure location.

1.5. Pupil information sheet and consent form

Pupil information sheet

Thinking Skills project

Picture of Researcher

My name is Ruth, and I am a Trainee Educational Psychologist, which means I support children and young people with their learning but that I also do research. Researchers try to find out things and I am interested in how to improve pupils' thinking skills.

What is the project about?

I would like to work with you and three or four other students in your English class to develop a tool to support your thinking skills in class. A tool called an Exam Wrapper has already been developed but this is for older children who are at University. I would like your suggestions around how we can make the tool work for you when you are completing independent work in class.

What are thinking skills?

Thinking skills have three parts:

1. Planning what you are going to do by thinking about similar work you have completed
2. Monitoring how you are performing. "Am I on the right track?" "Who can I ask for help?"
3. Evaluating how well you did and if you would change your approach to a task next time

Why thinking skills?

Other research has shown that pupils with good thinking skills perform better at school.

What would I need to do?

1. Meet with the small group and Ruth to look at a Thinking Skills tool and decide what needs to change. It might be that you each have your own Thinking Skills tool.
2. Complete a questionnaire about my Thinking Skills at the beginning of the project.
3. Speak with Ruth once a week during an English lesson to let her know what has (not) been useful about the tool.
4. Allow Ruth to record the sessions so she can listen back to what was said.
5. Maybe think of a better name for the Thinking Skills tool.
6. Complete a questionnaire about the process of developing the Thinking Skills tool at the end.

What will the researcher (Ruth) do?

1. Make changes to the Thinking Skills tool based on my ideas.
2. Support me to use the Thinking Skills tool.
3. Audio-record the sessions to listen to again.
4. Write down my comments about the Thinking Skills tool.
5. Answer questions about the project.
6. Ask if I still want to take part each time we meet.

How long would the project be?

I would hope it would only last for 8 -10 weeks during the Summer/Autumn Term. It would be during **one lesson per week** and will hopefully only take up 10 minutes of your time. The rest of your class may also be completing the thinking skills tool if your class teacher wants them to. The tool would only be changed with the small group.

The first session might take longer so that I can explain more about thinking skills. I would work with your class teacher to make sure that you do not miss out on any learning.

What will happen to my data?

Your questionnaires will be given a code so that nobody else would know who had written it. This code will be used for any quotes that you say when we are discussing the Thinking Skills tool. All of the work will be kept securely so that no-one but myself can access it. No-one else will be able to listen to the audio recordings. You can choose a code name for your quotes if you wish.

What is the legal basis for processing my personal data?

According to data protection legislation, we are required to inform you that the legal basis we are applying in order to process your personal data is that 'processing is necessary for the performance of a task carried out in the public interest' (Article 6(1)(e)). Further information can be found in the University's Privacy Notice https://www.sheffield.ac.uk/govern/data-protection/privacy/general.

Who is the data controller for the study?

The University of Sheffield will act as the Data Controller for this study. This means that the University is responsible for looking after your information and using it properly.

What if I don't want to take part?

It is up to you if you want to take part or not. You will not be in trouble if you choose not to take part. If you sign the consent form but then decide you no longer want to take part that is also fine. You don't have to give a reason. I will ask each time that I see you if you are still happy to take part. After Friday 22nd November 2019 you will no longer be able to withdraw your data.

What will happen after the researcher has left?

I will be writing up my findings for a large project called a thesis. This will be published by The University of Sheffield. I may publish part or all the project in a journal for other people to read. I will be talking to other researchers and educational psychologists about the work. At no time will your name or the school's name be used when I talk about the project.

I will give you a copy of your final Thinking Skills tool to keep and use in the future if you so wish. You can also keep the Thinking Skills tools you have written during the project.

What if I have questions?

Please ask your class teacher XXXX or the Assistant Principal XXXX if you have any questions.

Thank you for reading about the Thinking Skills project.

Ruth Thomas

Lead researcher, University of Sheffield

Trainee Educational Psychologist at *Local Authority*

Pupil consent form

Thinking Skills project

Tick or initial the boxes next to the sentences that you agree with.

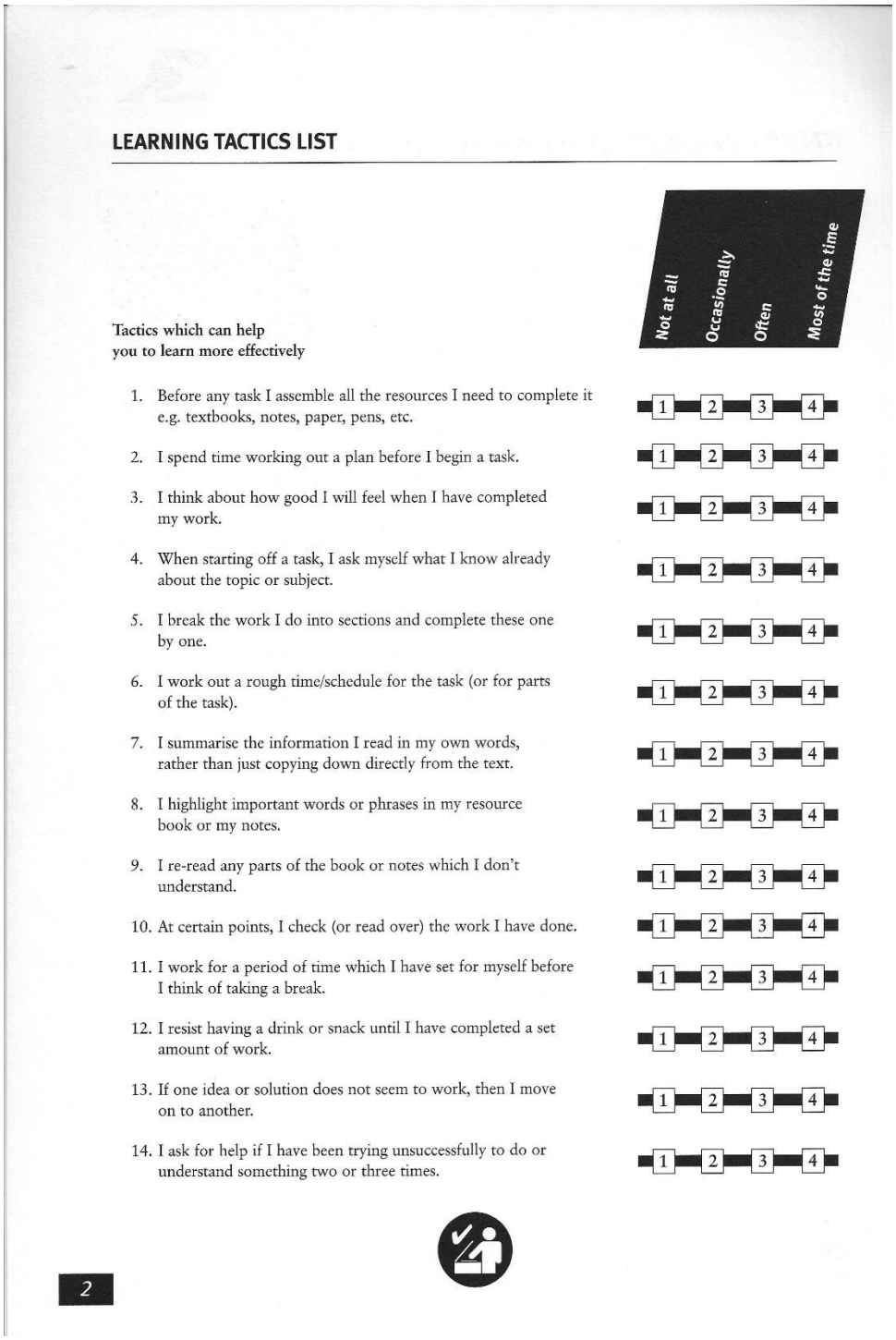
☐	I confirm that I have been given information about the project and I know I can speak to my class teacher if I have any questions.
☐	I understand that I will be working with Ruth for part of one lesson a week.
☐	I understand that I can stop taking part at any time and will not be in trouble. I understand I can contact Ruth Thomas [email address], my teacher XXXX or Assistant Principal XXXX if I no longer want to take part. I have until November 22nd 2019 to do this.
☐	I understand that all my work will be locked away.
☐	I understand that my work and words will have a code name or number and my real name will not be used.
☐	I understand that some activities will be audio recorded to help Ruth understand what we want to change on the Thinking Skills tool. I understand that no-one but Ruth will be able to listen to the recordings. I know that the recordings will be locked away and destroyed one year after the project ends.
☐	I would like to take part in the Thinking Skills project.

My name is_____

Date _____

Appendix 2

2.1 Learning tactics questionnaire

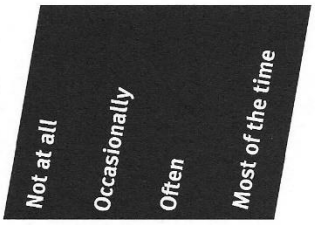


LEARNING TACTICS LIST

Tactics which can help you to learn more effectively	Not at all	Occasionally	Often	Most of the time
1. Before any task I assemble all the resources I need to complete it e.g. textbooks, notes, paper, pens, etc.	1	2	3	4
2. I spend time working out a plan before I begin a task.	1	2	3	4
3. I think about how good I will feel when I have completed my work.	1	2	3	4
4. When starting off a task, I ask myself what I know already about the topic or subject.	1	2	3	4
5. I break the work I do into sections and complete these one by one.	1	2	3	4
6. I work out a rough time/schedule for the task (or for parts of the task).	1	2	3	4
7. I summarise the information I read in my own words, rather than just copying down directly from the text.	1	2	3	4
8. I highlight important words or phrases in my resource book or my notes.	1	2	3	4
9. I re-read any parts of the book or notes which I don't understand.	1	2	3	4
10. At certain points, I check (or read over) the work I have done.	1	2	3	4
11. I work for a period of time which I have set for myself before I think of taking a break.	1	2	3	4
12. I resist having a drink or snack until I have completed a set amount of work.	1	2	3	4
13. If one idea or solution does not seem to work, then I move on to another.	1	2	3	4
14. I ask for help if I have been trying unsuccessfully to do or understand something two or three times.	1	2	3	4

2

LEARNING TACTICS LIST *(continued)*



Tactics which can help you to learn more effectively

15. I try to think of different examples from my own experience to enable me to understand new ideas or methods better. 1 2 3 4

16. Sometimes, I ask a friend (or my parents) to read through my written work and comment on it or ask me questions about what I have revised. 1 2 3 4

17. When I have finished my work, I ask myself the question: 'What is good about it and how could I have done better?' 1 2 3 4

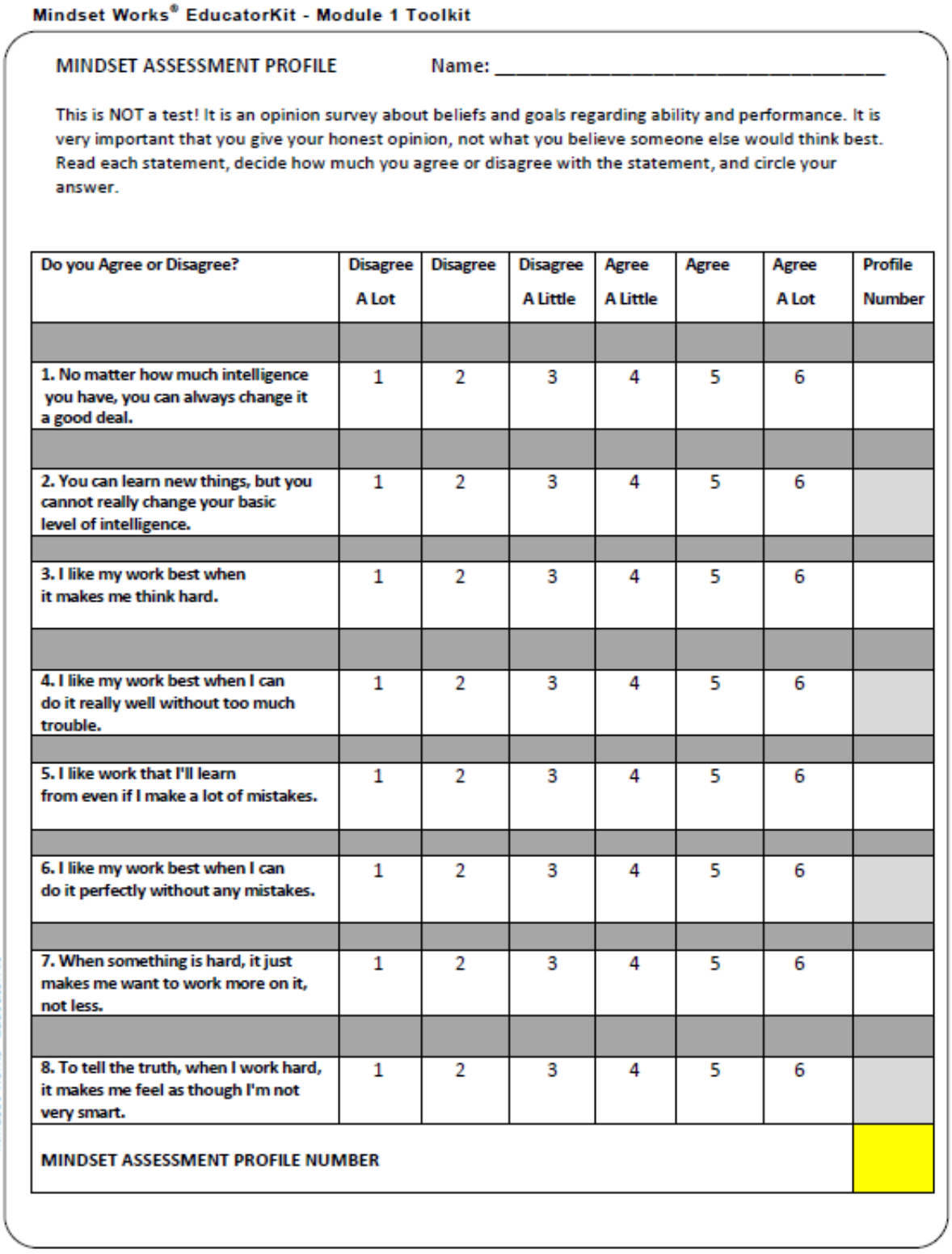
18. I compare my work with other pupils who have received a higher mark. 1 2 3 4

19. When told that my work is 'good', I think about why the teacher has said this. 1 2 3 4

20. When I have completed a task, I congratulate myself and feel good. 1 2 3 4

21. I keep a portfolio of my best work and occasionally have a look through it. 1 2 3 4

2.2 Mindset profile



Mindset Works® EducatorKit - Module 1 Toolkit

MINDSET ASSESSMENT PROFILE Name: _____

This is NOT a test! It is an opinion survey about beliefs and goals regarding ability and performance. It is very important that you give your honest opinion, not what you believe someone else would think best. Read each statement, decide how much you agree or disagree with the statement, and circle your answer.

Do you Agree or Disagree?	Disagree A Lot	Disagree	Disagree A Little	Agree A Little	Agree	Agree A Lot	Profile Number
1. No matter how much intelligence you have, you can always change it a good deal.	1	2	3	4	5	6	
2. You can learn new things, but you cannot really change your basic level of intelligence.	1	2	3	4	5	6	
3. I like my work best when it makes me think hard.	1	2	3	4	5	6	
4. I like my work best when I can do it really well without too much trouble.	1	2	3	4	5	6	
5. I like work that I'll learn from even if I make a lot of mistakes.	1	2	3	4	5	6	
6. I like my work best when I can do it perfectly without any mistakes.	1	2	3	4	5	6	
7. When something is hard, it just makes me want to work more on it, not less.	1	2	3	4	5	6	
8. To tell the truth, when I work hard, it makes me feel as though I'm not very smart.	1	2	3	4	5	6	
MINDSET ASSESSMENT PROFILE NUMBER							

Mindset Works® EducatorKit

Creating Your Mindset Assessment Profile

1. **First, determine your Profile Number for each question.**
   - **For questions with odd numbers (1, 3, 5, 7)**, write the number of your answer into the boxes in the right column.
   - **For questions with even numbers (2, 4, 6, 8)**, use the table below to fill in the gray boxes in the right column.

If you chose this answer:	Then write this number in the gray box on the right (Profile Number).
Disagree A Lot (1)	6
Disagree (2)	5
Disagree A Little (3)	4
Agree A Little (4)	3
Agree (5)	2
Agree A Lot (6)	1

2. **Now, add up all your Profile numbers.**
   - Add up all the numbers in the Profile column on the right, and write the total in the last box in the bottom right corner.
3. **What does your Mindset Profile Number mean?**
   - Find the group that includes your number in the chart below and circle it.
   - Now, read what it says about your MAP group.

If your profile number falls into this range:	Then your MAP (Mindset Assessment Profile) group is:	People in this MAP group usually believe the following things:
8-12	F5	You strongly believe that your intelligence is fixed—it doesn't change much. If you can't perform perfectly you would rather not do something. You think smart people don't have to work hard.
13-16	F4	
17-20	F3	You lean toward thinking that your intelligence doesn't change much. You prefer not to make mistakes if you can help it and you also don't really like to put in a lot of work. You may think that learning should be easy.
21-24	F2	
25-28	F1	You are unsure about whether you can change your intelligence. You care about your performance and you also want to learn, but you don't really want to have to work too hard for it.
29-32	G1	
33-36	G2	You believe that your intelligence is something that you can increase. You care about learning and you're willing to work hard. You do want to do well, but you think it's more important to learn than to always perform well.
37-40	G3	
41-44	G4	You really feel sure that you can increase your intelligence by learning and you like a challenge. You believe that the best way to learn is to work hard, and you don't mind making mistakes while you do it.
45-48	G5	

4. **Do you think the description under your MAP group matches the way you think and feel about your school work? Which parts are true for you and which are not?**

2.3 Pupil post-intervention evaluation form

Post-tool development process questionnaire - Pupil

1. How useful has it been looking at the "tool" each week?

Not at all useful	Slightly useful	Quite useful	Very Useful	Extremely useful

2. Did the researcher (Ruth) listen to your ideas?

Never	Rarely	Sometimes	Often	Always

3. How likely are you going to use the tool in the future?

Extremely unlikely	Unlikely	Maybe	Likely	Extremely likely

4. How did you find the tool development process? (E.g. how did you feel about it? What was it like working with an adult on a weekly basis? Why?)

_____
_____
_____
_____

5. Have you used your thinking skills in other subjects during the project?

Yes	No	Don't know

If yes, which one(s)?

_____
_____
_____

6. Do you think you can use the tool for other subjects?

Yes	No	Don't know

If yes, which one(s)?

_____
_____
_____

7. Have you enjoyed the project?

No	Sometimes	Yes	Not sure

What did you enjoy?

_____
_____
_____

What didn't you enjoy?

_____
_____
_____

8. What would you change about the process if you did it again?

_____
_____
_____
_____

Any other comments that you would like to make?

_____
_____
_____
_____

Thank you for completing this questionnaire and for taking part in the thinking skills project.

2.4 Teacher post-intervention evaluation form - Completed

Post-tool development process questionnaire – Teacher

1. How engaged do you feel the pupils were in the project?

Not at all	Slightly	Quite	Very	Extremely

2. Do you feel the thinking skills project has had a positive influence on their learning?

No affect	Minor affect	Neutral	Moderate affect	Major affect

What makes you say this?

I feel that the students have responded in a generally positive way, however, it's not consistently evident in their attitudes towards learning as they sometimes struggle to self-regulate. I hope that, over time, they are able to apply their knowledge from the thinking skills project more consistently. Additionally, the students have been positive in their comments about the project.

3. Do you feel the thinking skills project has influenced their ability to work independently?

No affect	Minor affect	Neutral	Moderate affect	Major affect

What makes you say this?

Some of the students who participated are now more willing to work independently and 'risk' making errors as part of their learning journey, however, there are also students who are not currently demonstrating any increase in their ability to work independently.

Any other comments that you would like to make?

Thank you for the time you have taken with the students. It has been a positive experience for them and provided them with some new strategies.

Thank you for completing this questionnaire and for taking part in the thinking skills project.

Appendix 3

3.1 Original exam wrapper

Name: _____

Department of Mathematical Sciences
Carnegie Mellon University

Test Reflection Sheet

Do you think that the problems on the exam fairly reflected the topics covered in class and recitation?

Yes ___ No ___

Did the grader's comments, together with the solutions, provide you with adequate feedback?

Yes ___ No ___

What percentage of your preparation for the test was done alone, and what percentage with one or more persons?

___ % Alone ___ % with other(s)

How much time did you spend reviewing with each of the following:

Reading class notes _____
Reworking old homework problems _____
Working additional problems _____
Reading the book _____

Now that you have looked over your exam, estimate the percentage of points you lost due to each of the following:

___ % from not understanding a concept
___ % from not being careful (i.e., careless mistakes)
___ % from not being able to formulate an approach to a problem
___ % from other reasons (please specify: _____)

Based on the estimates above, what will you do differently in preparing for the next test? For instance, will you change your study habits or try to sharpen particular skills? Please be specific. Also, what can we do to help?

For more information or help on using or designing exam wrappers in your course, contact:
Eberly Center for Teaching Excellence > http://www.cmu.edu/teaching/eberly/

3.2 Thinking skills tool week 1

Thinking Skills Tool Version 1

Was your equipment (e.g. pen, pencil, paper) all ready?

Yes No

Did you complete the work?

Yes No

What would have helped you to make the work better?

1. More time
2. Having time to write a plan
3. Having my equipment ready
4. Other

Did you spend most of the time:

1. Thinking about what you wanted to write
2. Writing
3. Thinking about other things
4. Talking
5. Not knowing what to write

What did you do when you were stuck?

1. I did not get stuck
2. Asked the teacher
3. Re-read the text/question/learning objective
4. Re-read what I had written
5. Asked someone on my table
6. Other

When you finished, what did you do?

1. Re-read my work
2. Re-read my work and made changes
3. Nothing

What will you do differently next time you have some independent writing to do?

1. Re-read the question
2. Re-read the learning objective
3. Look at similar work I have completed
4. Think about similar work I have completed
5. Pause halfway through the task to check if I am doing well

3.3 Thinking skills tool week 2

Thinking Skills Tool Version 2

Had you done similar work before e.g. in another year or subject?

Yes No Not Sure

What was the first thing that you did once you were told to start?

1. Started a sentence immediately
2. Thought about what my first sentence would be
3. Paused for a few minutes – planning in my head
4. Paused for a few minutes – thinking about other things
5. Paused for a few minutes – I didn't know where to start

What did you do when you were stuck?

1. I did not get stuck
2. Asked the teacher
3. Re-read the text/question/learning objective
4. Re-read what I had written
5. Asked someone on my table
6. Other……
   ……

Did you pause halfway through the task to think about how well you were doing?

Yes No

Did you complete the work?

Yes No

When you finished, what did you do?

1. Re-read my work
2. Re-read my work and made changes
3. Nothing

What will you do differently next time you have some independent writing to do?

1. Re-read the question
2. Re-read the learning objective
3. Look at similar work I have completed
4. Think about similar work I have completed
5. Pause halfway through the task to check if I am doing well
6. Other……
   ……

3.4 Statements to sort week 3

Is my answer correct?	Do I need to change my answer?
Do I need to add anything to my answer?	What have I learned from this task?
What did I like about this task?	What did I dislike about this task?
What did I find easy about this task?	What did I find difficult about this task?
How could I do this better next time?	Did I understand what I have done?

What should I do first?	What will I do next?
Do I know where to get information that will help me with the task?	Do I understand what I need to do in this task?
How much time will I need for this task?	Will anything I've learned before help me with this task?
What do I expect to find out by doing this task?	How can I spot a mistake if I make one?
Am I on the right track?	What strategies can I use to complete this task?

At the beginning of the task What do I need to do here?	**At the beginning of the task** What is the first thing I need to do?
At the beginning of the task What will I do next?	**At the beginning of the task** Does this task relate to anything else I have done before?

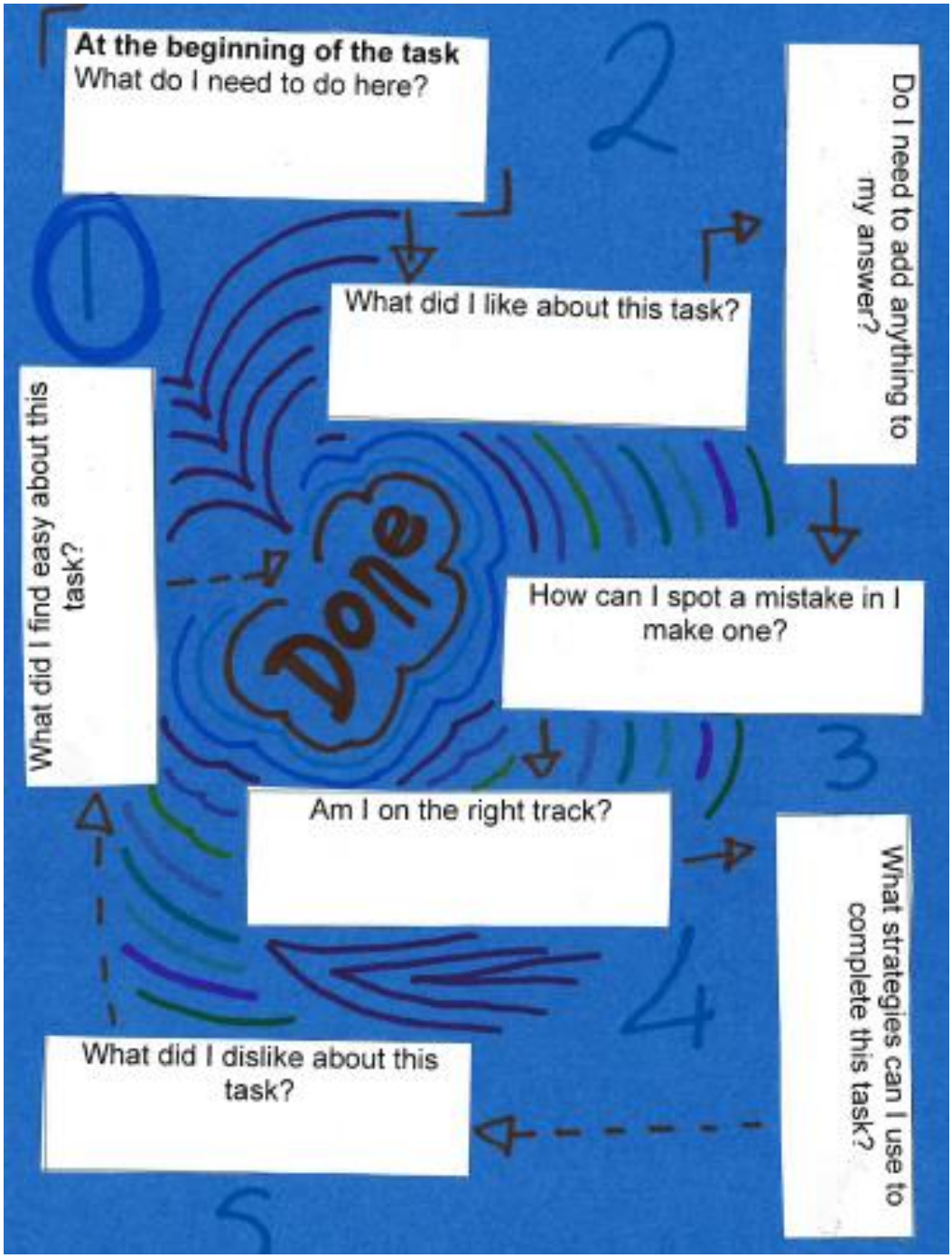
In the middle of the task How am I doing so far?	**In the middle of the task** Do I need to go back and change anything?
In the middle of the task How will I know when I'm finished?	

At the end of the task Have I done the task well?	**At the end of the task** Is there anything I could have done better?
At the end of the task What have I learned from doing this task?	**At the end of the task** What parts have I enjoyed doing?

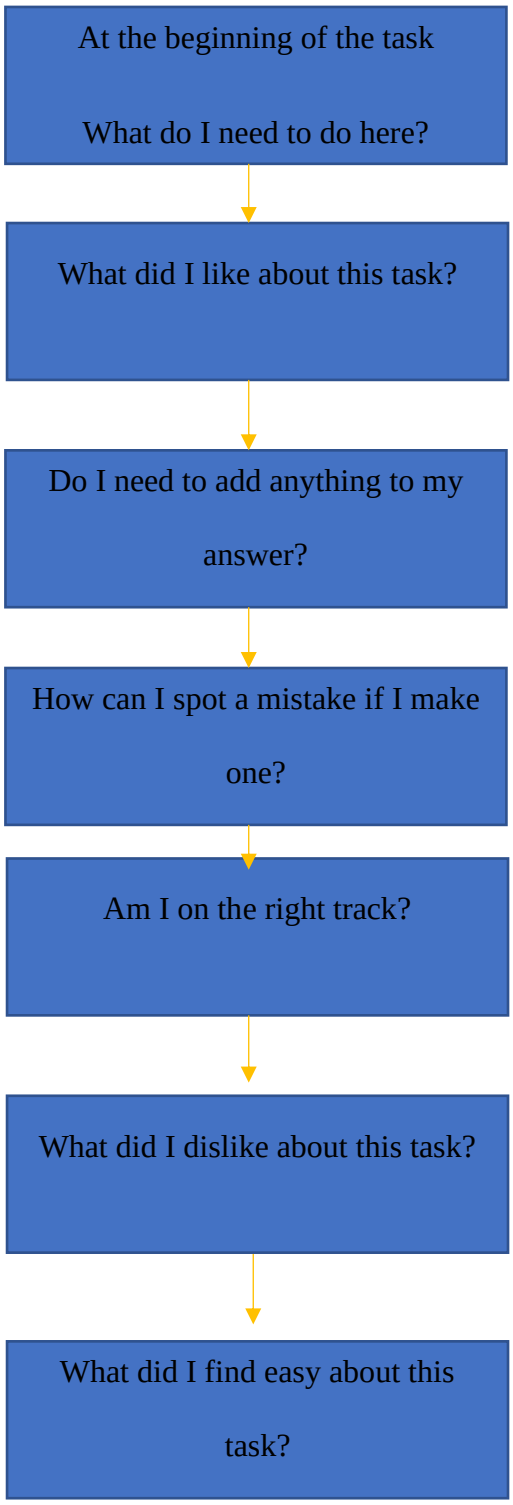
Fraser Lauchlan and Donna Carrigan (2013)

3.5 Participants' thinking skills tools

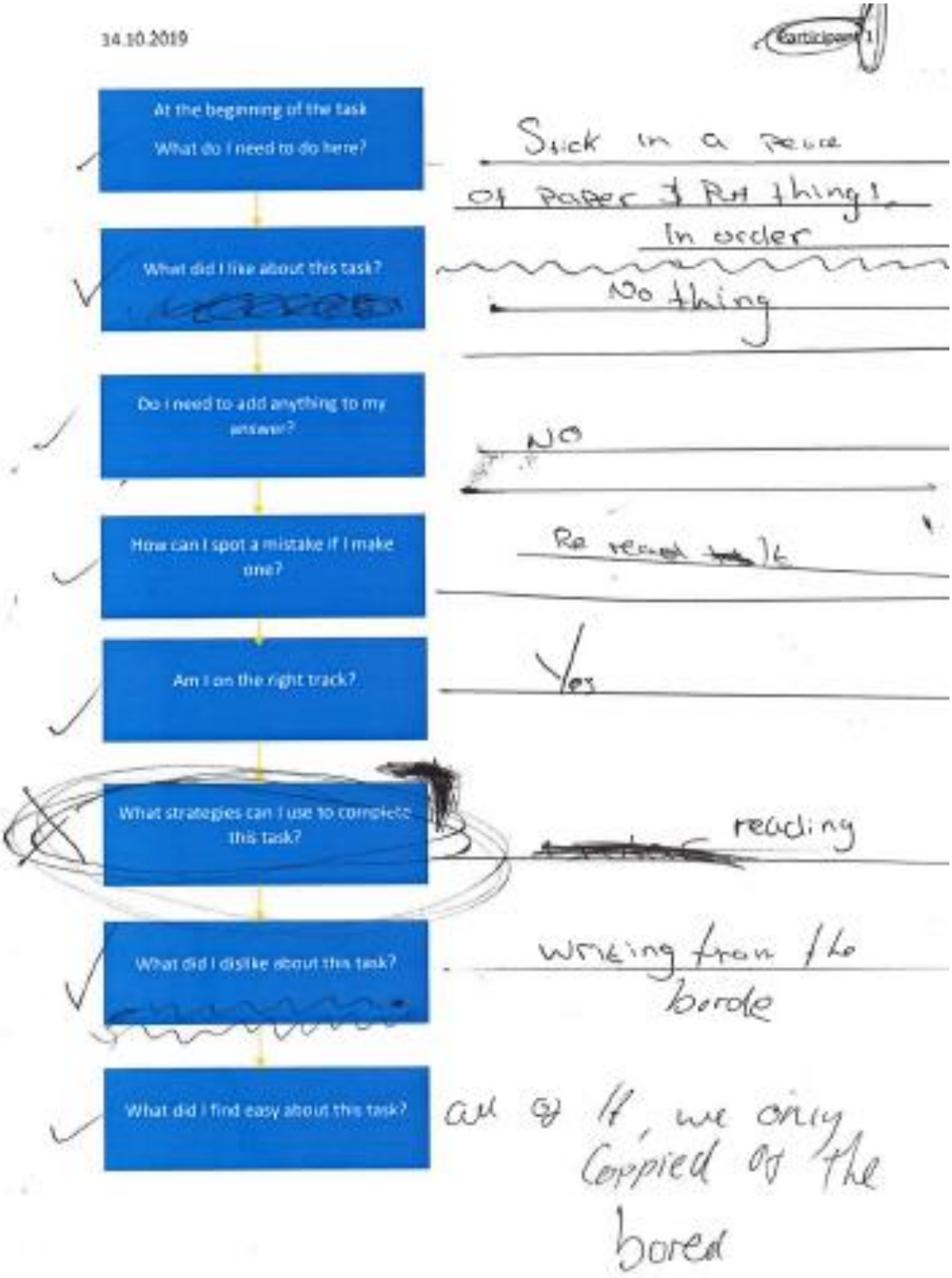
3.5.1 Spock's original



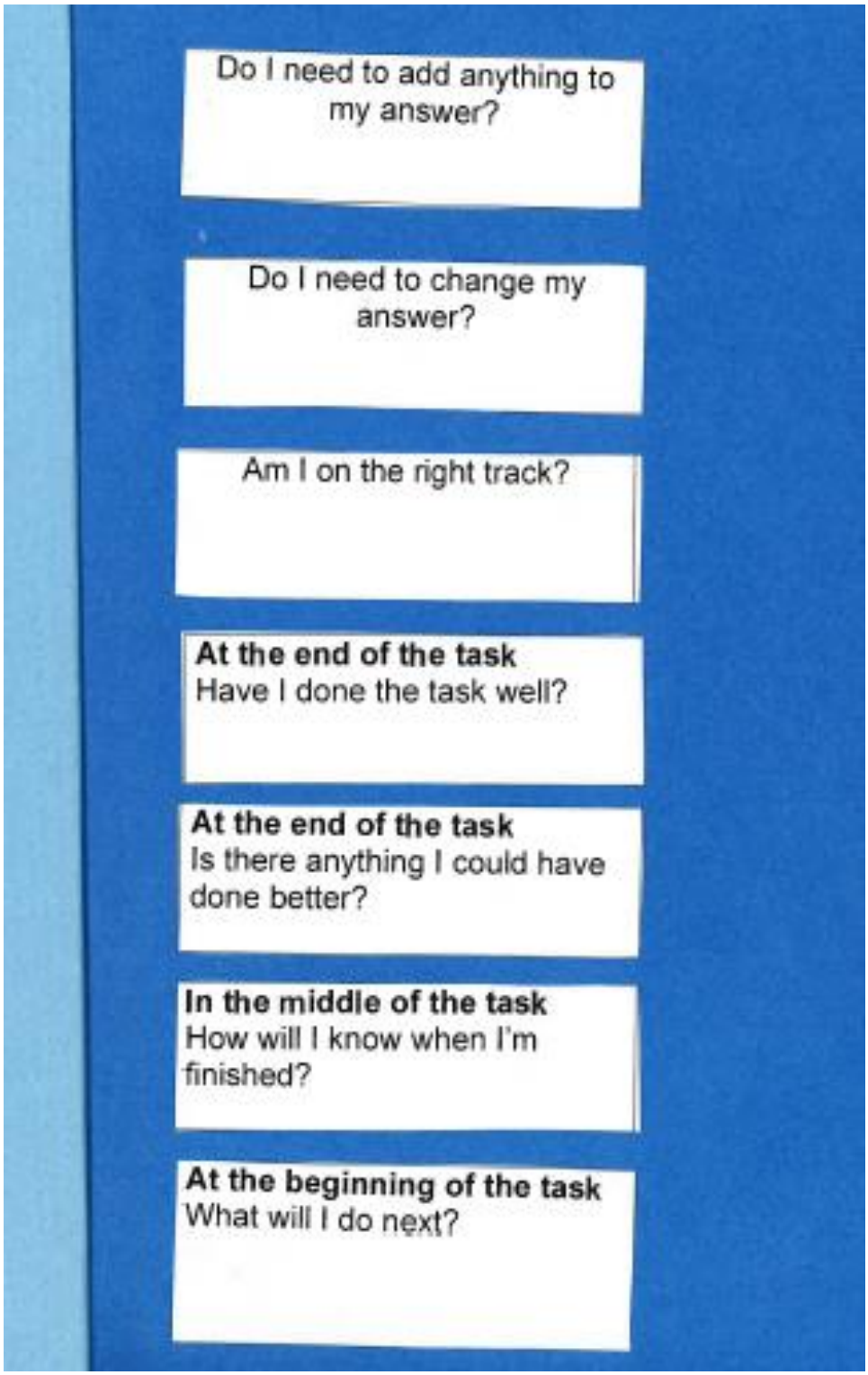
3.5.2 Spock's original typed by myself



3.5.3 Spock's completed tool



3.5.4 Bob the Frog's original – example of a page



3.5.5 Bob the Frog' original typed by myself

Do I know where to get information that will help me with the task?

_____
_____

How can I spot a mistake if I make one?

_____
_____

At the end of the task

What have I learned from doing this task?

_____
_____

What should I do first?

_____
_____

In the middle of the task

Do I need to go back and change anything?

_____
_____

At the beginning of the task

What is the first thing I need to do?

_____
_____

Is my answer correct?

_____

At the beginning of the task

What do I need to do here?

_____
_____

Do I need to add anything to my answer?

_____
_____

Do I need to change my answer?

_____

Am I on the right track?

_____
_____

At the end of the task

Have I done the task well?

_____
_____

At the end of the task

Is there anything I could have done better?

_____

In the middle of the task

How will I know when I'm finished?

_____
_____

At the beginning of the task

What will I do next?

_____
_____

Did I understand what I have done?

_____

What did I find difficult about this task?

_____

How could I do this better next time?

_____
_____

What have I learned from this task?

_____

What will I do next?

_____

Will anything I've learned before help me with this task?

_____

Do I understand what I need to do in this task?

_____

What strategies can I use to complete this task?

_____

3.5.6 Bob the Frog's completed tool, example page

Did I understand what I have done?

yes

What did I find difficult about this task?

nothing

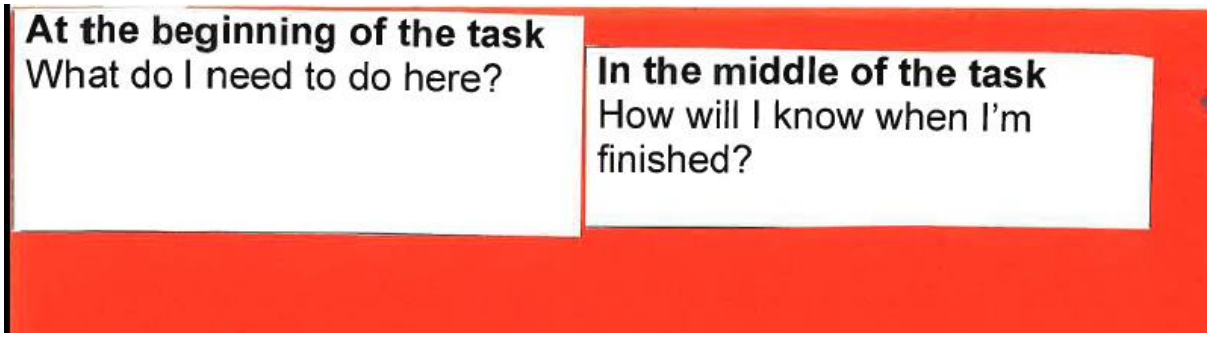
What have I learned from this task?

information

How could I do this better next time?

don't know.

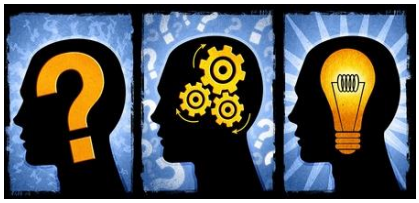
3.5.7 Freddie's original



3.5.8 Freddie's original typed by myself

At the beginning of the task

What do I need to do here?



In the middle of the task

How will I know when I'm finished?

3.5.9 Matthew's original typed by myself

At the end of the task

Have I done the task well?

At the end of the task

Is there anything I could have done better?

1. Written more
2. Checked my spelling
3.

At the end of the task

What have I learned from doing this task?

At the end of the task

What parts have I enjoyed doing?

3.6 Participant's targets and strategies

3.6.1 Spock

This Photo by

To pause during a task
to check if I'm on track

Strategies to try:

- Read what you have already written – what's missing?
- Look at neighbour's work.

Which strategy did you find most useful?

Have you met your target?

3.6.2 Bob the Frog week 5

This Photo by

To pause during a task

to check if I'm on track

Strategies to try:

- Read what you have already written – what's missing?
- Look at neighbour's work.

Which strategy did you find most useful?

Have you met your target?

3.6.3 Bob the Frog week 6

This Photo by

To stay focused on the task

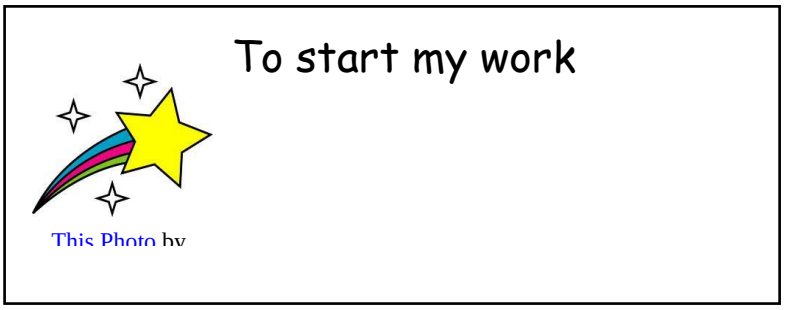
Strategies to try:

- Read what I have written

Which strategy did you find most useful?

Have you met your target?

3.6.4 Freddie



Strategies to try:

- 10 second movement break
- Re-read the question
- Choose one thing to focus on

Which strategy did you find most useful?

Have you met your target?

3.6.5 Matthew

This Photo by

How do I know I am doing well?

Strategies to try:

- Movement break (to focus)
- Reading the question again

Which strategy did you find most useful?

Have you met your target?

3.6.6 My target and strategy suggestions

Strategies for starting work:

- Re-read the question
- Re-read the success criteria
- Have I done something similar before?
- Choose one thing to focus on first

Strategies for during a task:

- Re-read the question
- Re-read the success criteria
- Look back through the textbook
- Read what you have already written – what's missing?
- Move your fingers and toes for the count of 10

Strategies for evaluation:

- Re-read my work – does it make sense?
- Have I done my best?
- If I did it again what would I change?
- What can I do better next time?
- Have I completed the task?
- What did I enjoy?
- What did I not enjoy?
- What did I find difficult?
- What did I find easy?
- What have I learned from doing this task?

Targets

Beginning:

- To be able to start my work quickly
- To have a strategy for starting my work when I'm unsure

During:

- To pause during a task to check if I'm on track
- To monitor how well I am doing during a task
- To have strategies for staying on task

End:

- To evaluate how I have done
- To know if I have done well

3.7 Responses to the themes matrix

Themes matrix

Week	Theme	Theme	Theme	Theme
1	Being stuck	Changing behaviour	Boredom in class	
2	The usefulness of the thinking skills tool	Changing behaviour	Boredom	Change in routine
3	Teachers	Distraction – off topic	Boredom	
4	No strategies for when stuck	Being independent	Overwhelmed	Requiring prompts
5	Difficulties in choosing strategies		Boredom/lack of focus	Requiring prompts
6				
7				

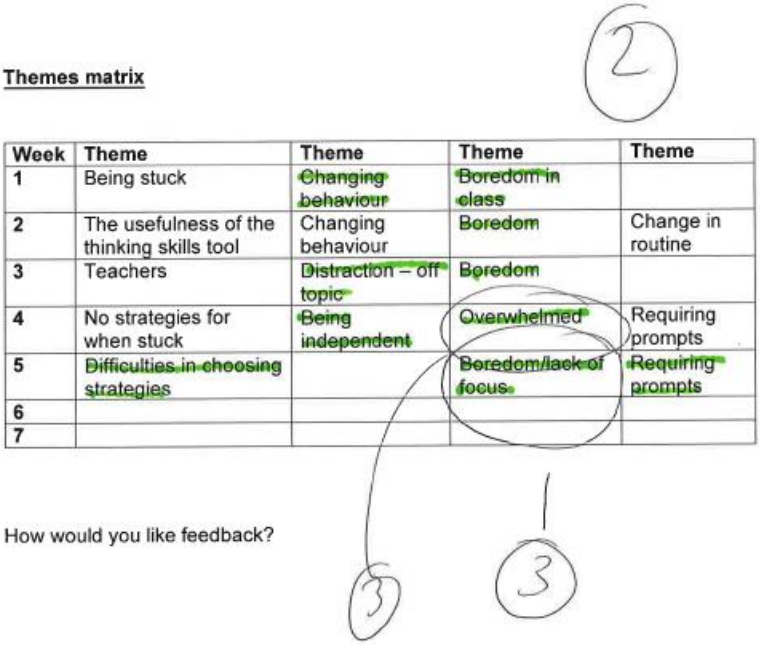
How would you like feedback?

hell no, I think

yes

maybe

Themes matrix



Week	Theme	Theme	Theme	Theme
1	Being stuck	~~Changing behaviour~~	~~Boredom in class~~	
2	The usefulness of the thinking skills tool	Changing behaviour	~~Boredom~~	Change in routine
3	Teachers	~~Distraction – off topic~~	~~Boredom~~	
4	No strategies for when stuck	~~Being independent~~	~~Overwhelmed~~	Requiring prompts
5	~~Difficulties in choosing strategies~~		~~Boredom/lack of focus~~	~~Requiring prompts~~
6				
7				

How would you like feedback?

*Note participant 2 used a green pen and I circled the themes for participant 3

Appendix 4

4.1 Codes used to develop the template

Codes for each theme and sub-theme

Key:

(Participant Number, Session Number) e.g. (1, 2) means that the phrase was said by participant number 1 during session 2

(My written comment in this session) e.g. (5) means that it was a comment that I wrote down in my reflective journal either during or after session 5

(+ My written comment after the session) e.g. 3+ in the session implies that I wrote it down after I had reflected on the session

Participant 5 is participant 4, Matthew, in the main thesis. They were given numbers when I invited the five participants for the pilot study so I kept them the same while data collecting. To avoid confusion in the main write-up I changed Matthew to be participant 4.

Individuals

(1) I'm perfect, I don't really need to do anything. (1, 1)
(2) I always get bored (3, 1)
(3) I am in a bad mood (5, 2)
(4) I like doing stuff like circling (5, 3)
(5) I am not doing this, I don't know how to do it (3, 3)
(6) My brain always goes 100mph. (5, 3)
(7) I can't even spell Tuesday (1, 3)
(8) I like colouring. It makes me relaxed. (3, 3)
(9) I need to write no. 2 as I'm no. 2 (2, 3)
(10) Really pleased with the session today (Me, 3)
(11) I'm pleased I separated them because participant 2 was more vocal about using the tool (4)
(12) This teacher lets me go for a walk (5, 5)
(13) To be honest it's getting started (3, 5)
(14) Quality over quantity (5, 5)
(15) I feel the project has improved now that it has simplified. (5)
(16) Are you bored? Yeah. Overwhelmed? (explained) Yeah (3, 6)
(17) Constant pen clicking (2, 6) – in response to thinking of a target and strategies
(18) I think I've got brain damage (3, 6)
(19) I can never work by myself (3, 6)

Personalised

(20) Can then combine the data to create individual "exam wrappers" (2+)

(21) Today sit by each of them to answer questions (pre 3)
(22) The idea is that you make something suitable for you. (Me, 2)
(23) ...will offer them the choice of wording and delete any duplicates (3)
(24) With 3, find some images which might provoke thoughts to support their metacognition – verbal responses? (Me, 3+)

Strategies

(25) The thing I really badly lack is making sure I've checked it all at the end...get it done properly in the first place. (5, 3)
(26) I write a lot (2, 3)
(27) What was hard? Writing notes from a film (Me to 3, 4)
(28) Remove: What strategies can I use to complete this task? (1, 4)
(29) I made a mind map (2, 4)
(30) I enjoy writing...It's GCSEs, you need to make notes. (2, 4)
(31) If I don't get it I won't start (5, 5)
(32) Just don't give me any work (3, 6)

Reality – Sessions 1, 2 & 4 are responses to questions on the Thinking Skills Tool

(33) I did not get stuck (2, 1)
(34) ...stuck? Asked someone on my table (3, 1)
(35) What did you do when you were stuck? Other. (1, 1)
(36) Did you spend most of the time...writing (2, 1)
(37) Did you spend most of the time...writing (5, 1)
(38) What would have helped...more time. (5, 1)
(39) What would have helped you to make the work better? More time (3, 1)
(40) Did you spend most of the time: thinking about what you wanted to write; talking (3, 1)
(41) What was the first thing that you did once you were told to start? Started a sentence immediately (2, 2)
(42) What did you do when you were stuck? Other. I depends on what it is about. (2, 2)
(43) ...stuck...asked someone on my table (5, 2)
(44) What did you do when stuck? Asked someone on my table. (3, 2)
(45) Pause for few minutes – I didn't know where to start. (1, 2)
(46) First thing...paused for a few minutes – I don't know where to start. (3, 2)
(47) How will I know when I'm finished? When I don't write anymore. (2, 4)
(48) How can I spot a mistake if I make one? Read back through it. (2, 4)
(49) I mean I actually think yeah...I changed a spelling mistake (1, 6) – responding to using the strategy of talking to a friend
(50) Dunno haven't even tried it yet (3, 6)
(51) I've forgotten what they were even for (3, 6)
(52) Prompting verbally by a teacher...would get on my nerves (1, 6)
(53) Someone is telling me about what happened at lunch...I'll forget [what to do in lesson] (3, 6)

Passivity

(54) When you finished what did you do? Nothing (1, 1)
(55) Thinking about other things (1, 1)
(56) What did you do when you were stuck. Sit there (3, 1)
(57) When you finished...nothing (3, 1)

(58) Sat there and did nothing (1, 2)
(59) ...finished? Nothing (5, 2)
(60) When you finished, what did you do? Nothing (2, 2)
(61) I get bored I just sit there. (3, 3)
(62) What will I do next? I don't know. (2, 4)
(63) What strategies can I use to complete this task? I don't know. (2, 4)
(64) How could I do better next time? Don't know (2, 4)
(65) What should I do first? I don't know. (2, 4)
(66) I don't know, errrrrr (2, 6)
(67) I just sit there (3, 6)

The Future

(68) Next time. Pause halfway through the task to check if I am doing well. (3, 1)
(69) ...differently next time? Pause halfway – am I doing well? (5, 1)
(70) "Target" Pause halfway through the task to check if I'm doing well (1, 2)
(71) Next time...look at similar work I have completed. (3, 2)
(72) Next time...compare to other's work (5, 2)
(73) What will you do next time...think about similar work I have completed (2, 2)
(74) In the middle of the task. How will I know when I'm finished? (3, 3)
(75) At the beginning of the task. What do I need to do here? Visuals. (3, 3)

Developing the Tool

(76) Questions where you have to think – tick (5, 1)
(77) Round the edge e.g. too simple (5, 1)
(78) Initially I felt the session had not been productive but having looked at their responses I can see there is a need for support around 'getting stuck' which would fall into the planning and monitoring elements. (Me, +1)
(79) Feeling better and more enthused about next week. (Me, +1)
(80) Change into a target at the end? (Me, +1)
(81) I am trying a more structured thinking skills tool. (1+)
(82) A key might have been helpful (5, 2)
(83) They all sat at the same table and I sat with them and moved round (3)

My support

(84) Think visual for next time and speaking about the answers (Me about 3, 3+)
(85) Can you read it to me? (Me to 3, 4)
(86) I repeatedly changed my phrasing (5)
(87) 2 happy with their targets so not changed (5+)
(88) Did you forget it was there? No, just haven't done anything. (Me to 3, 6)
(89) Read me what he'd written (before meeting me) and spotted a mistake!! (Me about 5, 6)
(90) Listen out for a key word, "No, I don't know" – we'll put it and you can try it (3, 6)
(91) Okay, I'll give you one (Read what I have written) (Me to 2, 6)
(92) Re-reading helped to remind you what you'd done (Me to 3, 6)

Dependence

(93) 3 chose 3 strategies with my support that he thought might be useful (5)
(94) They required support to use their questions but hopefully they benefitted from it (Me, 4)
(95) I chose a strategy for 2 (5)

Difficulties

(96) I don't get it [what are you going to try next time] (1 & 2, 1)
(97) What will you do differently next time you have some independent writing to do? ? (2, 1)
(98) Future thinking seemed difficult. (1+)
(99) I have been mulling over the session all week as I'm concerned over the quality of the data I have collected. (+2)
(100) I'm wondering if they're not actually enjoying the sessions (Me, pre-3)
(101) Made a flow diagram. 8 questions. Not all in a logical order. 4 about evaluation (1, 3)
(102) 23 questions. Not in a logical order. Remained on task. (2, 3)
(103) The participants are struggling to get used to their new teacher (Me, 3+)
(104) What strategies can I use to complete the task? Participant 1/2s tool. They didn't have ideas... (4)
(105) Difficult to get 1 and 2 to select strategies. (5)
(106) They all agreed with their mindset descriptions which goes a long way to explaining the difficulties with the project (6)
(107) I don't know (2, 6)

Behaviour

(108) You weren't as lively last week (Me, 2)
(109) You can't tell us off (1, 2)
(110) They were very lively and quite disruptive this week so it was difficult to talk. One pupil (2) was less so. (Me, +2)

Questions

(111) Ask for question ideas and relate to Planning, Monitoring and Evaluating. (Me, +1)
(112) Ask the YP. (Me, +1)
(113) Why are we in this room? When are you coming next week? (5, 2)
(114) Do we have to answer them? (1, 3)
(115) What do you mean we can choose our own name? (5, 3)
(116) Why have I got a higher target than 1? (2, 6)

Usefulness of the Tool

(117) Why is it useful? (1)
(118) Make them more aware of the purpose. (1+)
(119) The tool is meant to be useful to them in terms of developing their metacognition. (1+)
(120) Something to think about when you're stuck when I'm not here (Me to 3, 4)
(121) It doesn't mean it's definitely going to work...for you to try (6)

Ecological Validity

(122) Are they thinking about these questions in class (3)
(123) The work they have been completing in class hasn't really been much long, independent writing. (4)

Focus

(124) The students seem easily distractible by tasks. (1+)
(125) Miss, do you go to other schools? (3, 3)
(126) Trying to teach me a new slang word (3, 3)
(127) Singing (1 & 2, 3)
(128) Can we spend the rest of the lesson in here? (1, 4)
(129) Can we stay? [for the rest of the lesson] (1, 6)
(130) Rice in my skirt (1, 6)

Peer Relations

(131) I'm trying to carry on, it's quite hard work (Me, 2)
(132) Don't!!! Shut up!! (1, 2)
(133) Peer Fractions (2)
(134) Plants, trees, oxygen (1 & 2, 4)

Stories

(135) Marshmallows (pilot study) (2 & 3, 2)
(136) Random chat (2)
(137) Someone else sitting in their chair (1, 6)

School

(138) Teachers chat (2)
(139) Teachers (3)
(140) I don't think that's funny (1) Well I do (2) (session 4)
(141) Shakespeare is starting to bore me (1, 4)
(142) Earrings...apparently it disturbs the learning (1, 6)
(143) Great chain of being (1 & 2, 4)
(144) Soliloquy (3, 4) Oh when a character thinks to themselves (3, 6)
(145) Describing a character (3, 6)

Out of School

(146) Swimming (1, 2)
(147) Caravans (1, 3, & 5, 3)
(148) Hot pants (1, 3)

4.2 Evaluation feedback

How useful has it been looking at the “tool” each week? Very useful (1)

Did the researcher listen to your ideas? Often

How likely are you going to use the tool in the future? Likely

More session.

Group session.

Yes. Math.

Have you enjoyed the project? Yes. All of it.

Change? More sessions.

Thank you. [And for the marshmallows and chocolates]

How useful has it been looking at the “tool” each week? Very useful (2)

Did the researcher listen to your ideas? Always.

How likely are you going to use the tool in the future? Likely

More sessions.

Paired sessions.

Yes. All subjects. [Use it for other subjects?]

Enjoyed? Yes. All of it.

Change? Nothing.

How useful? Not at all useful (3)

Circled all responses for me listening to ideas and couldn’t tell me why.

Underlined question about use in the future.

Yes. Engineering.

Enjoyed? Sometimes. Chocolate. Getting out of lessons.

Didn’t enjoy? 5.

Change. By ourselves.

I enjoyed it.

How useful has it been looking at the “tool” each week? Quite useful (5)

Did the researcher listen to your ideas? Always.

How likely are you going to use the tool in the future? Extremely likely

Helped a lot actually.

Don’t know.

Other subjects? All of them except P.E.

Enjoyed? Yes. Not being with 1, getting support.

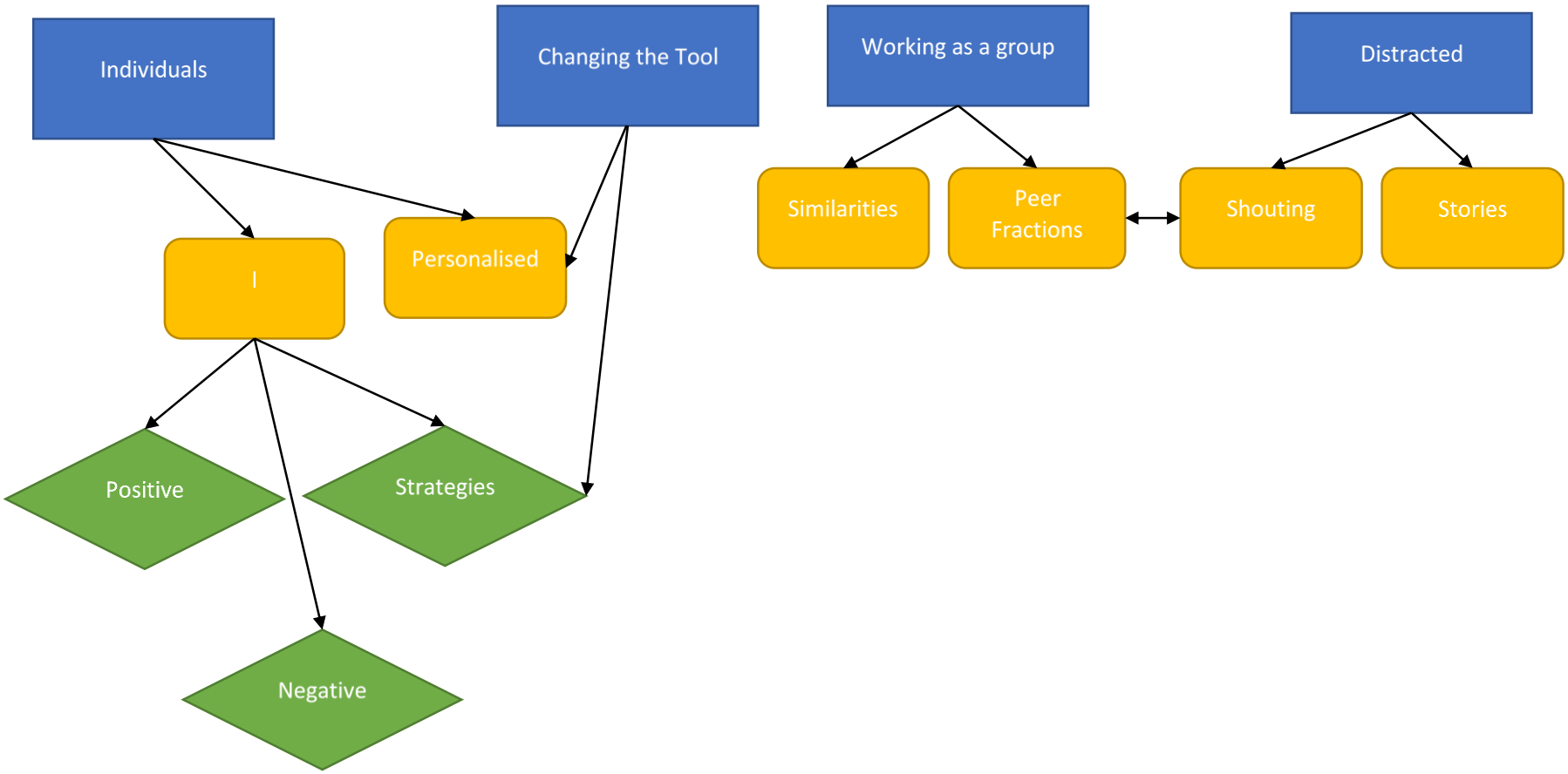
More sessions. Doing solo sessions.

4.3 Themes matrix

Week	Theme	Theme	Theme	Theme
1	Being stuck	Changing behaviour	Boredom in class	
2	The usefulness of the thinking skills tool	Changing behaviour	Boredom	Change in routine
3	Teachers	Distraction – off topic	Boredom	
4	No strategies for when stuck	Being independent	Overwhelmed	Requiring prompts
5	Difficulties in choosing strategies		Boredom/lack of focus	Requiring prompts
6				
7				

How would you like feedback?

4.4 Initial template



Appendix 5

5.1 Post-intervention reflections

Reflection after the pilot study - 1

I had wanted to run the pilot as a traditional focus group but at the time this no longer felt appropriate as three of the participants had sat themselves at different tables [in a full-size classroom].
A difficulty with this study is that they have been selected by a teacher with specific criteria from myself. They have given consent but that could be a response to the power imbalance.
Amending how I collected data was an instinctive response which hopefully addressed power issues.

Reflection after the pilot study - 2

All participants to trial the same thinking skills tool initially. From the pilot I can see that there will be differences between the participants, so I anticipate creating more bespoke, individualised tools after week 1.
My current plan is week 1 complete wrapper, week 2 evaluate wrapper. I am now wondering whether to combine both and change the wrapper each week? With the original you are meant to re-visit it though to inform your next approach to a piece of work.

Reflection after the pilot study - 3

One participant expressed a dislike for my initial question 'What did you do first?' This is a question relating to planning; a fundamental aspect of metacognition. I have removed it for the initial thinking skills tool but will remind the participants on my first intervention session of the three elements of metacognition that we discussed during the pilot study. *Typed and not written in journal in response to critical comment around AR and imposing own ideas. 31.07.2019.*

Reflection after Session 1

Thoughts:

- Make them more aware of the purpose
- Ask for question ideas and relate to PME [planning, monitoring and evaluating
- Model using with a piece of "work"

Future thinking seemed difficult [for the participants].
Initially I felt the session had not been productive but having looked at their responses I can see there is a need for support around 'getting stuck' which would fall into the planning and monitoring elements.

Reflection after Session 2 -1

They were very lively and quite disruptive this week, so it was very difficult to talk. One pupil (2 – should I name them??) was less so.
Had decided on a more practical activity for next week beforehand so I'm hoping that will go better – sorting metacognition questions.
Have thought about individual work, perhaps in Week 4?

Reflection after Session 2 - 2

I have been mulling over the session all week as I'm concerned over the quality of the data I have collected. I guess my voice is also data so I should return to the recording and transcribe that too.
I have read more about the learning tactics questionnaire and it says about students rating the strategies for ones they would like to use in the future.

- Perhaps try on Monday alongside sorting of statements
- Can then combine the data to create individual "exam wrappers"

Reflection after Session 3

Really pleased with the session today. They all sat at the same table and I sat with them and moved round. [Additional reflection – I am not sure why I had been standing at the front in previous sessions as the research was not about me being a teacher]. There was still some silliness, but the sorting activity kept them busy.
Participant 5 – looked at the additional questions on Learning Tactics List [that they hadn't completed]
-listen back to recording for their thoughts
Participant 3 – didn't like the activity much. He chose two statements then coloured in. Think visual for next time and speaking about the answers.

Reflection after Session 4

I'm pleased I separated them because participant 2 was more vocal about using the tool. 3 engaged better too. They required support to use their questions but hopefully benefited from it.
The work they have been completing in class hasn't really been much long, independent writing. Lots of copying which I'm not sure what the aims are for that.
Some thinking skills tool questions are not appropriate to a short, copied task.

Reflection after meeting with my supervisor

Reading the adjustments to the research questions that [tutor] suggested has made me feel better about the data as I believe I can now answer them.
Have slightly tweaked the wording on the evaluative questionnaire.

Reflection after Session 5

Difficult to get 1 and 2 to select strategies. I repeatedly changed my phrasing: e.g.

- What do you do when you're stuck?
- What is on the board?
- What is in your book?

What are their target grades?

I feel the project has improved now that it is simplified. I am more relaxed about it and can see how it will end and that it is now more useful. They were more engaged at our last session.

Reflection after meeting with their English teacher

It was interesting to hear from their teacher. They sounded like they were finding class management difficult – I shared the anecdote from participant 5 [This teacher lets me get up and have a break].

Getting to know a class works both ways and I hadn't considered that before.

Reflection after Session 6

It has been a difficult project. There is no end product that is working well for them and they are still unable to consider or use any strategies.

They all agreed with their mindset description which goes a long way to explaining the difficulties with the project.

It has been difficult:

- Engagement
- Trying the strategies (teacher has been off sick this week)
- Metacognition needs explicitly teaching so they have strategies to choose from
- Need one-to-one coaching??

5.2 Reflections on each participant

Own personal narrative

1: Needing to talk about things outside of class, gets annoyed at others

2: Gets on with tasks, likes writing, motivated to put in effort, can't articulate strategies or think of any to try

3: Inability to get on with work, low motivation to put in effort

5: Wants to do better, difficulties with teachers, struggles to change mindset "he seemed reluctant to try and change these" – (Me, 3+)

Appendix 6

6.1 Diagnostic criteria ADHD DSM-IV

People with ADHD show a persistent pattern of inattention and/or hyperactivity–impulsivity that interferes with functioning or development:

1. **Inattention: Six or more symptoms of inattention for children up to age 16 years, or five or more for adolescents age 17 years and older and adults; symptoms of inattention have been present for at least 6 months, and they are inappropriate for developmental level:**
    - Often fails to give close attention to details or makes careless mistakes in schoolwork, at work, or with other activities.
    - Often has trouble holding attention on tasks or play activities.
    - Often does not seem to listen when spoken to directly.
    - Often does not follow through on instructions and fails to finish schoolwork, chores, or duties in the workplace (e.g., loses focus, side-tracked).
    - Often has trouble organizing tasks and activities.
    - Often avoids, dislikes, or is reluctant to do tasks that require mental effort over a long period of time (such as schoolwork or homework).
    - Often loses things necessary for tasks and activities (e.g. school materials, pencils, books, tools, wallets, keys, paperwork, eyeglasses, mobile telephones).
    - Is often easily distracted
    - Is often forgetful in daily activities.
2. **Hyperactivity and Impulsivity: Six or more symptoms of hyperactivity-impulsivity for children up to age 16 years, or five or more for adolescents age 17 years and older and adults; symptoms of hyperactivity-impulsivity have been present for at least 6 months to an extent that is disruptive and inappropriate for the person's developmental level:**
    - Often fidgets with or taps hands or feet, or squirms in seat.
    - Often leaves seat in situations when remaining seated is expected.
    - Often runs about or climbs in situations where it is not appropriate (adolescents or adults may be limited to feeling restless).
    - Often unable to play or take part in leisure activities quietly.
    - Is often "on the go" acting as if "driven by a motor".
    - Often talks excessively.
    - Often blurts out an answer before a question has been completed.

- Often has trouble waiting their turn.
- Often interrupts or intrudes on others (e.g., butts into conversations or games)

In addition, the following conditions must be met:

- Several inattentive or hyperactive-impulsive symptoms were present before age 12 years.
- Several symptoms are present in two or more settings, (such as at home, school or work; with friends or relatives; in other activities).
- There is clear evidence that the symptoms interfere with, or reduce the quality of, social, school, or work functioning.
- The symptoms are not better explained by another mental disorder (such as a mood disorder, anxiety disorder, dissociative disorder, or a personality disorder). The symptoms do not happen only during the course of schizophrenia or another psychotic disorder.

Based on the types of symptoms, three kinds (presentations) of ADHD can occur:

- *Combined Presentation*: if enough symptoms of both criteria inattention and hyperactivity-impulsivity were present for the past 6 months
- *Predominantly Inattentive Presentation*: if enough symptoms of inattention, but not hyperactivity-impulsivity, were present for the past six months
- *Predominantly Hyperactive-Impulsive Presentation*: if enough symptoms of hyperactivity-impulsivity, but not inattention, were present for the past six months.

Because symptoms can change over time, the presentation may change over time as well.

Reference

American Psychiatric Association: Diagnostic and Statistical Manual of Mental Disorders, 5th edition. Arlington, VA., American Psychiatric Association, 2013.

https://www.cdc.gov/ncbddd/adhd/diagnosis.html

US Department of Health & Human services

6.2 Diagnostic criteria hyperkinetic disorders ICD-10

Description

Attention deficit hyperactivity disorder is characterized by a persistent pattern (at least 6 months) of inattention and/or hyperactivity-impulsivity, with onset during the developmental period, typically early to mid-childhood. The degree of inattention and hyperactivity-impulsivity is outside the limits of normal variation expected for age and level of intellectual functioning and significantly interferes with academic, occupational, or social functioning. Inattention refers to significant difficulty in sustaining attention to tasks that do not provide a high level of stimulation or frequent rewards, distractibility and problems with organization. Hyperactivity refers to excessive motor activity and difficulties with remaining still, most evident in structured situations that require behavioural self-control. Impulsivity is a tendency to act in response to immediate stimuli, without deliberation or consideration of the risks and consequences. The relative balance and the specific manifestations of inattentive and hyperactive-impulsive characteristics varies across individuals, and may change over the course of development. In order for a diagnosis of disorder the behaviour pattern must be clearly observable in more than one setting.

https://icd.who.int/browse11/l-m/en#/http%3a%2f%2fid.who.int%2ficd%2fentity%2f821852937

04/19

6.3 BRIEF

The areas of executive function that the BRIEF measures are:

Behavioural regulation scales: inhibit, shift, emotional control

Metacognition scales: initiate, working memory, plan/organise, organisation of materials, monitor

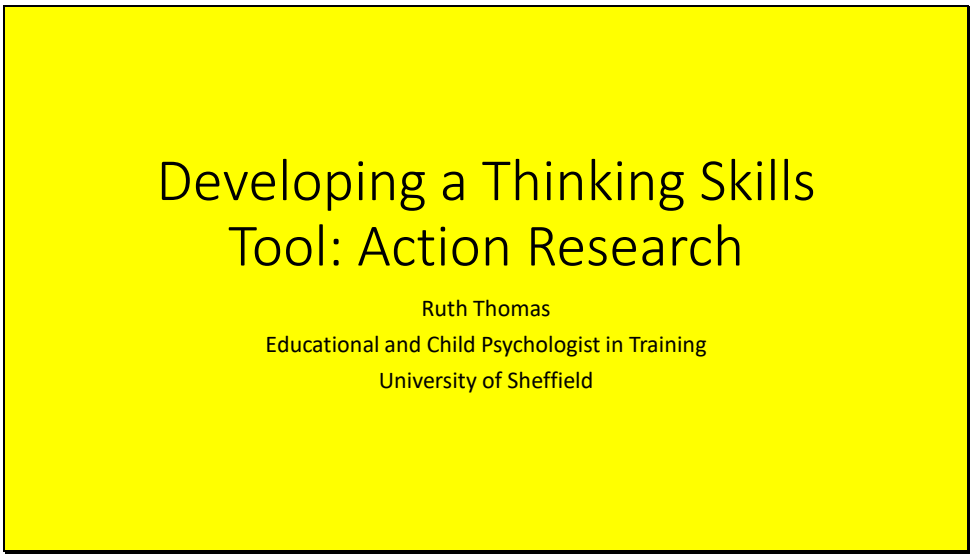
6.4 Executive function skills Guare, Dawson and Guare (2013)

Skill	Description
Response inhibition	Being able to think before acting.
Working memory	Being able to hold information in your head while completing a complex task.
Emotional control	Being able to manage your emotions to achieve goals and complete tasks.
Flexibility	Being able to change plans when faced with a setback or obstacle.
Sustained attention	Managing to pay attention to a situation or task despite getting distracted or being bored or tired.
Task initiation	Being efficient and timely about beginning tasks rather than procrastinating.
Planning/prioritisation	Being able to create a plan to achieve a goal and also considering what is and is not important in order to achieve this goal.
Organisation	Keeping track of information or materials so they can be retrieved easily.
Time management	Knowing how much time is needed to complete a task and being able to keep to deadlines.
Goal-directed persistence	Keeping focussed on achieving a goal and not putting things off due to competing distractions.
Metacognition	Thinking about how you problem solve and self-monitoring and self-evaluating during a task.

Appendix 7

7.1 Pilot study PowerPoint

Slide 1



Who I am
Research

Agenda for the session: explain thinking skills, explain action research, activity to demonstrate thinking skills, views on exam wrapper, questions about research

Slide 2

The Thinking Skills Tool

- What is the research about?
- Exam Wrapper
- Supporting independent work
- Small group work
- Weekly

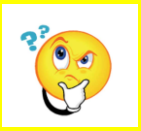
The exam wrapper was developed in America to support university students after they had exams to help the to engage in the revision and feedback process rather than just looking at the grade. I would like to work with you to develop something similar for supporting you with your independent class work – so when you are working by yourselves.

It might be that you find it difficult to get started, or you spend too long getting resources ready, or you start writing without a plan. You might just write and not think about whether you are actually answering the question.

So my idea is to come in September and sit with you as a small group in class and use a version of the exam wrapper that you have helped me to write to review a piece of classwork. The idea is to look at the wrapper before you do another piece of independent work to remind yourself what you were going to do next time.

Slide 3

What are Thinking Skills?



Metacognition

1. **Planning** what you are going to do by thinking about similar work you have completed
2. **Monitoring** how you are performing. "Am I on the right track?" "Who can I ask for help?"
3. **Evaluating** how well you did and if you would change your approach to a task next time

So the technical term for thinking skills is the word metacognition.

Cognition is the mental process of acquiring knowledge through thought, experience or the senses.

Metacognition is thinking about the processes that support our learning.

Three elements: PME

We're going to do an activity that demonstrates these skills.

Why are they useful? Research has suggested that students who think well, learn well, regardless of what set you are in. Aged 12-15 most growth?

Slide 4

Thinking Skills

Tower building

Build the tallest tower that you can with the marshmallows and spaghetti in five minutes.

What do you know already about?

1. Spaghetti?
2. Marshmallows?
3. Towers?

2.30- 5.00
https://www.youtube.com/watch?v=f-4N7OxSMok

Tower Building
The goal is to see who can build the highest tower within a set amount of time.

Plan

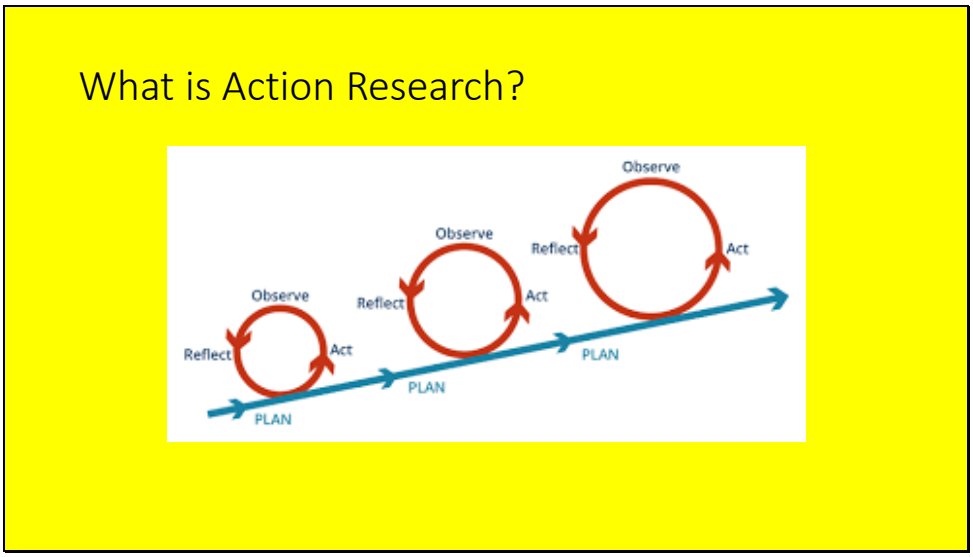
Monitor – stop after two minutes. Are you doing well? Do you need to make changes?

Evaluate – how did you do? What would you change if you did it again?

Slide 5

What if your tower had to hold a tennis ball? What would you change?

Slide 6



My project is using a method called action research.

This means that I don't know what the end of this project will look like. I have planned for today, we have acted, observed and we're going to reflect together today. Then I will plan again for when I return in September. This will continue for a few cycles – as many as we think we need.

Slide 7

The Exam Wrapper

1. What are your first thoughts?
2. What do you like about it?
3. What do you not like about it?
4. What would you change to make it useful in class?

Slide 8

What will I have to do?

- Meet with Ruth for 5-10 minutes once per week in class to either use or review the Thinking Skills tool.
- The rest of your class might be doing a similar activity.

Slide 9

What happens next?

- Timetable
- Send out a letter in September
- Enjoy the summer holiday!

7.2 Pilot study adapted exam wrapper

Thinking Skills Tool

What did you do first?

1. Started writing
2. Made a plan in my head
3. Re-read the text
4. Drew a plan out

Was your equipment (e.g. pen, pencil, paper) all ready?

Yes No

Did you complete the work?

Yes No

What would have helped you to make the work better?

5. More time
6. Thinking about what I was ooing to write first
7. Having my equipment ready

Did you spend most of the time:

6. Thinking about what you wanted to write
7. Writing
8. Thinking about other things
9. Talking

What did you do when you were stuck?

7. I did not get stuck
8. Asked the teacher
9. Re-read the text
10. Re-read what I had written
11. Asked someone on my table

When you finished, what did you do?

4. Re-read my work
5. Re-read my work and made changes
6. Nothing

What will you do differently next time you have some independent writing to do?

7.3 Comments on original exam wrapper and the adapted exam wrapper (Appendix 7.2)

Comments on Exam Wrapper

1: Participant 1 coded the questions as either a) It's okay, b) Kinda bad or c) It's bad.

- Do you think that the problems on the exam fairly reflected the topics covered in class and recitation? It's okay/kinda bad
- The rest all Kinda bad or It's bad

2: Scribbled all of the questions out

- Had percentages – that harder we may not know abait (about). "How are we meant to know that?"
- And that it's more complicated to understand

3: Drew lines through each question in black felt tip

- "Too hard"

5: Left it clear and wrote a comment

- Don't like it, it looks complicated

Comments on pilot Thinking Skills Tool

1: Participant 1 coded the questions as either a) Okay, b) Kinda bad/okay or c) Bad.

- Okay – Did you complete the work? Y/N; What would have helped you to make the work better? 3 options in words
- Kinda bad/okay – Was your equipment (e.g. pen, pencil, paper) all ready? Y/N; What did you do when you were stuck? 5 options in words
- Bad – What did you do first? 4 options in words; Did you spend most of the time: 4 options in words; When you finished, what did you do? 3 options in words

2: Ticked all of the questions.

- More separated and easier to read. "easier to read"
- Easier.
- More questions.
- "Has an emoji"

3: Ticked the majority of questions except, 'What did you do first?' Had underlined this question. Coloured in the emoji.

5:

- This is a circle question sheet, it is easier
- "easier to understand", "circle question" e.g. you can circle options

Note: "" means that the comment was said to me and not written on their sheets

Appendix 8

8.1 Literature review strategy

Initially, I used the following search terms to conduct and refine my literature review:

- ADHD children
- "ADHD" children "challenging behaviour"
- ADHD children and adolescents
- "Classroom interventions" ADHD
- "Working memory" classroom intervention
- ADHD "Executive functioning deficits"
- Working memory training

Once I had completed this background reading I continued to search using terms such as 'metacognition', 'motivation'. 'adolescents' in varying combinations with 'ADHD.' Once I had found the exam wrapper intervention, 'exam wrapper' became a search term yielding only eight hits.

Subsequent literature searches were conducted around the philosophy of research so 'ontology' and 'epistemology' were new terms added to searches.

Specific searches were done around two research methodologies: mixed methods and action research. These were combined with the term 'ADHD'. The philosophy of these approaches was also searched for.

'Trustworthiness' relating to qualitative research and also 'template analysis' followed. Once I had collected my data, my search terms looked for further articles about adolescents,

metacognition and self-regulated learning. After writing the results chapter I wrote a list of reading I wanted to try and find:

- CYP setting own learning targets
- CYP (child or young person) and explicit metacognition teaching
- CYP and modelling strategies
- ADHD individual BRIEF strengths/difficulties
- CYP passive or active learners
- Group dynamic adolescents
- Adolescent independence re. learning
- CYP mindset

Some of these searches were successful and others were less so.

Some literature was found in other literature. For example, when locating articles about the exam wrapper I looked at the references in the papers I had found.

I moved on from a search when I felt that the articles in the search list were no longer relevant to this study and I had enough to write ab

Appendix 9

9.1 Potential challenges and obstacles in this research

Table 9.1 Potential challenges and obstacles in this research

Challenges	Obstacles	Recommended Strategies	This Research
Gathering genuine views from the participants	Researcher viewed as the expert: Participants defer to my interpretation	Strategy 1: Anticipating Potential Barriers 1. Identifying the power and politics present within the research. 2. Establishing transparent relations with participants.	1. Aware of the age difference between myself and the student participants; informed teacher participants that I used to teach (albeit in primary school); have worked in the school previously so am familiar with the hierarchies. 2. Pilot study involved providing the participants with information about the three elements of metacognition: planning, monitoring and evaluation.
	Researcher viewed as having questionable intentions	Strategy 2: Conveying the Data Analysis Process with Transparency 1. Providing participants with the themes as we go along	1. Presented the participants with themes each week, alongside quotes to aid understanding
	Findings are unclear	Strategy 3: Reconstructing Data Collection memories & Identifying Prominent Themes. 1. Providing participants with activities to support them in	1. Reviewed the themes from each week 2. What do they think the themes mean?

		reconstructing their memory of data collection. 2. Exposing participants to a multitude of perspectives.	
Challenges	**Obstacles**	**Recommended Strategies**	**This Research**
Navigating Potential Differences in Interpretation	Findings Conflict with Participants' Personal Interests	Strategy 4: Establishing Guidelines for Theme Comparisons. 1. Deciding on a decision-making structure with participants regarding the final set of themes. 2. Having examples of participant narratives and asking participants to elaborate on the discrepancy in their initial narrative compared to current opinions.	1. I asked the participants how they would like feedback on the analysis. 2. Quotes for each participant and the associated theme were presented to them.
	Translating Feedback	Strategy 5: Incorporating Member Checks into Data Analysis 1. Taking extensive field notes during and after member checks 2. Creating a visual matrix to track the data	1. Took notes during member checks, and immediately after. Recorded most sessions on a Dictaphone. 2. Examined matrix for discrepancies and checked with participants if responses were not consistent.