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**Using Digital Training to Support the Wellbeing and
Management Skills of Teachers of Children With ADHD
Symptoms**

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Abstract

The current research aim was to determine the feasibility and acceptability of a digital intervention to assist primary school teachers in managing ADHD symptoms in the classroom. The thesis also aimed to provide preliminary evidence of the effectiveness of such digital interventions in decreasing teachers' stress and enhancing children's outcomes. The needs of children with ADHD are a significant concern for teachers, with around 5% of children meeting the threshold for clinical diagnosis and an additional 5% of school children having symptoms but not reaching diagnostic threshold. The manifested behaviours of ADHD not only affect the child, but also the teacher and the overall classroom atmosphere.

Teachers in the United Kingdom have reported high levels of stress, and approximately 20% of new teachers in England leave the profession within the first three years due to a variety of factors, including student misbehaviour. In addition to often complex workloads, teachers are also expected to meet the needs of students with, or at risk of, developing ADHD. This has led to the belief that early interventions from teachers targeting young children with ADHD behaviour may reduce any ongoing adverse effects and can change the trajectory of the disorder while at the same time reducing stress levels on teachers. Interventions to support teachers' management skills could break the cycle of disadvantage for both teachers and children with ADHD symptoms. An additional point of investigation in this thesis is to understand how, given the limited available free time teachers

have to engage with an intervention, a digital tool may offer an accessible intervention that supports reduction in teacher stress. The purpose of this thesis was to assess the feasibility and acceptability of a digital intervention to help primary school teachers in supporting children with ADHD symptoms. The thesis also aimed to provide preliminary evidence of the perceived effectiveness of digital interventions in reducing teacher stress and improving children's outcomes, thus, the doctoral research was divided into four studies.

Study 1 is a systematic review and meta-analysis to investigate the effectiveness of teacher-delivered interventions for child externalising behaviours based on teacher and child outcomes. Five electronic databases were used in a systematic search. The findings support the role of teacher interventions for teachers who work with children who exhibit externalising behaviours.

Study 2 describes a qualitative study using reflexive thematic analysis of semi-structured interviews with 17 teachers of children aged four to eight years in the United Kingdom (UK) to develop an understanding of their experiences of teaching children with ADHD symptoms in the UK and their unmet needs for support. The analysis revealed that teachers working with children with ADHD symptoms can feel overwhelmed and require more training in supporting those children.

Study 3 is a qualitative study that sought to evaluate the feasibility and acceptability of using the ADHD Behavior Toolbox application to support

teachers of children with ADHD behaviours aged four to eight years using reflexive thematic analysis of 15 teacher interviews. The teachers were generally very satisfied with the suggested strategies, and the idea, usability, and functionality of the app. However, most participants provided suggestions to improve application functionality from their perspective. The analysis also revealed that the application was seen to support both new and experienced teachers.

Study 4 outlines a study protocol for a single arm pre-post study to assess the feasibility of the ADHD Behavior Toolbox application with a target child, using a sample size of between 30 and 40 teachers. Participants would be asked to complete an online survey at baseline with validated measures of self-efficacy, depression, anxiety and stress, and child externalising behaviour for a target child. Participants would then use the ADHD Behavior Toolbox within their classroom practice before completing the measures post-intervention and completing a usability questionnaire.

The need for teachers' intervention for children with ADHD symptoms is revealed in the first three chapters of this thesis. The thesis also investigates the feasibility and acceptability of the ADHD Behavior Toolbox app for reducing teacher stress and supporting teachers of children with ADHD. Teachers were generally pleased with the application and provided feedback on how it could be improved to be more beneficial and appropriate to their needs. Overall, the study findings are promising, indicating that digital intervention may be an acceptable option. More research is needed to

investigate the potential efficacy of the Behavior Toolbox application using quantitative data, as well as to pilot recruitment and outcome measures prior to conducting a randomised controlled trial. We aim to develop and improve the ADHD Behavior Toolbox by following the (MRC) framework until we reach the implementation phase. At this phase, the app can be implemented in wide areas of the UK in schools in an effort to create a positive climate that supports children with ADHD symptoms and reduces stress for teachers.

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List of Abbreviations

3C = Coping-Competence-Context

ABC = Ascendence-Behaviour-Consequence

ADHD = Attention Deficit Hyperactivity Disorder

ADHD/C = Attention Deficit Hyperactivity Disorder Combined

ASD = Autism Spectrum Disorder

Attention Deficit Hyperactivity Disorder predominantly Hyperactive impulsive,

ADHD-H = Attention Deficit Hyperactivity Disorder Inattentive, ADHD -I

BOS = Bristol Online Survey (JISC)

CAQDAS = Computer Assisted Qualitative Data Analysis Software

CARD = Classroom Appraisal of Resources and Demands

CBCL = Child Behavior Checklist

CCOF = Classroom Competence Observation Form

CD = Conduct Disorder

CG = Cris Glazebrook

CI = Closeness

CLASS = Classroom Assessment Scoring System

CMSQ = Classroom Management Strategies Questionnaire

CMT = Classroom Management Training

CON = Conflict

COREQ = Consolidated Criteria for Reporting Qualitative research

CP = Conduct Problems

CTRF = Caregiver Teacher Report Form

CTRS = Conners Teacher Rating Scale

CTRS-R = Conners Teacher Rating Scales-Revised

DASS-21 = Depression Anxiety and Stress Scale 21

DBDs = Disruptive Behaviour Disorders

DD = David Daley

DE = David Erickson

DfE = Department of Education

DLPFC = Dorsolateral Prefrontal Cortex

DNA = Deoxyribonucleic Acid

DPICS = Dyadic Parent Child Interaction Coding System

DSM5 = Diagnostic and Statistical Manual of Mental Disorders

E = Elizabeth Liddle

EBP = Externalising Behaviour Problems

ECBI = Eyberg Child Behavior Inventory

EE = Expressed Emotion

EF = Executive function

FBA = Functional Behaviour Analysis

fMRI = Functional Magnetic Resonance Imaging

GCSE = General Certificate of Secondary Education

IQ = Intelligence Quotient

IY = Incredible Year

MOOSES = Multiple Option Observation System for Experimental Studies

MPROX = Most Proximal

MRC = Medical Research Council

NIHR = National institute for Health Research

NQT = Newly Qualified Teachers

ODD = Oppositional Defiant Disorder

OECD = Organisation for Economic Co-operation and Development

OFC = Orbitofrontal Cortex

OR = Odds Ratio

OREVS = Observer Rating of Eco-behavioural Variables Scale

OXSIT = Oxford School Inclusion Team

PBIS = Positive Behavioral Interventions and Supports

PBLIND = Probably Blinded

PBQ = Preschool Behaviour Questionnaire

PRO = Prosocial

RCT = Randomised Control Trial

RD = Reem Al- Dabbagh

SA = Saudi Arabia

SCP = Social Competence Performance

SCT = Sluggish Cognitive Tempo

SDQ = Strengths and Difficulties Questionnaire

SDQ-T = Strengths and Difficulties Questionnaire - Teacher version

SEC = Social and Emotional Competence

SENCo = Special Educational Needs Coordinator

SES = Socio Economic Status

SESBI = Sutter-Eyberg Student Behaviour Inventory

SSBS-2 = School Social Behaviour Scale-Second Edition

SSIS = Social Skills Improvement System

STRS = Student-Teacher Relationship Scale

TA = Thematic Analysis

TALIS = Teaching and Learning International Survey

TAS = Teacher use of Appropriate Strategies

TCIDOS = Teacher-Child Interaction Direct Observation System

TCR = Teacher-Child relationship

TIDier = Template for Intervention Description and Replication

TOCA-C = Teacher Observation of Classroom Adaptation-Checklist

TPOT = Teacher-Pupil Observation Tool

TRF = Teacher's Report Form

TSE = Teachers' Self-Efficacy

TSES = Teachers' Self-Efficacy Scale

TWS = Teacher Workload Survey

UCL = University College London

UK = United Kingdom

VMPFC = Ventromedial Prefrontal Cortex

WHAAM = Web Health Application for ADHD Monitoring

WMC = Walker-McConnell Scale of Social Competence and School Adjustment

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Publications and Presentations (see Appendix 1)

March 2018, Poster presentation CANDAL annual conference (Chapter1)

May 2018, Wining the best poster presentation in the Institute of Mental Health Research Day (Chapter2)

June 2019, Presenting a poster the CANDAL annual conference (Chapter 3)

November 2019, Sue Watson presentation (Chapter3)

July 2022, CANDAL webinar presentation (Chapter4)

September 2022, publication (Chapter2)

Chapter 1: Literature Review

1.1 Attention Deficit Hyperactivity Disorder (ADHD)

Attention Deficit Hyperactivity Disorder (ADHD) is a neurodevelopmental disorder that can be identified by several characteristics, particularly impulsivity, hyperactivity, and inattention (American Psychiatric Association, 2013; DuPaul, 2016). ADHD is considered one of the most common childhood disorders (DuPaul, 2016). The world prevalence for school children with ADHD was estimated in different meta analyses using pooled data to be about 5.29% (Polanczyk et al., 2014) 7.1% (Thomas et al., 2015), and 5.9% to 7.1% (Willcutt, 2012). According to Polanczyk and colleagues (Polanczyk et al., 2014), there is no noticeable change in ADHD prevalence over time, but prevalence varies depending on the type of assessment.

Children are usually first referred for diagnosis at school by their teachers (DuPaul & Kern, 2011; Sax & Kautz, 2003), demonstrating that school environments may be more sensitive to ADHD symptoms or may overestimate ADHD. Based on the above mentioned prevalence of ADHD, it is expected that one child in every class will have ADHD, with substantial academic and social difficulties if left untreated (Daley & Birchwood, 2010).

1.1.1 Structure of the disorder

The disorder is classified into three subtypes: i) Attention Deficit Hyperactivity Disorder predominantly Inattentive, (ADHD -I) ii) Attention Deficit Hyperactivity Disorder predominantly Hyperactive impulsive, (ADHD-H), and iii) Attention Deficit Hyperactivity Disorder Combined (ADHD-C), according to the American Psychiatric Association's fifth edition of the Diagnostic and

Statistical Manual of Mental Disorders (DSM-5) (American Psychiatric Association, 2013). These symptoms and characteristics can negatively impact children's school experience in many ways (Liu et al., 2015), including potentially making children more likely to make careless mistakes or to lose their belongings (American Psychiatric Association, 2013; DuPaul, 2016). Children with ADHD may also fidget or squirm as a means of self-regulating, find it difficult to remain seated when expected, and may perform unacceptable or inappropriate behaviours such as running around or climbing in the classroom (American Psychiatric Association, 2013). They may also be unable to wait patiently for their turn, or they may talk excessively, which can disrupt the learning environment (Daley & Birchwood, 2010). Importantly, these symptoms can vary widely in severity across cases (American Psychiatric Association, 2013; DuPaul, 2016).

1.1.2 Classification of the disorder

The DSM-5 reduced the minimum diagnostic age for ADHD to age 4 years (American Psychiatric Association, 2013). This change allows symptoms to be identified, and ADHD diagnosed, if necessary, prior to school entry at age five in the United Kingdom (UK). Children can receive a diagnosis if they display symptoms in more than one setting, being most commonly assessed at home and school. They must also exhibit symptoms for more than six months to ensure that such symptoms are not simply a reaction to some current situation. The symptoms should also first occur before the age of 12 years and have a detrimental impact on the child's academic and/or social life (American Psychiatric Association, 2013; NICE, 2018).

1.1.3 ADHD as a developmental disorder

Children may begin to display ADHD symptoms and difficulties early in life, potentially from the ages of 2 to 3 years, although the disorder can only be diagnosed after the age of 4 years (American Psychiatric Association, 2013). Although it is suggested that by adolescence some children may no longer meet the diagnostic criteria or may have a significant decline in symptoms, ADHD may also persevere into adolescence and adulthood, with about 50% to 86% of those diagnosed continuing to meet the diagnosis criteria or having significant symptoms (Barkley, 2019). Young adults may also retain the disorder over time while experiencing a change in the trajectory of the disorder. It has been suggested, for example, that hyperactivity and impulsivity in childhood may predict an increase in inattention in adolescence (Greven et al., 2011), although this may be mediated by stress (Hartman et al., 2019).

1.2 Comorbidity

ADHD is a heterogeneous disorder that may occur alone or alongside other disorders. Comorbidities such as externalising and internalising problems tend to present more with combined type ADHD, and it is these that may cause most disruption in school settings (Grizenko et al., 2009). Externalising problems reflect individuals' tendencies to direct emotions away from themselves, and may manifest as rule breaking, non-compliance, and aggressive behaviours (Campbell et al., 2000), while internalising problems occur where individuals tend to direct their emotions toward themselves, thus being characterised by anxiety, emotional dysregulation, depression, and somatic behaviours (Achenbach, 1978). One Danish community study found

that conduct disorder was one of the most common co-occurring disorders with ADHD present in about 16.5% of all cases (Jensen & Steinhausen, 2015). However, it has been suggested that the rates of comorbidity vary dependent on the setting. Bauermeister et al. (2007), for example, confirmed that comorbidity is lower in community samples (7.5%) than in clinical samples for children aged 4 to 17 years. Nevertheless, community prevalence in a study conducted in Puerto Rico found that 39% of children with ADHD had comorbid Oppositional Defined Disorder (ODD), while 53% of children with ODD had ADHD. Similarly, while just 13% of children with ADHD had conduct disorder, 72% of children with conduct disorder displayed ADHD symptoms (Bauermeister et al., 2007). It has also been suggested that children with both ADHD and ODD who encounter high-risk environments could develop Conduct Disorder (CD) (Beauchaine et al., 2010). Children with ADHD, ODD, and CD share various impulsive behaviours (American Psychiatric Association, 2013), though the comparative findings by Lynam et al. (2000) suggest that the link between children with impulsive behaviour and juvenile crime appears to be stronger in poorer communities. Non-impulsive children raised in poor communities, on the other hand, were no more likely to commit crime than those raised in better-off communities. This conclusion was based on psychological tests, and the results suggest that high risk communities may promote delinquency in at risk children who demonstrate impulsivity (Lynam et al., 2000), whereas a protective community may inhibit the delinquent expression of such traits (Beauchaine et al., 2010).

It has also been estimated that 16.5% to 30% of ADHD children may have learning difficulties with respect to maths, reading, and writing (DuPaul, 2007; Jensen & Steinhausen, 2014). ADHD and learning difficulties are highly associated with various genetic factors (Little et al., 2014; Rosenberg et al., 2011). Slow processing and cognitive weakness related to response inhibition are also common in cases of both ADHD and learning difficulties (Cheung et al., 2014), which can affect both ongoing learning and academic achievement (Little et al., 2014).

Prior to the DSM-5, children were unable to receive dual diagnoses under the DSM classification, as it was considered that any symptoms of ADHD were simply secondary symptoms in children with Autism Spectrum Disorder (ASD), rather than reflecting an additional diagnosis (American Psychiatric Association, 1980). This was changed in the DSM-5 to reflect the fact that children can have co-occurring ADHD and ASD (American Psychiatric Association, 2013). The results from a recent meta-analysis indicated that the rates of ASD in children with ADHD are around 19% and 24% in community and clinical samples, respectively (Hollingdale et al., 2020). Across the United States, based on a nationally representative sample, the full comorbidity of ASD and ADHD is approximately 42% (Stevens et al., 2016).

Both ASD and ADHD can affect the performance of working memory and may thus cause language difficulties (Habib et al., 2019; Kuijper et al., 2017), intensifying any academic difficulties experienced by such children (Carrasco et al., 2021). However, ASD management differs from that required

for ADHD, particularly with respect to reward processing. Children with ADHD require small and immediate rewards, while children with ASD prefer larger delayed rewards (Antrop et al., 2006; De Castro Paiva et al., 2019; Demurie et al., 2012).

Children with ADHD are at increased risk of a broad range of internalising disorders (Yoshimasu et al., 2012). This means that anxiety, depression, personality disorder, bipolar disorder, and eating disorders may emerge as comorbid disorders with ADHD diagnosis (Jensen & Steinhausen, 2014). The rates of comorbid anxiety and depression in school-age children with ADHD have been identified at 27.4% and 17.8%, respectively (Xia et al., 2015) based on examination of 135 children with ADHD and 65 control children without ADHD in China. Moreover, results from a Norwegian study drawn from 1,208 pre-schoolers age 35-44 months reported that one third of pre-schoolers who were diagnosed with ADHD showed signs of anxiety (Overgaard et al., 2016). The study compared children with ADHD and anxiety symptoms to children who were diagnosed with only ADHD and noticed that the former group showed more severe initial symptoms than the latter group (Overgaard et al., 2016). This may happen because such children often experience internalising emotional symptoms such as worry as well as experiencing low self-confidence due to peer rejection (Diamantopoulou et al., 2005), which can impact motivation, again resulting in lower academic attainment (Smith, 2012).

1.3 Aetiology of ADHD

Active research efforts are underway to determine the exact causes of ADHD. A combination of genetic, biological, and environment factors have been identified as being involved in the development of ADHD.

1.3.1 Biological factors

Brain imaging studies using Magnetic Resonance Imaging (MRI) provides new insight into the underlying cause of ADHD by determining differences in brain structure among people with ADHD. Based on such studies, it has been suggested that people with ADHD may have abnormalities with respect to basal ganglia volume and frontal cortex surface (Hoogman et al., 2017; Hoogman et al., 2019), and smaller volumes of grey matter (Vilgis et al., 2016) and white matter (Wu et al., 2020). There is also some evidence of chemical imbalances in the brain such as dopamine dysfunction (Economidou et al., 2012; Spencer et al., 2007) and noradrenaline imbalance (Economidou et al., 2012). Dopamine is widely regarded as an essential neurotransmitter for reward processing and behavioural motivation.

Functional Brain imaging studies using functional Magnetic Resonance Imaging (fMRI) detect subtle alterations in blood flow associated with cognitive processing (Posner et al., 2014). Functional MRI studies have shown that people with ADHD and those without the disorder have distinct patterns of brain activity (Posner et al., 2014). Moreover, the use of electroencephalography (EEG) has demonstrated that individuals with ADHD have different patterns of brain waves than individuals without ADHD (McLoughlin et al., 2005). More research is required to fully comprehend the

relationship between brain function and ADHD, as well as to develop reliable and valid diagnostic tools.

1.3.2 Genetic factors

Evidence from studies focusing on families, twins, and adoption has suggested that ADHD is highly heritable (Demontis et al., 2019; Faraone et al., 2005; Zhou et al., 2008). Faraone and Larsson (2019) reported that, based on 37 twin studies, heritability of ADHD in children was estimated to sit at about 74% (Faraone & Larsson, 2019). Children of parents with ADHD are between two to eight times more prone to have the diagnosis than children of parents without ADHD (Faraone & Mick, 2010). Studies on children support heritability more strongly than adult studies with rates of 75% to 90% and 30% to 50%, respectively (Brikell et al., 2015). Molecular genetic studies further suggest that the dopamine regulatory system genes DRD4 and DRD5 (Kustanovich et al., 2004), and CHMP7 (Dark et al., 2020) are associated with ADHD. However, findings are inconclusive and research regarding genetics remains ongoing, including Genome Wide Association studies that aim to observe groups of individuals to assess a genome-wide set of genetic variations as a way to identify the Deoxyribonucleic acid (DNA) variants that contribute to a given trait (Pearson & Manolio, 2008).

1.3.3 Environmental factors

ADHD aetiology is highly associated with genetic factors (Demontis et al., 2019; Faraone & Larsson, 2019), yet numerous environmental factors have also been associated with ADHD (Faraone et al., 2021). However, association does not always mean causation (Thapar et al., 2013). Given the

high rates of heredity, it is challenging to control for the possibly confounding environmental element. For example, perinatal maternal anxiety during pregnancy has been linked to ADHD (Glover, 2011; Vizzini et al., 2019), although, mothers with ADHD may have greater prenatal anxiety. Other meta-analyses have explored the associations between ADHD risk and symptom severity and diet. These suggest that maternal vitamin D deficiency can increase the risk of ADHD by 50% (Sucksdorff et al., 2021), while nutritional deficiencies such as deficiencies in Omega 3 and 6 (Hawkey & Nigg, 2014; LaChance et al., 2016; Sonuga-Barke et al., 2013) and iron (Wang et al., 2017) have also been linked to increased risk of ADHD. Other meta-analyses have linked the consumption of additives such as food colourings (Nigg et al., 2012; Sonuga-Barke et al., 2013) to the development of ADHD, although work on the potential of an unhealthy diet high in sugar to trigger the disorder produced no statistically significant results (Li et al., 2020).

An enormous body of research has also investigated prenatal exposure to maternal smoking and ADHD. The results from multiple meta-analyses indicate that maternal smoking may increase the risk of ADHD, by up to 50% (Dong et al., 2018; He et al., 2020; Huang et al., 2018; Nilsen & Tolve, 2020). However, this link can also be attributed to other genetic confounders that may increase the probability of both maternal smoking and ADHD (Faraone et al., 2021; Obel et al., 2016; Skoglund et al., 2014).

Associations between other environmental toxins and ADHD have also been investigated, as some researchers believe that the presence of various

toxins in the environment may hinder natural brain growth (Lanphear, 2015), and that this may contribute to ADHD development (Nigg, 2008; Nigg et al., 2012). The results from a systematic review and meta-analysis across 47 studies found a significant relationship between ADHD in children and exposure to chemicals such as lead (Pb), pollution, cigarette smoke and plasticizers which are a group of chemicals that are used in plastic manufacturing (Nilsen & Tolve, 2020).

Other researchers have also investigated the influence of parents in the development of ADHD symptoms, considering the early onset of symptoms (Johnston et al., 2018; Wong et al., 2018). The behaviours examined included parental stress and negative parenting (Hutchison et al., 2016; Roskam et al., 2018; Roskam et al., 2016), and negative parenting practices in the development of ADHD in children (Modesto-Lowe et al., 2008). However, such causes cannot be easily generalised, as multiple confounders may play a role in ADHD development.

Although it is not possible to conclude that poor family environment causes ADHD, it has been shown it can worsen aggressive symptoms (Langley et al., 2010). Some studies have, however, suggested that family conflict is a consequence rather than a cause, as ADHD symptoms in a child can contribute to parent-child hostility (Lifford et al., 2009; Thapar et al., 2013). In addition, if parenting interventions are able to alleviate symptoms, then parenting can have an influence on children's ADHD symptoms. Daley et al., (2014) conducted a meta-analysis examining the effects of parental

intervention with respect to children with ADHD aged 2 to 18 years. They found that parenting interventions could improve parenting, based on blinded measures (SMD 0.63; 95% CI 0.47-0.78), as well as reduce conduct problems in children (SMD 0.31; 95% CI 0.05-0.57). Another meta-analysis of parent training that examined 1,003 children aged 2.5 to 6 years across sixteen studies concluded that parental training could reduce ADHD symptoms, based on parents' reports. The results also indicated the development of better parental acceptance and understanding of ADHD (Rimestad et al., 2019). This is relevant to the current work, as it is likely that school environments and teacher-child relationships can similarly impact student behaviour trajectories over time (Maldonado-Carreño & Votruba-Drzal, 2011; Nemer et al., 2019; J. L. Spilt et al., 2012).

Although ADHD is highly associated with genetic risks, the actual physical interpretation of genetic code may vary between individuals according to the prevailing environment in a process known as epigenetics (Inguaggiato et al., 2017). This means that certain environmental factors can contribute to decreasing the adverse effects of ADHD, with the brain having the ability and the flexibility to rewire various pathways according to its environmental experience based on its level of neuroplasticity (Demarin & MOROVIĆ, 2014). Epigenetics and neuroplasticity both imply that genetic impact can be modified and stable alterations in the effects of DNA created that may either improve or worsen the effects of ADHD (Mill & Petronis, 2008; Palladino et al., 2019). Many researchers therefore believe that negative factors in a child's

environment, such as physical abuse, harsh punishment, and poverty, may play a significant impact in modifying the expression of the genes responsible and thus negatively impact the trajectory of any tendency towards ADHD. Theories of epigenetic programming promote the importance of environmental effects on ADHD, though the epigenetic programming mechanisms that may affect ADHD have not been completely elucidated, thus requiring further research (Palladino et al., 2019). In particular, large sample sizes and longitudinal research are required to correct for the extra confounding variables involved when measuring these metrics (Cohen, 2010). However, if epigenetic and environment factors are proven to have an impact on ADHD, this should influence health policies with respect to developing a preventative approach towards ADHD and associated externalising disorders (Mirkovic et al., 2020).

1.4 The impact of ADHD on academic achievement

Children with ADHD commonly experience difficulties in social and cognitive functioning (Daley et al., 2014) that may jeopardise these children's futures (Erskine et al., 2016; Klein et al., 2012). Children and adolescents with ADHD are vulnerable to achieving lower academic grades, retaking school years, and even dropping out of school entirely (Barbaresi et al., 2007; Barkley, 2006; Booth & Crouter, 2008; Erskine et al., 2016; Fried et al., 2013; Klein et al., 2012). One study in Australia compared 327 children aged 4 to 7 years with ADHD to 3,916 typically developing children in terms of academic performance, standardised test results and trajectories. The results suggested

that children with ADHD have significantly lower academic outcomes, particularly in writing and other subjects that require more support to manage inattention problems (Lawrence et al., 2021). Based on this poor academic achievement, they may be more vulnerable in adulthood to poor job performance (Daley et al., 2019), financial difficulties, and homelessness (Gordon & Fabiano, 2019).

Another systematic review of 176 longitudinal studies examined the long-term academic functioning (≥ 2 years) of school-age children with treated ADHD, untreated ADHD, and typically developing children. Treatment in this case referred to pharmacological, non-pharmacological, and multi-modal treatment. Achievement test and performance results in children with untreated ADHD were negatively affected. However, the review revealed that 79% of the achievement test outcomes and 42% of performance outcomes from the included studies improved with treatment (Arnold et al., 2020). The multi-modal treatment showed the greatest improvement between groups, with 100% improvement in achievement tests and 67% improvement in academic performance outcomes, compared to 75% and 33% improvement in non-pharmacological outcomes and 75% and 50% improvement in non-pharmacological outcomes, respectively. However, it should be noted that the included outcomes in the multi-modal outcome group comprised 5 outcomes compared to 8 in the pharmacological and non-pharmacological outcome groups. These results suggest that children with ADHD require targeted

interventions to improve their academic attainment to reduce the potential long-term adverse impacts of the disorder on learning (Arnold et al., 2020).

Erskine et al. (2016) explored the long-term adverse impacts of ADHD and CD in a systematic review and meta-analysis based on reporting Odd Ratios (OR). Two years follow-up was the minimum across all 98 included studies, and the analysis suggested a negative impact on both academic attainment and employment from ADHD and CD. The results also indicated an increased vulnerability to substance use disorders (OR=2.1,95% CI=1.7-2.6) the inability to complete high school (OR = 2.7,95% CI= 1.5-4.7); and criminality (OR = 3.5, 95% CI= 2.3-5.3) which emphasised the need for early intervention to prevent potential emergence of adverse long-term effect of the disorders (Erskine et al., 2016).

Birchwood and Daley (2012) conducted regression analysis on 324 adolescents aged 15 and 16 years in their final year of compulsory education in England. Participants were asked to complete tests of general cognitive ability, and rating scales that measured current and retrospective symptoms of ADHD, depression, anxiety, and motivation. After six months, their academic grades based on their General Certificate of Secondary Education (GCSE) results were reviewed. Cognitive ability and motivation were found to be the two strongest determinants of academic success. Anxiety, depression, and aggression were not found to predict academic outcomes, but higher levels of ADHD symptoms were linked to poorer academic attainment (Birchwood & Daley, 2012). These results were confirmed by Sayal et al.

(2015) in a longitudinal population-based study that investigated the relationship between academic achievement and ADHD, ODD, and Disruptive Behaviour Disorders (DBDs) in 11,640 children at the age of 7 years old, using their latest GCSE examination results as academic outcomes. They reported an inverse correlation between ADHD symptoms at an early age and GCSE achievement, with a one-point increase in inattention symptoms in children aged seven accounting for a two-to-three point drop in GCSE results at the age of sixteen (Sayal et al., 2015). Thus, some long-term academic risk appears to be due to the impact of ADHD symptoms on academic performance.

1.5 Reasons for association between ADHD and poor school performance

1.5.1 Poor Executive Function

Executive function (EF) has been recognised as an underlying mechanism for ADHD symptoms and functional impairments. Previous studies have indicated that, compared to typically developing children, children with ADHD experience poor EF, which can be thought of as a set of higher cognitive skills supported by the prefrontal cortex in the brain (Miyake & Friedman, 2012). EF thus controls attention, self-regulation, decision making, goal directing (Banich, 2009), working memory (Shields et al., 2015), organisational skills, and problem-solving (Miyake & Friedman, 2012), any or all of which may, in turn, significantly impact day-to-day functioning (Barkley & Murphy, 2011; Sjöwall & Thorell, 2019).

EF can also be divided into “hot” and “cold” cognitive functioning (Zelazo & Müller, 2011), terms that differentiate the impact of EF on behaviour. Cold EF refers to those working memory, planning, and organisational skills that do not involve emotions, while hot EF refers to emotional decisions such as resisting temptation or anger control. EF depends on various pathways of the brain, with the orbitofrontal and ventromedial regions of the prefrontal cortex OF/VMPFC being involved in hot EF, while the Dorsolateral Prefrontal Cortex DLPFC is involved in cold EF (Zelazo & Müller, 2011). The hot and cold model of EF overlaps with the triple-pathway model of ADHD, which extends beyond EF and suggests three neuropsychological pathways connecting cognitive dysregulation and ADHD: these are inhibitory control, delay aversion, and time processing (Sonuga-Barke et al., 2010).

1.5.1.1 Inhibitory Control

This refers to the cognitive ability that allows a person to control their actions, emotions, thoughts, and responses (Best & Miller, 2010; Nigg, 2000; Van Goozen et al., 2004). A recent systematic review and meta-analysis across 25 studies compared four groups: 1) children with ADHD; 2) children with CD + ODD + ADHD; 3) children with ODD + CD; and 4) healthy controls. The children varied in age from 2 to 17 years old. Inhibitory control was found to be low in all groups except for the healthy control group, suggesting that inhibitory control is associated with a range of disruptive behaviours not specific to ADHD (Bonham et al., 2021). However, the systematic review included several different study designs, and the meta-analysis comparing the

groups focused on outcomes developed across only two or three studies, limiting the robustness of its analysis.

1.5.1.2 Delay Aversion

This refers to sensitivity to delayed reward, which involves both self-regulation and resisting temptation (Sagvolden et al., 2005; Van den Bergh et al., 2006). A child with ADHD may thus prefer a small and immediate reward over a large and delayed one (Antrop et al., 2006; De Castro Paiva et al., 2019; Demurie et al., 2012; Sonuga-Barke, 2002) based on a lack of future vision (Mioni et al., 2017). A recent systematic review investigated delay discounting among children aged 6-12 years with ADHD and children with autism, as compared to typically developing children. The review included six studies, five of which examined ADHD, with only one featuring autism, and it provided evidence that children with ADHD tend to rush decision making in childhood (De Castro Paiva et al., 2019). However, the review included only a small number of studies, with two reporting no differences between children with ADHD and typically developing children (Antonini et al., 2015; Scheres et al., 2006).

Another study included 33 children with ADHD and ODD, 67 children with ADHD, and 30 typically developing children. This study explored a gambling task and a delay discounting task to examine hot EF, while cold EF was assessed using card sorting and spatial span tasks that measured working memory. The study concluded that ADHD was associated with problems with cold EF, but not with impairments in hot EF, regardless of comorbid ODD (Antonini et al., 2015).

1.5.1.3 Temporal processing or timing

This refers to time analysis patterns and the ability to perceive and present the passage of time, which is a cognitive skill that plays an important role in prioritising tasks, predicting consequences, and response times (Huang et al., 2012; Mauk & Buonomano, 2004; Puyjarinet et al., 2017). A recent meta-analysis examining the relationship between ADHD and temporal processing included 25 studies of children under 18 years old. The results from 12 of these studies confirmed that children with ADHD suffer from time estimation issues, especially with respect to long durations (Nejati & Yazdani, 2020). Another study investigated time estimation among 20 college students with ADHD and 20 non-ADHD students. Students were asked to complete an academic task, with instructions provided before the task to all participants. Despite a tendency to impulsiveness, the ADHD group spent 2.6 minutes longer than the other group completing the assignment, with an average error rate for the ADHD group three times higher than that in the non-ADHD group. After the students finished, they were asked to estimate the time they had spent completing the task. Students with ADHD tended to overestimate the time they had spent on the task: the mean time estimation prospectively, and retrospectively for the ADHD group was 19, and 16 minutes, while it was 14, and 11 minutes in the non-ADHD group (Prevatt et al., 2011). Although the experiment suggests that students with ADHD may have time processing difficulties compared to their non-ADHD peers which can impact on their academic performance, this study focused only on a small number of college

students, and the result may thus not be applicable to other population age groups.

Children with ADHD usually score lower than typically developing children in Intelligence Quotient (IQ) tests; however, these scores are unreliable as children with ADHD often also display executive dysfunction, which is known to adversely impact IQ testing (Birchwood & Daley, 2012). Some research also suggests that EF skills can affect multiple vital aspects of functioning, such as academic performance, in children (Best et al., 2009), as well as impacting adolescence and future employment (Miller et al., 2011; Valiente et al., 2013). A recent systematic review and meta-analysis investigated the relationship between EF and academic performance in children aged 6 to 12 years over the past decade (Pascual et al., 2019). The review included 19 longitudinal studies from various different countries and educational systems: children in these studies were diagnosed with various with DSM-5 mental disorders, although typical development was not ruled out, and studies with specific learning disorder samples were excluded. The study concluded that a clear statistical relationship exists between EF and academic performance based on one or more of EF components -inhibitory control, working memory, or cognitive attention. The meta-analysis particularly confirmed a relationship between EF and academic performance in mathematics and languages in primary school. It is proposed that IQ tests could be replaced by assessment of EF, as both have the same capacity to predict academic performance, and the latter is less biased (Pascual et al.,

2019). This meta-analysis did not concentrate specifically on ADHD, however the results were comparable to those of earlier studies focusing on EF and academic outcomes for ADHD (Singh et al., 2022; Sjöwall et al., 2017; Soto et al., 2020).

1.6 Children with ADHD symptoms may benefit less from education

ADHD symptoms may be identified during the preschool period, though the condition can also continue into adulthood (American Psychiatric Association, 2013). ADHD symptoms in early years predict future risk to educational attainment, social problems, and emotional difficulties (O'Neill et al., 2017), and acting out behaviours in particular can impact a child's learning potential (Erskine et al., 2016; Klein et al., 2012). The severity of ADHD symptoms can thus predict deficiencies in academic achievement in children (Birchwood & Daley, 2012; Frazier et al., 2007; Martin, 2012).

1.6.1 Disruptive behaviours

ADHD is frequently associated with disruptive behavioural disorders, and individuals with ADHD are also more likely to exhibit higher rates of aggression and off task behaviours (Abikoff et al., 2002). They also have a greater risk of developing ODD, as well as being more likely to develop conduct problems in the future, which may in turn lead to adverse consequences such as developing anti-social behaviours (Moffitt, 2017), substance abuse (Gunes et al., 2018), academic failure, and higher school drop-out rates (Barkley et al., 1990; Breslau et al., 2011).

As noted earlier, ADHD is often comorbid with ODD (Bauermeister et al., 2007), which is associated with irritability and anger (Evans et al., 2017);

children with ADHD and ODD are thus more likely to argue in the classroom, ignore classroom rules, and intentionally annoy others, as well as indulging in verbal and behavioural outbursts (American Psychiatric Association, 2013). The behaviours associated with these coexisting disorders may therefore have substantial implications for the child's academic achievement and performance (Schaeffer et al., 2003) especially when aggravated by environmental factors (Moffitt, 2017). Further, the ODD element tends to impact the development and delay social and emotional skills, while the ADHD element can cause not only peer relationship issues but also academic difficulties (Evans et al., 2020).

As mentioned earlier, while the mechanisms of epigenetic programming in ADHD are not fully understood and more research is thus required (Palladino et al., 2019), a recent systematic review investigating various environmental and genetic factors (Azeredo et al., 2018) suggested that the influence of genes may be considered more significant than that of environmental factors. Nevertheless, it must be acknowledged that environmental factors play a very important role in the development of such disorders, and twin studies have suggested that various behaviours can be provoked by classroom environments (De Zeeuw et al., 2015). In their study, de Zeeuw and colleagues (2015) examined whether the heredity of teacher-rated ODD and ADHD behaviours is moderated by shared classrooms, based on student and teacher gender, using the short Connors Teacher Rating Scales-Revised (CTRS-R) across the Netherlands twin register. They

identified 3,793 twin pairs aged 7 years, 3,470 twin pairs aged 9 years, and 2,534 twin pairs aged 12 years. They found that heredity effects were more prominent in twins taught in the same classroom, whereas the behaviours of children taught in different classrooms with different teachers and peers were less impacted by hereditary effects (De Zeeuw et al., 2015). This suggests that, although genes may determine the possibility and increase the probability of an individual developing ODD or ADHD, epigenetics can help explain the rest of the emerging picture. In particular, as mentioned earlier this implies that changing the environment of the affected person can shift the trajectory for these disorders by modifying the expression of the responsible genes and controlling some outcomes (Inguaggiato et al., 2017). There may be merit in controlling children's exposures to certain negative environmental factors such as the use of ill-considered punishment, poverty, inappropriate family discipline and abuse as a prevention mechanism (Mirkovic et al., 2020).

Jennings and Greenberg (2009) introduced the importance of teachers' Social and Emotional Competence (SEC). This describes the maladaptive pathway that occurs when a teacher under pressure, with correspondingly low SEC, uses punitive and ill-considered strategies to control challenging behaviour. This process can have the effect of escalating both disruptive behaviour and teacher stress, creating a downward spiral of disadvantage. Children's disruptive behaviour is thus clearly influenced by classroom environment and teachers' behaviours (Jennings & Greenberg, 2009). Forsberg et al. (2021) conducted 18 focus groups with 104 children aged 7 to

15 years in Sweden. The goal of that study was to determine how students felt about their relationships with teachers, the school climate, and disruptive behaviours. While the interview questions were broad and did not specifically include concepts related to disruptive behaviour or school climate, the analysis revealed that disruptive behaviours are complex and are perceived to be affected by multiple factors, including relationships with both teachers and peers. Additionally, some pupils noted the need for instructors who are kind and thoughtful in order to establish pleasant and caring classrooms and playground environments (Forsberg et al., 2021), while others suggested that teachers alone have the ability to affect the school climate (Farmer et al., 2011; Farmer et al., 2016). Creating a warm and understanding environment for children with ADHD symptoms can play an important role in improving behavioural and school engagement (Archambault et al., 2017), perhaps preventing school failure and improving long-term outcomes (Rushton et al., 2020).

1.6.2 Other comorbidities which impact on school performance: learning disabilities, sluggish cognitive tempo, and anxiety

Learning disabilities are common in children with ADHD (Jensen & Steinhausen, 2014; Pliszka, 2015), causing such children to experience difficulty in developing the necessary skills to facilitate development in reading, writing, spelling, or mathematics, as well as potentially causing difficulties in processing and recalling information (Penney, 2018). Children with coexisting ADHD and ODD may, in particular, demonstrate dysfunction with respect to

cognitive processing causing difficulties in learning (Cheung et al., 2014) that may significantly affect academic achievement (Little et al., 2014).

Some evidence further suggests that ADHD is highly comorbid with Sluggish Cognitive Tempo (SCT) with a 39% to 59% overall comorbidity rate (Barkley, 2013). Although the symptoms of SCT resemble standard ADHD inattention, it is a distinct disorder (Becker et al., 2014), with children with SCT experiencing excessive daydreaming, fatigue, and tiredness; difficulty in controlling impulses; increased apathy; and executive dysfunction (Barkley, 2013; Kofler et al., 2019). Several researchers have also linked SCT to academic underachievement, social impairment, and emotional dysregulation (Barkley, 2014; Jacobson & Mahone, 2019; Tamm et al., 2016). Having both SCT and ADHD may thus contribute to a child experiencing even greater academic and social difficulties (Becker et al., 2020).

People with ADHD also have a higher chance of developing anxiety and depression during their lifespan according to some studies (Bauermeister et al., 2007; Sobanski, 2006; Xia et al., 2015). While some have suggested that children with ADHD and anxiety can perform better with respect to inhibitory control tasks and sustained attention over time (Ruf et al., 2017; Vloet et al., 2010), other studies have explored the fact that anxiety can worsen the effects of ADHD in terms of executive function delays, as seen when shifting between tasks (Castagna et al., 2019; Visu-Petra et al., 2014; Yurtbaşı et al., 2018) and updating information in working memory (Castagna et al., 2019; Jarrett et al., 2016; Pliszka, 1989). Moreover, children with coexisting ADHD and anxiety

tend to experience intensified sleep problems (Graham et al., 2010; Hansen et al., 2014; Tong et al., 2018), as well as somatic complaints such as abdominal pain, back pain, and headaches (Leirbakk et al., 2015).

Hartman et al. (2019) undertook a longitudinal study that suggested that children and adolescents with ADHD exposed to high levels of stress in the environment were more likely to develop anxiety, frustration, increased impulsivity, as well as emotional dysregulation and symptoms of depression. The study also explored the idea that encountering stressful situations, such as negative peer relationships or changing schools or teachers, can change the trajectory of such disorders from standard types to inattention types. The role of stressful environments in the trajectory of children with ADHD is thus highlighted (Hartman et al., 2019).

1.6.3 School readiness

The preschool period is crucial to children's lives because it is when children reach their initial developmental milestones (Booth & Crouter, 2008). It is also usually the first time that children are expected to socialise with peers and form relationships with adults other than their parents (Booth & Crouter, 2008), reflecting its status as a time to gain basic knowledge and to build up academic and cognitive skills alongside social and emotional skills (Bierman et al., 2009). Unacceptable behaviours, such as tantrums, disobedience, inattentiveness, and impulsivity, might be typical and expected at the start of school life (Connor, 2002) due to the need for school adjustment and the pressure inherent in such developmental transitions (Campbell et al., 2000). However, by the age of five, these behaviours are expected to decrease in

typically developing children, indicating their readiness for school entry (Campbell et al., 2000; 2014). However, children with ADHD are not predicted to experience stability in these behaviours until they reach primary school, which may impact their readiness for school entry, social integration, subsequent academic achievement, and progression (Bierman et al., 2009). School readiness refers to the ability and competency level of a child to start school and achieve school-set goals (Pianta et al., 2007). School readiness thus covers several skills that may predict a child's school achievements, such as language development, cognitive skills, and social and emotional skills (Pianta et al., 2007).

Children develop their language and literacy skills in pre-school by listening to stories and engaging in conversation with peers and teachers (Whorrall & Cabell, 2015). They also develop their numeracy skills and cognitive skills in preschool settings, and these can be an early indicator of future success (Duncan, 2007; MacDonald & Carmichael, 2018). Children with ADHD symptoms will often miss out on this type of learning due to the nature of their behaviours (Jonsdottir et al., 2005), and this can also have a negative effect on their future learning. Perrin and colleagues compared 45 children aged 4 to 5 years who were diagnosed with ADHD or who had a high level of ADHD symptoms, to 48 typically developing children. The comparison explored school readiness by both direct observation and parental questionnaires across five of school readiness domains: physical, social and emotional, approaches to learning, language, and cognition, as defined by the

National Education Goals Panel (Copple, 1997). The result showed a significant difference between the two groups. While only 13% of the non-ADHD group scored low in school readiness, 79% of the ADHD group had low school readiness scores, illustrating their lack of school readiness. Findings suggest that schools and teachers may need to scaffold the learning of children with ADHD when they reach school (Perrin et al., 2018). However, it should be noted that the results for cognition in the ADHD group were not significantly different from those of the control group (Perrin et al., 2018) which indicate that children with ADHD have low school readiness despite having normal cognitive functioning.

The effectiveness of the Chicago School Readiness Project was examined in a cluster randomised trial in 18 schools including 2 classrooms from each school, 236 students in intervention and 230 in intervention group, examining long-term school success. The programme focused on teacher behaviour management strategies and stress reduction and initially showed positive results in terms of children's self-regulation, EF, and school achievements when assessed after a preschool year. The programme continued to have a positive effect only on EF and school achievement in the follow-up assessment 11 years after the programme's completion, suggesting that early intervention can have a long-lasting impact on EF and academic achievement (Watts et al., 2018). A pre-schooler's readiness for school entry may also predict the child's educational success in primary school (Booth & Crouter, 2008), further supporting the idea that early intervention may help to

alter developmental trajectories and protect children from later educational disadvantage.

1.7 Social disadvantages

As discussed previously, the aetiology of ADHD is very complex, and both genetic and environmental factors have been suggested to contribute to the development of ADHD. Socioeconomic family disadvantages, such as insecure housing, low income that causes difficulty in providing essentials, low maternal age at birth, parents' genetic risk, and the absence of a parent, may increase the risk of ADHD (Rowland et al., 2018; Russell et al., 2015, 2018; Russell et al., 2014), with poverty more generally associated with an increase in externalising behaviours in children aged 1.5 to 8 years (Mazza et al., 2016). It has also been shown that family characteristics such as family size, Socioeconomic Status (SES), and parents' education can impact children's academic attainment (Shahaeian et al., 2018; Vaknin et al., 2019), and children in most early years settings come from many different families and socioeconomic backgrounds. Russel et al. (2018) examined the relationship between levels of ADHD symptoms and the family change in SES in a longitudinal study, comparing these to levels of ADHD symptoms using the Strengths and Difficulties Questionnaire (SDQ). Measures for SES and SDQ were applied across participants throughout childhood, with each participant assessed four times between the period before birth and 11 years old (n = 6,416). The results showed an increased risk of ADHD in families with financial difficulties, suggesting that the severity of ADHD symptoms is

influenced by SES (Russell et al., 2018). Epigenetic studies and neuroplasticity thus offer hope for reversing the severity of ADHD if equality is prioritised.

1.7.1 Impact on teacher student relationships

Teacher-child relationships are characterised by levels of closeness and conflict, which reflect the positive and negative interactions between a teacher and a child (Pianta, 2001). A growing number of studies have suggested that challenging behaviour increases teacher-child conflict (Crockett et al., 2018; Doumen et al., 2008) and negative interactions with teachers can enhance a tendency to develop more significant behavioural problems (O'Connor et al., 2011; Sutherland et al., 2008). It has also been suggested that teachers with low levels of SEC can promote the escalation of student disruptive behaviour (Jennings & Greenberg, 2009). Moreover, long-term adverse relationships are negatively associated with academic achievement and positively associated with school failure (Burchinal et al., 2010; Hamre, 2014), hence influencing the trajectory of students' negative behaviour (Collie, 2017). High quality student teacher relationships, can decrease disruptive behaviour, anxiety, and social problems in children with emotional behavioural problems (Maldonado-Carreño & Votruba-Drzal, 2011; Nemer et al., 2019; J. L. Spilt et al., 2012), as teachers with low SEC can escalate students disruptive behaviour thus negatively affect academic attainment throughout primary school (Maldonado-Carreño & Votruba-Drzal, 2011).

According to attachment theory, it is important for the child to have a secure relationship with their caregivers to prevent externalising problems (Fearon et al., 2010) and to enhance academic achievement (Burchinal et al., 2010; Hamre, 2014). Thus, improving teacher-child relationships may support the development of a better school environment for children at risk of ADHD (Zendarski et al., 2020). Unfortunately, students with ADHD and externalising behaviour often have negative relationships with their teachers (Crockett et al., 2018; Doumen et al., 2008). The relationships between students with ADHD and their teachers were explored in a systematic literature review covering the period 2008 to 2018 (Ewe, 2019). The results from this investigation of both qualitative and quantitative literature showed that teachers tend to experience more conflict and less rapport with students with ADHD in primary and secondary schools as compared to their relationships with their typically developing peers. This result corresponds with the feelings of rejection by teachers' students with ADHD described in qualitative data from two mixed method studies. Such feelings of rejection may lead to a higher levels of externalising behaviour in students; however, these conclusions were drawn from only seven studies, and the systematic review itself was conducted by only one author (Ewe, 2019).

1.7.2 Impacts on peer relationships (difficulties with group work, team games etc)

Children with behavioural problems may experience future maladjustment, with reduced life quality and lack of friends if their problems remain untreated. Such children are usually rejected by their peers and find

developing relationships to be challenging (Grygiel et al., 2014, 2018; Hozo et al., 2005), and they may thus suffer from loneliness (Kim, 2018). Their relationships also usually face more conflict and less warmth due to the challenges presented by their ADHD symptoms (Normand et al., 2013).

Collaborative learning refers to enhancing learning by encouraging interactions among a small group of children (usually about two to five children) using various strategies of learning and teaching (Johnson & Johnson, 1999). It has been established that collaborative learning can support learning across school years (Slavin, 1996) and, even in preschool, it has become evident that argumentative skills gained via collaborative learning and interacting with peers and adults can help in building children's critical thinking skills (Dovigo, 2016). Poor EF can indicate the severity of children with ADHD's symptoms, which in turn can predict social impairment (Haebich et al., 2021). Children with ADHD also suffer from working memory deficits, which is one of the executive functioning skills that can most significantly impact behaviours such as social cue decoding (Mauriello et al., 2021), cooperating with people, following directions (Jaroslawska et al., 2016), and inhibitory control (Bonham et al., 2021; Raiker et al., 2012). Such working memory deficits can affect the development of classroom skills by children with ADHD, reducing their ability to plan, understand social cues, predict others' actions, and control their own impulses (Kofler et al., 2018). This may potentially cause difficulties in interacting with friends in their social lives and in classroom collaboration work (Gresham, 2017). Thus, the educational experience for children with ADHD

may be enhanced by mitigating any ADHD adverse effects by means of early pharmacological (NICE, 2018; Schlander, 2007) or nonpharmacological treatments (Lambez et al., 2020; NICE, 2018).

1.8 Treatments for ADHD

Various treatments and interventions are both available and recommended for ADHD under NICE guidelines, and the effectiveness of several pharmacological (NICE, 2018; Schlander, 2007) and behavioural interventions (Lambez et al., 2020; NICE, 2018) have been established with respect to mitigating ADHD symptoms and adverse effects.

Pharmacological intervention may consist of stimulant or non-stimulant medications. Stimulants work on the neurological pathways to increase focus and concentration by balancing dopamine production, whereas non-stimulants work by enhancing levels of norepinephrine (noradrenaline). It is recommended that the impact of such interventions is continuously monitored, as any positive impact may gradually decrease (Cunill et al., 2015), and there is significant debate about the long-term effect of such treatments on children (van de Loo-Neus et al., 2011).

Hennissen et al., (2017) conducted a systematic review and meta-analysis of eighteen studies to assess the effect of stimulant medication - methylphenidate and amphetamines, and non-stimulant atomoxetine on the heart rate and diastolic and systolic blood pressure of 5837 children and adolescents over a 28-week period. Due to cardiovascular issues 2% of participants withdrew from the trials, while 12.6% of participants reported

cardiovascular problems which were resolved by themselves or after changing the medication dose. The review concluded that heart rate and both types of blood pressure increased slightly but significantly in children and adolescents with ADHD after using amphetamines and atomoxetine. The review also explored a small but significant increase in only systolic blood pressure as an effect of using methylphenidate in children and adolescents with ADHD. Individuals with heart rate and blood pressure problems are at increased risk for cardiovascular morbidity and mortality, so taking these medications with caution is essential (Hennissen et al., 2017).

Other side effects reported during the use of pharmacological treatments include appetite suppression, growth problems, and sleep difficulties (Graham et al., 2010; NICE, 2018). The value of these medications for pre-schoolers has thus been subject to debate, based on these adverse effects (Kollins et al., 2006) 2001). The safety of methylphenidate was investigated in a Preschool ADHD Treatment study (PATS) trial in 303 pre-schoolers aged 3 to 5.5 years in eight phases over 70 weeks. The first investigation after five weeks assessed the short-term adverse effect of medication; one assessment after 40 weeks examined the long-term adverse effects of medication. A moderate to severe adverse impact was reported by 30% of the parents across all eight phases, with issues including nervousness, emotional dysregulation, sleep and appetite problems (Kollins et al., 2006); 11% of families were not able to manage these adverse effects and discontinued the medication (Wigal et al., 2006).

A recent systematic review was conducted to examine the effectiveness of methylphenidate in improving academic achievement in children with ADHD aged 6 to 18 years. The Newcastle-Ottawa Scale was used to assess the potential bias and limits of included studies and compare it to the reported results. Despite the small number of included studies and substantial heterogeneity in study designs, participant age group, drug dosage, and comparison groups, the results were interesting. There were nine studies included, five of which examined the long-term influence for methylphenidate on academic performance. Four of them concluded that it is ineffective; three of these studies were of high quality. The other four included studies evaluated the short-term effect and concluded that methylphenidate can improve academic performance; however, all of these studies had a significant risk of bias and the claimed benefits do not fully balance out the adverse complications (De Faria et al., 2022).

Psychosocial interventions involve a wide range of behavioural techniques targeting various intellectual, emotional, social, and environmental aspects. These techniques are designed and applied to increase adaptive behaviours and moderate symptoms (Barkley, 2002). To achieve this goal with children and adolescents interventions may be performed directly or delivered through their parents or teachers (England et al., 2015). Behavioural interventions, which are a type of psychological intervention that focuses on changing the child's behaviour gradually (Barkley, 2002), have demonstrated positive effect on both children with ADHD and their parents (Daley et al.,

2017; Daley et al., 2014; Tarver et al., 2014). Improvement in symptomatic conduct in children with ADHD is demonstrated across the literature after behavioural treatment, which also seems to empower parents and enhance parenting (Daley et al., 2017; Daley et al., 2014; DuPaul et al., 2018) Thus, behavioural interventions are generally seen as effective if directed at parents, though they may be less effective for teachers (Rimestad et al., 2018).

The evidence for other psychological intervention, including cognitive therapy and neurofeedback, is mixed however (Cortese et al., 2016; Cortese et al., 2013). Cognitive interventions include various tasks designed to help children manage planning, problem-solving, dividing challenging tasks into steps, and increasing attention (Safren et al., 2010). Neurofeedback is a brain-training process that is enhanced by technology to offer better feedback to the trainee (Lofthouse et al., 2012). The efficacy of neurofeedback depends on the time and effort put in by both trainer and trainee (Lofthouse et al., 2012). Results from reviews and meta-analysis suggest that, with respect to neurofeedback training in cases of ADHD, further studies with blinded measures are required (Lofthouse et al., 2012; Sonuga-Barke et al., 2013) and more work is required on practical clinical implementation (Enriquez-Geppert et al., 2019).

1.8.1 Behavioural intervention

One of the frameworks for behavioural intervention is the Positive Behavioural Interventions and Supports (PBIS) (2022) framework which is a three-tier framework of behaviour support that is implemented in a large number of schools worldwide. (McDaniel et al., 2015; 2022). This framework

aims to provide intervention based on children's needs. Tier 1 focuses on schoolwide intervention and support for all students. This approach is schoolwide, positive behaviour support, where one coach or champion receives a few days of training and then works in a school to deliver the intervention and coordinate it with school administrator, parent representative, and teachers. This typically focuses on changing the environment and employing modelling, positive teaching, and providing universal classroom strategies. The aim of this type of intervention is to prevent common behavioural problems from occurring. In an RCT Bradshaw et al., (2012) used the framework of Tier 1 to examine the effectiveness of School-Wide Positive Behavioral Interventions (SWPBIS) on 12,344 primary school children in 37 schools on enhancing children's behaviours (Bradshaw et al., 2012). The study examined the intervention for four years and concluded that SWPBIS is significantly effective in controlling behavioural problems. However, some children did not respond adequately to this prevention intervention, indicating that more work needs to be done to meet the needs of these children (Bradshaw et al., 2012). This suggests that this form of intervention is required to develop a whole-school preventive system, which can also aid in identifying children with more complex problems who require further care.

Tier 2 focuses on a smaller number of children with chronic behavioural problems. This approach is usually face-to-face over a number of weeks. An example of that is the Best In Class intervention, which consists of six hours delivered to teachers and aims to support children with behavioural problems.

It also has coaching sessions and observation to provide feedback to teachers. The programme focuses on rule setting, avoiding unwanted behaviour, and providing children with praise in addition to positive feedback in the classroom. There are 14 sessions of coaching, each lasting 1.5 hours of coaching and 30 minutes of observation. This intervention aims to improve children's and teachers' outcomes (Conroy et al., 2019; Conroy et al., 2020; Conroy et al., 2015; Sutherland et al., 2020). Both approaches Tier 1 and 2 require time to be deducted from the school's daily hours. It also requires travelling expenses for teachers or trainers, which can be prohibitively high (Blonigen et al., 2008).

Tier 3 interventions are highly personalised for non-responding students with severe behavioural problems and include complex strategies, such as functional behavioural intervention plans (O'Neill et al., 1990) which require a high level of coordination.

The evidence for other psychological interventions, including cognitive therapy and neurofeedback, is mixed, however (Cortese et al., 2016; Cortese et al., 2013). Cognitive interventions include various tasks designed to help children manage planning, problem-solving, dividing challenging tasks into steps, and increasing attention (Safren et al., 2010). Neurofeedback is a brain-training process that is enhanced by technology to offer better feedback to the trainee (Lofthouse et al., 2012). The efficacy of neurofeedback depends on the time and effort input by both trainer and trainee, however (Lofthouse et al., 2012). Results from reviews and meta-analysis suggest that, with respect to neurofeedback training in cases of ADHD, further studies with blinded

measures are required (Lofthouse et al., 2012; Sonuga-Barke et al., 2013) and more work is required to understand the practical clinical implementation (Enriquez-Geppert et al., 2019).

1.9 Rationale for school-based interventions and evidence for effectiveness

As noted earlier, ADHD and externalising behaviours are seen in about 10% of school age children (Polanczyk et al., 2014; Sayal et al., 2018). These children exhibit atypical levels of hyperactivity, inattention, and impulsivity, symptoms which can cause complications with respect to various cognitive, emotional, and social aspects of school. These behaviours therefore not only impact the child but can also affect the teacher and the overall classroom atmosphere (Daley et al., 2014; DuPaul & Stoner, 2014). Interventions that use behavioural strategies are thus recommended to support children with ADHD and externalising problems (Daley & Birchwood, 2010; Kendall et al., 2008). Psychological interventions that use specific cognitive theory-based strategies, such as cognitive behaviour therapy, social learning, contingency management, and behaviour modification may also be used to target individual behaviours. These strategies aim to promote positive behaviours while decreasing unwanted behaviours, and are offered to the child by mediators such as teachers and parents (Jitendra et al., 2008; Sonuga-Barke et al., 2013) or peers (Jitendra et al., 2008). Such school-based interventions are considered an effective way to help children with ADHD and behavioural problems who have academic, social, and emotional difficulties.

The term, “school-based intervention” is more broadly defined as a multidimensional intervention aimed at supporting schoolchildren in their attempts to improve their social, emotional and academic skills. A growing number of researchers have investigated the effectiveness of school-based approaches for managing externalising behaviour problems. A systematic review and meta-analysis of 44 studies investigating school-based interventions that aimed to reduce bullying in schools revealed that school-based interventions suppressed bullying and victimisation by about 20%; however, this meta-analysis was not based on randomised control trials, instead relying on age-cohort designs (Ttofi & Farrington, 2011). Similarly, another meta-analysis that also investigated school-based interventions focused on social and emotional learning to reduce conduct problems. The meta-analysis included 213 studies, and more than half of the interventions were delivered to primary school children. The analysis suggested that school-based interventions can provide a small but significant reduction in conduct problems in schoolchildren, with a pooled effect size of 0.22 (Durlak et al., 2011). In a systematic review of children with ADHD, DuPaul et al. (2012) examined the effect of school-based interventions. Results from the 60 included studies showed that school-based interventions are associated with moderate-to-large effect sizes for improved academic and behavioural performance.

1.10 Argument for teacher-based interventions

1.11 Barriers to implementing school-based interventions

School-based interventions involve multiple components, all of which are necessary to ensure an appropriate environment at school. Forman et al. (2009) and Pikelman et al. (2015) explored the barriers and the enablers of school-based interventions, noting that the cooperation of parents tended to contribute positively to the success of such programmes. Further, to ensure the sustainability of a programme, the turnover of teachers and administrative staff should be minimised, with sufficient funds ensured to guarantee access to the resources and equipment required to support both children and teachers. In addition, providing sufficient time and resources to ensure that teachers and other school staff have sufficient training is also very important (Forman et al., 2009; Pinkelman et al., 2015).

1.11.1 Transactional Model of Stress and Coping

This thesis applies the Transactional Model of Stress and Coping (Lazarus & Folkman, 1987) to explore teachers' experiences and emotions regarding teaching children with ADHD symptoms alongside their perceptions of their own unmet needs as teachers facing additional stress every day at work. Stress is, by definition, a physical and emotional response to stressors in the environment: when such stressors surpass the limit of an individual's practical and emotional resources, stress may thus build up and jeopardise the individual's wellbeing. The primary appraisal of such situations is to understand how that person cognitively perceives the triggering external factors in terms of threats or challenges, as people tend to experience different

levels of stress based on their personal appraisals of a stressor. The secondary appraisal involves individuals judging their capability with regard to their internal potential for coping with such situations (emotion-focused coping) or the external resources that they can access to alleviate them (problem-focused coping). The process of coping thus requires the creation of a balance between external demands and both internal and external resources (Lazarus & Folkman, 1987).

According to this model, individuals constantly assess their surroundings and use emotional cues from previous stressful experiences to guide this appraisal process: this may again be divided into two approaches. The first of these is problem-focused coping, which aims to balance the demands of a stressor by implementing various strategies and resources to directly reduce the impact of the stressor. Using this approach, teachers will evaluate a stressful situation in the classroom based on the resources they can utilise to address the situation (e.g. skills, practical support etc) and the severity and quality of their resulting emotional response (level of stress) will reflect that balance between perceived demands, resources and skills. For example, a teacher intent on developing skills that decrease the impact of disruptive behaviour in the classroom will perceive themselves to be better at balancing the demands placed on them. The second approach is emotion-focused coping, which aims to minimise the perceived impact of a stressor using psychological techniques, such as denial, or behavioural strategies, such as alcohol use or exercise (Lazarus & Folkman, 1987). Emotion-focussed

coping may reduce perceived demands but may also increase the actual level of demands as teachers may only respond to the child's negative behaviour.

Creating a balance between stressors and resources is necessary to help teachers appraise the challenging situations they encounter in their classrooms less negatively, thus helping to reduce workload pressure. Demanding work environments can, nevertheless, lead to stress (Fernet et al., 2012; Klassen & Chiu, 2011; Skaalvik & Skaalvik, 2011), and chronic stress can trigger significant physical issues (Järvelin-Pasanen et al., 2018; Rosengren et al., 2004; Tenk et al., 2018; Watanabe et al., 2018) as well as mental health concerns such as depression and anxiety, which in turn can lead to teacher burnout and resignations (Borman & Dowling, 2008; Carver-Thomas & Darling-Hammond, 2017). Empowering teachers with adequate resources are thus necessary, both to reduce daily stress and to contribute to their wellbeing.

McCarthy et al. (2016) conducted a meta-analysis that included 18 studies examining teachers' perceptions of available resources using the Classroom Appraisal of Resources and Demands (CARD) tool. The tool allows for comparisons across schools with regard to multiple variables, including students' challenging behaviours, stress prevention resources, job satisfaction, and burnout. The analysis divided the teachers into three groups: the first one featured teacher who believed that their resources exceeded demands placed on them (Resource group), the second was of teachers who believed that demand exceeded the resources available (Demand group),

while the third was teachers who believed that demand was roughly equivalent to the available resources (Balance group). The meta-analysis revealed a moderate relationship between the CARD analysis and other variables, with teachers in the Demand group at higher risk of burnout than those in the Resource group. The study also showed that teachers in the Demand group reported having access to lower levels of resources and perceived more demand, based on symptoms of burn out, students' challenging behaviours and professional disappointments, than teachers in the Resource group. The study thus emphasised the need for more professional development for teachers to help them balance their demands and resources (McCarthy et al., 2016). Nevertheless, the samples in the studies examined were drawn from a single country (USA), potentially reducing generalisability.

Another study investigated stress, depression, and anxiety in primary school teachers who participated in mindfulness-based stress reduction training. The study aims to explore the potential benefits of the intervention using the in reducing reported stress, anxiety, and depression among 10 primary school teachers. The intervention aims to change teachers relationship with tress by enhancing cognitive appraisal. The study used pre-post intervention and used the Dass 21 measure showed experienced significant reductions in stress, depression, and anxiety following the training which suggest that the intervention maybe beneficial in enhancing primary school teachers ability to cope with the work demands. However, the The lack of a control group in the study limits the ability to determine whether

any observed change is directly related to the intervention itself. The study also had a small sample size, which leads to preliminary result and tentative conclusions (Gold et al., 2010).

1.11.2 The 3C Theory

According to the Coping-Competence-Context (3C) Theory of Teacher Stress (Herman et al., 2020), there are three different pathways that may influence the stress levels experienced by instructors. This theory supports the concept of optimal intervention, which also focuses on these three pathways. The pathways overlap each other, and they all contribute to teachers' job stress. (Herman et al., 2020).

The Coping pathway focuses on the teacher's personality, ethos, and perceived coping strategies. Stress mindsets can have a long-lasting negative impact on teachers' behaviour and mental health and may thus lead to high levels of staff turnover (Kim et al., 2020). On the other hand, growth or creative mindsets, which refer to those mindsets in which the individual believes that their malleability and competence can be developed further, can positively influence self-efficacy and satisfaction (Puente-Díaz & Cavazos-Arroyo, 2017), as well as potentially predicting better problem-solving skills (Karwowski, 2014). Frondoza et al. explored the relationships between mindsets and teaching competence, emotions, and work engagement in a sample of 547 teachers. Teachers completed a mindset questionnaire regarding their teaching competences, job engagement, and negative emotions (anger, and anxiety). The results indicated that teachers who felt that their competence was modifiable perceived challenges as opportunities to

learn. The study also suggested that this belief was associated with improved emotions and higher enjoyment levels (Frondozo et al., 2020).

The Competence pathway reflects the impact of stress on teachers' practices and management skills, which may, in turn, impact students' disruptive behaviours and thus indirectly affect teachers' mental health. This pathway is based on the previously described SEC model, which demonstrates the maladaptive process whereby a teacher under pressure may use harsh and ill-considered approaches to control challenging behaviour, resulting in escalating disruptive behaviour and additional teacher stress (Jennings & Greenberg, 2009).

Finally, the Context pathway links stress levels to the school system and administrative support approaches. In 2010, England began shifting to a self-improving school system, exempting schools from following a top-down approach (Hargreaves, 2011, 2012). The government instead encouraged schools to become involved with research as well as to become academies, being funded by charities and companies rather than by local authorities, offering greater chances for schools to engage with research and improve their practice. Teachers' professional knowledge may be enhanced by engaging with educational research (Cain, 2015; Hammersley-Fletcher et al., 2015; Winch et al., 2015) which can help create a learning environment. However, such engagement should be carefully managed and facilitated by school leaders (Brown & Zhang, 2017; Waruwu et al., 2020; Zhang et al., 2017).

1.11.3 Teachers' responsibilities in schools and their links to stress

While any stressful work environment can contribute to serious health conditions such as cardiovascular diseases (Järvelin-Pasanen et al., 2018; Rosengren et al., 2004) and metabolic problems (Tenk et al., 2018; Watanabe et al., 2018), teachers are particularly exposed to high levels of stress due to their severe workloads (Skaalvik & Skaalvik, 2011). In the case of teaching, stressful work environments also drive higher rates of resignation and frequent absences, both of which are serious problems in many countries (Borman & Dowling, 2008; Carver-Thomas & Darling-Hammond, 2017).

Teachers in the UK have reported high levels of stress across several studies (Ravalier & Walsh, 2018; Skaalvik & Skaalvik, 2015), and about 20% of new teachers in England leave the profession within the first three years (Hayes, 2004). Teachers report many reasons for thinking about leaving their jobs, including workloads, time pressures, lack of supervisory support, lack of resources, stress, and student misbehaviour. In fact, teachers rate student misbehaviour as one of the greatest stressors within schools (Liu & Onwuegbuzie, 2012a; McCarthy et al., 2016; Skaalvik & Skaalvik, 2011). The use of this term may refer to any disruptive behaviours that interfere with the teaching process, and which thus may affect learning goals (Houghton et al., 1988). A meta-analysis investigated the relationship between student misbehaviour, such as disciplinary problems, inattention, and classroom disruption and the three aspects of teacher burnout across 19 studies, 11 of which included primary school teachers. Students' misbehaviour had the greatest impact on teachers' emotional exhaustion then depersonalization,

and then personal achievement. The meta-analysis concluded that there was a significant relation between students' misbehaviour and teacher burnout (Aloe et al., 2014)

Chang (2009) attributed the stress caused by students' misbehaviour mainly to teachers' own appraisals of such behaviour as related to the repeated negative feeling and emotions they experienced, which can, over time, cause burnout (Chang, 2009). Poor teacher appraisal of such behaviour can also negatively impact classroom environments (Avtgis & Rancer, 2008), affecting the personal relationships between the children and the teachers (Marzano et al., 2003), and negatively influence the ongoing behaviours of those children (Bru et al., 2002). Students spend much of their time in school, and children in primary school spend most of this time with their class teachers. The classroom environment is thus very important within the teaching and learning process, and stressed teachers can negatively affect the way students perform in the classroom (Roeser et al., 2013).

The relationship between teacher burnout and students' psychological wellbeing has also been assessed by measuring children's cortisol levels alongside the level of burnout in their teachers. The study showed that higher levels of teacher burnout were associated with higher levels of morning cortisol in children (Oberle & Schonert-Reichl, 2016); however, it should be noted that the study had a small sample size, with cortisol levels measured on only one occasion.

1.11.4 Relationships between teacher behaviour and child behaviour

Teachers' behaviour can influence students in the classroom and shape their behaviours. As noted in section 1.6.1 the SEC model by Jennings and Greenberg (2009) suggests that teachers' failure to respond to students' behaviours in the classroom can result in a downward spiral or burnout cascade that can intensify disruptive behaviour and prompt teachers to engage in punitive actions. Jennings and Greenberg (2009) also argue that students' academic achievement, and emotional and social competence are influenced for the better by the more positive classroom climate that can be created by teachers. Herman et al. (2018) explored the relationship between teacher stress and burnout and student achievement and disruptive behaviours in a cross-sectional trial of 121 teachers and 1,817 of their students aged 5-10 years old across nine primary schools. The teachers were asked to self-report their stress, burnout, coping skills, and self-efficacy using questionnaires, and also asked to complete an observational measure to rate students' disruptive behaviours, prosocial skills, and attention problems. The results showed that instructors who reported higher levels of stress, burnout, and inadequate coping skills were associated with children with greater levels of disruptive behaviour and low academic accomplishment. This association underpins the need to support teachers to avoid stress, as highlighted by Herman et al. (2020) and discussed further in section 1.11.2.

Students' disruptive behaviours can be also explained by the Antecedent-Behaviour-Consequence (ABC) model, introduced by Albert Ellis (Ellis & Grieger, 1986). This model was derived from the behavioural

approach, which suggests that behaviour is shaped by the environment (Skinner, 1935). The model thus examines the antecedents, behaviours, and consequences of behaviours, focusing on developing understanding of these three concepts as a way to generate a better understanding of unwanted behaviours in a manner that allows them to be addressed and improved upon (Ellis & Grieger, 1986; Kauffman et al., 2011; McKinney et al., 2005). The term antecedent refers to what happens before an unwanted behaviour, which may include anything that triggers the behaviour, including the setting, a given topic, or social situation. The term behaviour refers to the way a person behaves or responds to a specific situation. The term consequence refers to the outcome associated with the behaviour step, which may either positively or negatively reinforce the behaviour. Working on a long task, for example, can be the antecedent and may cause a child with ADHD to exhibit inappropriate behaviour in the classroom, such as wandering around and disrupting the class. Teachers can give the child a timeout as a consequence. This may reinforce the behaviour and make it more likely to occur again, as the time out will satisfy the demand of interrupting the concentration on the activity because the child with ADHD cannot handle extended tasks. Instead, the teacher could divide the task into small tasks with brief breaks in between, which is a consequence that will prevent that behaviour from happening again.

The ABC model allows psychologists, teachers and parents to analyse the environment in which unwanted behaviours occur to determine what may have triggered those behaviours, as well as to examine whether what happens

after such behaviour occurs tends to reinforce or inhibit the behaviour. Such analysis can provide better understanding and thus help in terms of building a hypothesis and testing it using measures of behaviour before, during, and after applying an intervention. This can also help with the formation of alternative behaviours based on changing the various antecedents and consequences (Ellis & Grieger, 1986; Haynes, 2012; Kauffman et al., 2011; McKinney et al., 2005). Teachers must determine the nature of children's behaviours, and the reasons why they misbehave. The ABC model, based on enabling teachers to functionally assess the antecedents and consequences that affect children most significantly, allows a framework to be developed that can help with identifying measurable dysfunctional behaviour and thus in designing suitable strategies to manage this. Functional behavioural analysis (Davis, 1998) suggests that children misbehave for four main reasons. The first is as a means of escape from undesirable tasks, whether these are tasks they cannot do or tasks they find easy but tedious. The second reason is to seek attention: children love attention, whether positive or negative, and any child who feels ignored in the classroom may seek attention from their peers and teachers by means such as making noises or moving in order to make their peers laugh or to attract the teacher's focus. The third reason for misbehaviour is to get access to a desired item or activity; an example of this might be a child roughly pushing a peer out of a queue in order to get to a slide first. Finally, some children also misbehave as a reaction to internal sensory stimulation: in particular, children with behavioural disorders may fidget and squirm in their

seats due to physical or mental discomfort, or they may shout out the answers to the teacher's questions because of their emotional disunity and lack of inhibition (Best & Miller, 2010; Nigg, 2000; Van Goozen et al., 2004)

The unwanted behaviours can be functionally analysed by teachers. Borgmeier et al. (2017) described Liza, a 9-year-old girl, who was identified by her teacher as being a student who exhibited disruptive behaviour. Her teacher used the ABC tracker, which is used to record what happened before, during, and after undesirable behaviour, to develop an understanding of the triggers of the behaviours. After recording five incidents, the teacher was able to summarise and describe the routine, noting that the situation usually occurred during writing time, and that the antecedent or trigger was when the teacher asked Liza to do a writing task. Finally, the behaviour involved rejecting the given task, shouting out disrespectfully, and leaving the classroom. The teacher had then tended to leave Liza alone, due to a need to focus on the rest of the class. As a result of the functional analysis, the teacher attempted to regulate Liza's undesirable behaviour by better meeting her academic needs (Borgmeier et al., 2017). In order to control misbehaviour, teachers must clearly comprehend the underlying causes. Disruptive behaviour can then potentially be avoided before it occurs, and the volume of externalising behaviours seen in the classroom may thus be reduced.

1.12 Interventions and the importance of teachers

Although ADHD symptoms can affect educational achievement (Birchwood & Daley, 2012; Frazier et al., 2007; Martin, 2012) and social development, teachers are still expected to meet all of these students' relevant academic and social needs (Jennings & Greenberg, 2009). This is a necessary consequence of the fact that students spend more than 14,000 hours of their lives in school (Bridget & Robert, 2010; Hamre & Pianta, 2010; Long, 2021), which in primary school in particular means that this time is spent with the classroom teacher. This has led to the belief that the use of preventative or early interventions by teachers, targeting young children with or at risk of developing ADHD, may change the trajectory of the disorder, reducing any ongoing adverse effects (Halperin & Healey, 2011; Sonuga-Barke et al., 2013). Previous research has thus focused on developing early interventions for children to be applied before the emergence of adverse effects such as emotional stress, social problems (Daley et al., 2014), comorbid disorders (Jensen & Steinhausen, 2014), and academic underachievement (Birchwood & Daley, 2012; Frazier et al., 2007; Martin, 2012), based on the premise that adverse effects may act as a barrier to interventions later on. Teachers' knowledge and experience in early years settings may not only help to reduce and prevent some disruptive behaviours in the classroom, but also aid in the early detection and referral of ADHD cases (NICE, 2018).

Feil et al (2016) conducted a randomised controlled trial examining the First Step to Success Intervention, which targeted the parents and teachers of children aged 3 to 5 years who displayed externalising problems. The results

were drawn from teacher and parent reports, and these suggested that the programme improved children's social skills and decreased the incidence of behavioural problems (Feil et al., 2016). Based on this, teachers should be trained on strategies for dealing with children with externalising behaviours. However, while classroom management can significantly improve a teacher's ability to manage the classroom and may consequently improve children's behaviours (DuPaul et al., 2012; Gaastra et al., 2016, 2020; Purdie et al., 2002), teachers in the UK are still not systematically trained in the use of the appropriate strategies (NICE, 2018).

Teachers face several challenges when teaching children with ADHD in preschool settings, as they need to successfully motivate these children and teach them the necessary social skills for school in order to increase their likelihood of academic achievement (Singh & Squires, 2014). Facilitating teachers' work in this regard is thus crucial to increasing teacher competence by preparing them to face these additional job demands, as highlighted by the Transactional Model of Stress (Lazarus & Folkman, 1987). A reduction in teachers' stress in the classroom environment should also help promote teacher-child relationships, which may potentially enhance student behaviour, as suggested by the SEC model (Jennings & Greenberg, 2009). Providing teachers with the strategies and knowledge to handle children with externalised behaviour issues should thus both facilitate the educational process and improve teacher-student relationships.

1.12.1 Teachers' psychological wellbeing

Teacher psychological wellbeing refers to the subjective evaluation of teachers' positive emotional experiences and their overall sense of satisfaction and fulfilment with their work with the absence of stress and worrying emotions (Diener & Ryan, 2009; Gross & Muñoz, 1995; Ryan & Deci, 2001). 'Hedonic' which means enjoyment and pleasure, and 'eudaimonic' which means self-worth and fulfilment are two distinct but complementary approaches used in understanding psychological wellbeing (Gross & Muñoz, 1995; Ryan & Deci, 2001). Failure to find enjoyment in everyday activities and low self-worth are associated with depression and it can be argued that emotional disorders are indicative of a lower sense of wellbeing. However, wellbeing is conceptualised as more than the absence of depression or anxiety (Gallagher & Lopez, 2009).

Strategies that address both hedonic and eudaimonic factors, such as promoting coping strategies that support emotional wellbeing and a sense of self-efficacy, can lead to greater psychological wellbeing (pleasure and self-fulfillment). Previous studies have examined the effect of teachers' skills on both teacher and child performance (Brunsek et al., 2020; Early et al., 2006; Kelley & Camilli, 2007; Syslová, 2019). However, the effect of teachers' skills on teacher wellbeing still requires further investigation. Supporting teachers' wellbeing is crucial as poorer coping is associated with higher levels of stress (Lazarus & Folkman, 1987) which can negatively impact the classroom environment (Jennings & Greenberg, 2009). This can, in turn, affect student

behaviour and overall academic performance (Ervasti et al., 2012; Haynes et al., 1997; Rothì et al., 2008).

According to Ryff & Keyes (1995), psychological wellbeing consists of six dimensions: Autonomy refers to the self-governance and independency; Environmental Mastery refers to the ability to successfully control your environment; Positive relationships with others refers to the ability to interact with others and build close relationships with compassion and affection; Personal growth refers to the ability to keep personally growing and developing new skills; Purpose in life refers to the person feeling that they have goals in life; Self-acceptance refers to having a positive attitude towards oneself (Ryff & Keyes, 1995).

Previous studies had examined the effect of teachers skills on teachers and child performance (Brunsek et al., 2020; Early et al., 2006; Kelley & Camilli, 2007; Syslová, 2019). However, the effect of teachers skills on teachers wellbeing still need to be investigated. Supporting teachers' wellbeing is crucial as low teachers' stress can negatively impact the classroom environment (Jennings & Greenberg, 2009) which in turn can affect students behaviour and academic performance (Ervasti et al., 2012; Haynes et al., 1997; Rothì et al., 2008).

1.12.2 Teacher self-efficacy and its effects on performance, wellbeing, and children's outcomes

The concept of self-efficacy refers to an individual's beliefs about their own ability to meet their goals (Bandura, 1977; Bandura, 1986). The concept of self-efficacy has been linked to hedonic wellbeing as individuals with high

self-efficacy in teaching will experience achievement and sense of satisfaction (Lipińska-Grobelyny & Narska, 2021). Self-efficacy was also linked to eudemonic psychological wellbeing as individuals with high self-efficacy tend to experience greater confidence, which can reflect positively on teachers' performance in the classroom and may lead to better students' academic outcomes (Lipińska-Grobelyny & Narska, 2021). The concept of self-efficacy was also linked to the six dimensions of psychological wellbeing (Jerusalem & Schwarzer, 1992). Bentea (2017) examined the relationship between self-efficacy and psychological wellbeing in 217 teachers using the Teacher Self-Efficacy Scale (Schwarzer & Hallum, 2008). The results showed that teachers' sense of self-efficacy correlates negatively with exhaustion and positively with the six dimensions of wellbeing (Bentea, 2017).

Self-motivation and the likelihood of success regarding personal goals are influenced by self-evaluation and a person's confidence in their own abilities: teachers must thus be aware of their own competence in order to enable positive engagement and performance in class, in a way that impacts all learners in the classroom; even those who are more challenging to teach (Armor, 1976). However, many teachers' specific self-efficacy regarding students with learning or behavioural needs is lower than that with respect to typically developing students (Hosford & O'Sullivan, 2016).

Teacher and child relationships are dyadic in nature and can, at their best, contribute to both student success and teacher wellbeing. It has been suggested that teachers' self-efficacy regarding the use of classroom

management strategies can influence student motivation and the likelihood of those students achieving various goals (Alexander, 2020). Conversely, student misbehaviour can negatively affect teacher self-efficacy (Aloe et al., 2014). One study (Engin, 2020) examined 1,476 children and 60 teachers to determine if motivation levels of students vary according to teachers' motivation, and teachers' self-efficacy. The study indicated that teachers with high self-efficacy had higher motivation with regard to both classroom responsibilities and educational goals, and higher student motivation and academic achievement (Engin, 2020). Improved teacher self-efficacy was also found to enhance children's social skills (Hu et al., 2021), to reduce conflict between teachers and students (Hajovsky et al., 2020), and to increase teachers' wellbeing (Huang et al., 2019; Spilt et al., 2011).

1.12.3 Teacher-child relationships and stress

Teaching young children is emotionally demanding and can increase the risk of teacher stress (Jeon et al., 2016); in particular, a lack of support and control in schools is considered by many teachers to be a further stressor in such cases (Jeon et al., 2016; Wagner et al., 2013). Certain teaching roles can also promote negative emotions and feelings, such as frustration, guilt, and anxiety (Clipa & Boghean, 2015; Madrid & Dunn-Kenney, 2010).

Teachers' negative perceptions of behaviour problems, and teacher-student relationships are positively associated with teacher stress (Aldrup et al., 2018). Students with externalising problems are more likely to have high levels of conflict with their teachers (Crockett et al., 2018; Doumen et al., 2008), which can create high levels of stress in teachers (Gagnon et al., 2019;

S Yoon, 2002) that may interfere with student academic performance, triggering further disruptive behaviour (Vandenbroucke et al., 2018). Additionally, stressed teachers may have trouble forming relationships with such children.

Teachers further reported managing disruptive behaviours to be one of the main stressors they experienced in schools (Houghton et al., 1988; Thompson, 2009). Abdin and Robinson (2002) applied the teaching stress process model to emphasise the importance of teacher interactions with children's specific challenging behaviours as a major source of stress. Conflict in such relationships can also impact teaching stress significantly (Gagnon et al., 2019), while positive and warm relationships can reduce teachers' stress (Gallup, 2014). Problem-focused coping strategies within the Transactional Model of Stress and Coping as discussed in section 1.11.1 may provide one solution by supporting the development of teacher competency with regard to classroom strategies, which may reduce the impact of specific behaviours in the classroom (Lazarus & Folkman, 1987). This supports the idea that teachers respond to stressors based on their coping capacity, vulnerability, and personal appraisal of the situation (Pines, 2002; Spilt et al., 2011), all of which can have an impact on their understanding, which in turn may enable them to reshape and modify children's behaviours.

Children with behaviour problems can find it difficult to form alliances with teachers, which can result in inferior student-teacher relationships. Some studies suggest that a cycle of educational disadvantage may emerge,

whereby poor teacher-student relationships can increase the level of stress for the teacher (Herman et al., 2018) which, in turn, may escalate disruptive behaviours in children (Jennings & Greenberg, 2009). This negative relationship may also impact cognitive processing and worsen academic and behavioural problems in such children (Vandenbroucke et al., 2018). This was also highlighted in a recent systematic review including 5,311 teachers and 50,616 children over 14 studies, four of which implemented longitudinal designs among primary school children. The review provided further evidence that teacher stress and burnout can impact student academic achievement and motivation as well as triggering further disruptive behaviour (Madigan & Kim, 2021). In contrast, a good teacher-student relationship has been suggested to positively influence job satisfaction (Veldman et al., 2013).

Teacher-student relationships can foster feelings of self-worth, motivation, and respect (Furrer & Skinner, 2003; Hamre & Pianta, 2001). Externalising behaviour in children can negatively affect this relationship (Doumen et al., 2008). Therefore, teachers' roles require them to modify the classroom climate to meet the needs of all children in the classroom including those with ADHD symptoms. For example, teachers must provide those students with ADHD symptoms with some degree of choice and provide rationale when choice is limited, validate students' perspectives, and avoid controlling language when teaching (Rogers & Tannock, 2018).

Ward et al. (2017) interviewed 19 primary school teachers with experience working with ADHD students in the United Kingdom. The

studies suggest that teachers need to be prepared to deal with a wide range of student problems in order to meet the emotional and behavioural needs of their students. Positive teacher-student relationships are essential and can contribute to a positive classroom environment. The study concluded that knowledge, resources, and self-efficacy are needed for teachers in order to help students with ADHD symptoms learn and thrive and improve their behaviours (Ward et al., 2021).

Students' challenging behaviours can create stressful situations for teachers, and their stress in turn may hinder any effective use of classroom management techniques (Li-Grining et al., 2010). Thus, interventions targeting classroom management may seek to both reduce teacher stress and improve teacher-child relationships, thus contributing to teachers' wellbeing (Sandilos et al., 2018; Zhai et al., 2010), job satisfaction (Koomen et al., 2006; Toropova et al., 2021), and stress management (O'Connor, 2008; Sandilos et al., 2018; Spilt et al., 2011).

1.13 Argument for interventions in early years settings

As previously stated, the DSM-5 states that ADHD can be diagnosed in children as young as four years, or, in other words, during preschool (American Psychiatric Association, 2013). By the age of 8 years, a great deal of self-control is expected (Keown, 2011), suggesting that early indications of ADHD must be successfully treated promptly to avoid ongoing social and academic difficulties (DuPaul & Stoner, 2014). Early intervention in children aged 3 to 6 years has proven to be beneficial for children with ADHD (DuPaul et al., 2015),

being useful in both mitigating social problems (Grygiel et al., 2014) and handling academic challenges in youngsters (Lambez et al., 2020; NICE, 2018). A more in-depth discussion of these factors will be examined in Study 2 of this thesis (Chapter 3).

1.14 Knowledge gap

Children spend more than 14,000 hours of their lives in school according to The School Day and Year , House of Commons report (Bridget & Robert, 2010; Hamre & Pianta, 2010; Long, 2021) and early years children spend most of their time with their individual classroom teacher. Teaching in general is considered a stressful job (Jeon et al., 2016), and teachers themselves consider managing disruptive behaviour to be one of the main factors contributing to such stress frequently. Therefore, excessive stress may be caused by interacting with just one child with challenging behaviour in a classroom (Abidin & Robinson, 2002), though the resulting stress can impact teacher-child relationships across the classroom (Gallup, 2014) causing conflict that may hinder the development of warmth between the teacher and the child (Gagnon et al., 2019). Teachers' social and emotional competency and self-efficacy may also impact their behaviours toward such children, and it has been noted that "stressed-out teachers tend to have stressed-out students" (Schonert-Reichl, 2017, p. 137), which may result in poorer academic attainment.

In addition to these factors, a lack of resources in schools can contribute to increasing teachers' stress (Jeon et al., 2016; Wagner et al., 2013). Teacher

training is one of the most limited resources in many schools, despite the Transactional Model of Stress and Coping suggesting that problem-focused coping can help with building competency for teachers, and that this can impact positively on the experiences of both teachers and students with behavioural problems.

To develop understanding of ADHD in schools, this thesis seeks to explore the effectiveness of teacher-delivered interventions in support of children with externalising behaviours in schools, with the focus being on teacher and child outcomes based on the application of classroom management strategies. This is important as, thus far, the majority of teacher interventions for children with ADHD have involved increasing teachers' knowledge (Aguiar et al., 2014; Syed & Hussein, 2010; Ward et al., 2020). This thesis also attempts to give a voice to early years teachers working with children aged 4 to 8 years, seeking their understanding of their experiences and discussing the unmet needs of children at risk of ADHD in the UK. The thesis draws on the suggestion by Moore (2017) that more qualitative research is needed to understand the needs and experiences of teachers of children with ADHD in the UK (Moore et al., 2017). Building on this exploratory work, a brief intervention will then be adapted and modified to address various barriers to success and to support teachers and children with ADHD and behavioural problems in early years settings. The feasibility and acceptability of this brief intervention among teachers will be assessed in preparation for an RCT in future studies.

1.15 Thesis aim

The overarching aim of this thesis is to determine the feasibility and acceptability of a digital intervention to help primary school teachers support children with ADHD symptoms in the classroom. The thesis also aimed to provide preliminary evidence of the perceived effectiveness of digital interventions in decreasing teachers' stress and improving children's outcomes. The overall doctoral project was divided into four studies to accomplish the thesis aim. The first, a systematic review and meta-analysis (Chapter 2), was conducted to explore the potential of teacher-delivered interventions using classroom management strategies to support teachers and children with externalising problems in schools.

Study two (Chapter 3) then used reflexive thematic analysis (Braun & Clarke, 2006, 2014) to determine the recurring patterns in semi-structured interviews exploring teachers' experiences and needs regarding children with ADHD symptoms. The knowledge gained was used in study three (Chapter 4) to help inform the content of a brief intervention adapted to support teachers of children between 4 and 8 years old with ADHD symptoms. Study three (Chapter 5) used a qualitative method to explore the feasibility, acceptability, and perceived effectiveness of the ADHD Behavior Toolbox application (Erickson, 2022) on children with ADHD symptoms. Study 4 is a pre-post, single arm study evaluating the initial effectiveness of the ADHD Behaviour Toolbox in promoting teacher self-efficacy and mental wellbeing and reducing externalising behaviour in the target child with ADHD symptoms. This study aimed to test implementation, sample size, power calculation, measures,

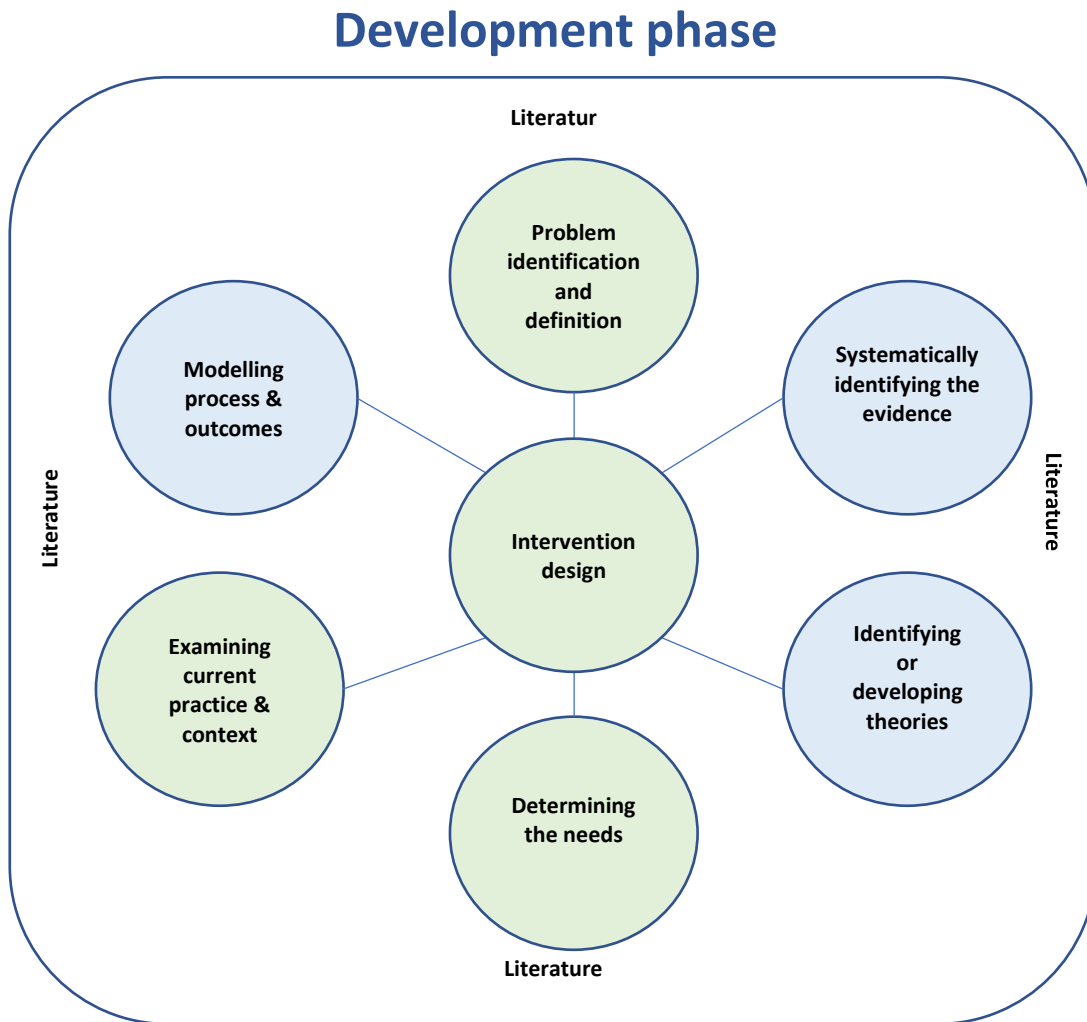
procedure, and inclusion criteria in preparation for an RCT. However, it was not possible to conduct study four due to the Covid-19 pandemic (see Appendix 2) and the restrictions imposed on schools. Consequently, only the protocol is presented in Chapter 5.

1.16 Medical Research Council frameworks MRC for developing and evaluating complex interventions

This thesis was guided by The Medical Research Council (MRC) framework for evaluating and implementing complex interventions (Craig et al., 2008; MRC, 2000; Skivington et al., 2021) which is a commonly recognised and updated set of reliable and rigorous guidelines for assessing complex health interventions. The MRC framework consists of four non-linear phases: development and identification, feasibility and piloting, evaluation, and implementation. The framework can be used iteratively to ensure a continuum of increasing evidence. This thesis focused on the first two phases of the MRC guidelines in preparation for an RCT to evaluate efficacy of the adapted intervention in future studies.

The comprehensive model of Bleijenberg (Bleijenberg et al., 2018) was applied in the literature review and systematic review, see Figure 1. This model added more detail to the MRC framework for evaluating complex interventions in the development and identifying phase. The model uses the core elements of the MRC framework and adds three aspects to it: problem identification, determining the needs, and exploring the current context. These serve to enrich the development phase and reduce research waste.

Figure 1: The comprehensive model of Bleijenberg



Note: Green colour represents the MRC framework for evaluating complex intervention steps, the blue colour is the additional steps (Bleijenberg et al., 2018)

1.17 Study methodology

This PhD follows the epistemological position of the social constructivism approach and offers a greater voice to the participating teachers. Social constructivism implies that there are multiple realities, and in the context of the qualitative investigations presented in thesis, the reality is

co-constructed by the researcher and the participants based on their social experiences and viewpoints (Kim, 2001). This implies a co-construction of reality between the researcher and the participants. Therefore, it was important to use a reflexive approach by reflecting on the researcher's experience, personal life, and ethos to help the reader comprehend the interpretation of the findings of the qualitative studies in this thesis (Dodgson, 2019; Jootun et al., 2009).

Originally, in the third study, we adopted a pragmatic approach, initially intending to apply qualitative and quantitative methods in a useful manner in a feasibility study. The pragmatic approach offers a practical way to develop the answers to a research question (Creswell, 2003; Johnstone, 2004; Pawson & Tilley, 2001) across both positivism and interpretivism (Bhaskar, 2016). This epistemological position also permits seeking for critical realism in terms of answering the research question based on integrating a variety of measurable and non-measurable dimensions. Although some researchers have argued that it is not possible to combine both qualitative and quantitative methods due to their inherent differences (Ford-Gilboe et al., 1995), it is now more widely accepted that, done carefully, such moves can create a more nuanced and balanced epistemological position (Creamer, 2018; McEvoy & Richards, 2006). However, due to the challenges of conducting research during a global pandemic, the mixed study ethical approval was amended to a qualitative feasibility study. As such, the primary research in this thesis is solely

qualitative. However a feasibility quantitative protocol is presented in (Chapter 5).

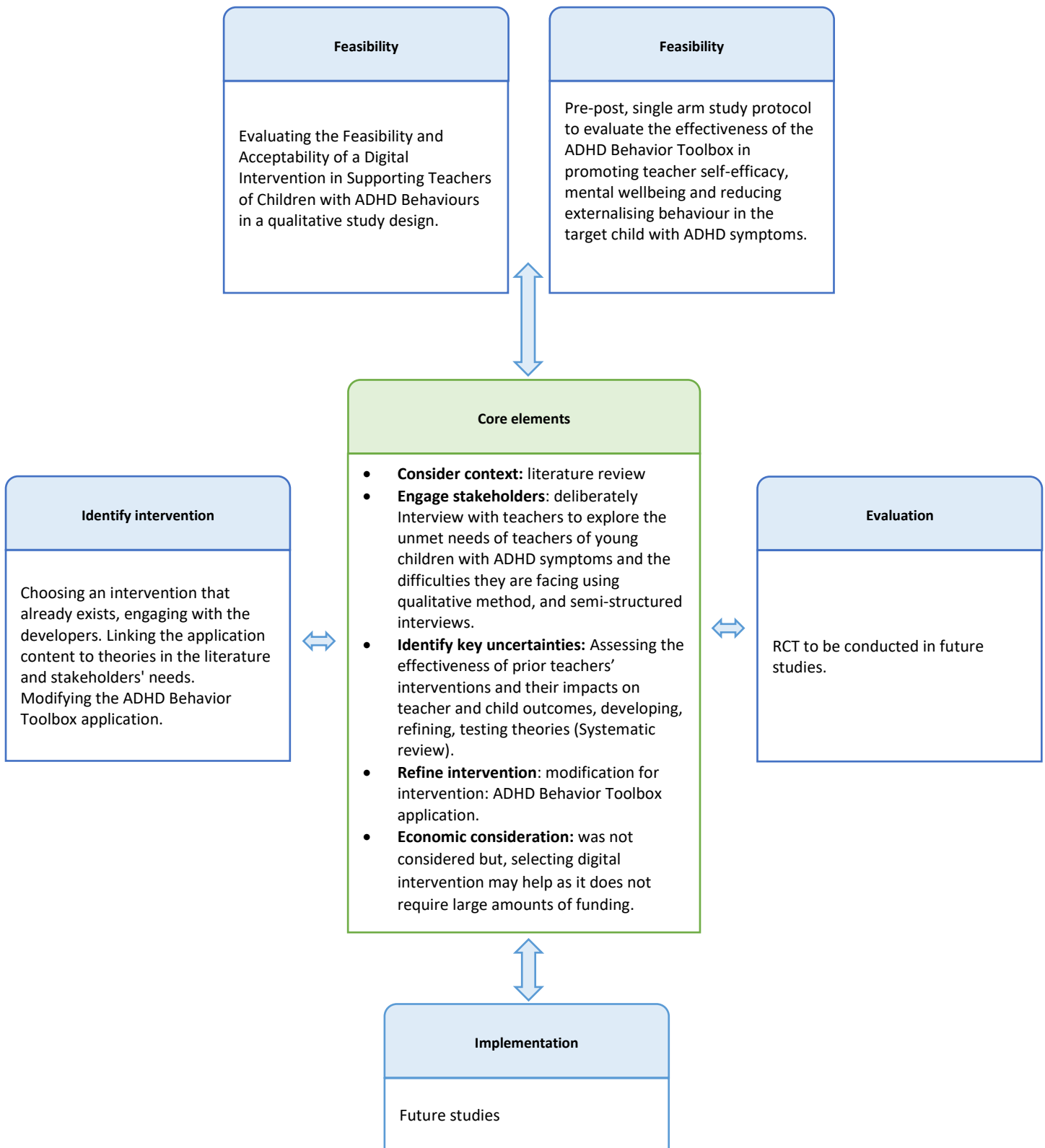
1.18 Project plan

The ADHD Behavior Toolbox application is a complex intervention which consists of multiple components that can interact and produce various outcomes (Skivington et al., 2021). It aims to help teachers and children with ADHD symptoms by providing strategies for a range of behaviours with the intention of enhancing child behaviour and teacher competence. This thesis aims to evaluate the ADHD Behavior Toolbox application following the MRC framework for complex interventions (Craig et al., 2008; Skivington et al., 2021), and the comprehensive model of Bleijenberg (Bleijenberg et al., 2018) as follows:

1. A literature review focused on identifying the problem, determining the needs, considering the setting of children with ADHD and teachers, and reviewing some of the theories that can help teachers support children with behavioural problems to reduce teachers' stress.
2. A systematic review and meta-analysis to assess the effectiveness and impact of previous teacher interventions for children with externalising behaviours to identify key uncertainties and establish an evidence base for interventions with teachers and investigate previous interventions and potential outcomes.
3. Teachers' interviews to learn about teachers' experiences, challenges, and unmet needs when educating students with ADHD behaviours.

4. A process of refinement and adjustment of the application in line with the ABC model (Ellis & Grieger, 1986), the 3C model (Herman et al., 2020), and the Transactional Model of Stress and coping (Lazarus & Folkman, 1987) and based on identified teacher needs and requirements
5. A qualitative examination of the feasibility and acceptability of the ADHD Behavior Toolbox application.
6. A study protocol for a feasibility study to determine whether and how the application can be evaluated effectively by utilising it with teachers and assessing participant recruitment methods, measures, potential outcomes, effectiveness in enhancing teachers' wellbeing and children's behaviours using quantitative data in preparation for a larger RCT. Figure 2 illustrates how the thesis maps onto the core elements of the MRC framework.

Figure 2: Phases of the MRC Framework for Evaluation of Complex Interventions



Note: The Figure was adapted from the latest MRC framework (Skivington et al., 2021)

Chapter 2: Systematic Review and Meta-Analysis of the Effectiveness of Teacher Delivered Interventions for Externalising Behaviours (Published)



Reem Aldabbagh Systematic Review and Meta analysis.pdf

2.1 Intergation section

The review found that teacher-mediated interventions for children with externalising behaviors have a positive impact on both teachers and children. The interventions were found to be beneficial for improving teacher-child closeness, and reducing teacher-child conflict. Building a good relationship is key for both teacher and child, as children's challenging behaviours are considered a stressor for teachers, which may hinder the use of classroom management strategies (Li-Grining et al., 2010), and can lead to increased teacher stress and increase the child's disruptive behaviours (Jennings & Greenberg, 2009). Accordingly, efforts to increase teacher competency may provide teachers with strategies that focus on strengthening the relationship between teachers and children in an effort to create a healthy environment in the classroom which can help to break the loop that is driving the child's disruptive behaviour (Herman et al., 2020).

The self-efficacy effect analysis was conducted for the thesis but was not included in the published version of the systematic review as it contains only four studies. All of them were self-reported measures, all of which were MPROX. The analysis revealed moderate and significant impact of

intervention on teacher's self-efficacy regarding classroom management and instructional strategies. Heterogeneity among the included studies was small as 3 of the studies are used the same TSES measure (see Figure 3).

The overall effect was medium (0.5) and significant. Self-efficacy is a factor that can contribute to wellbeing, as it refers to an individual's belief in their own ability to succeed in a particular situation or task (Lipińska-Grobelny & Narska, 2021).

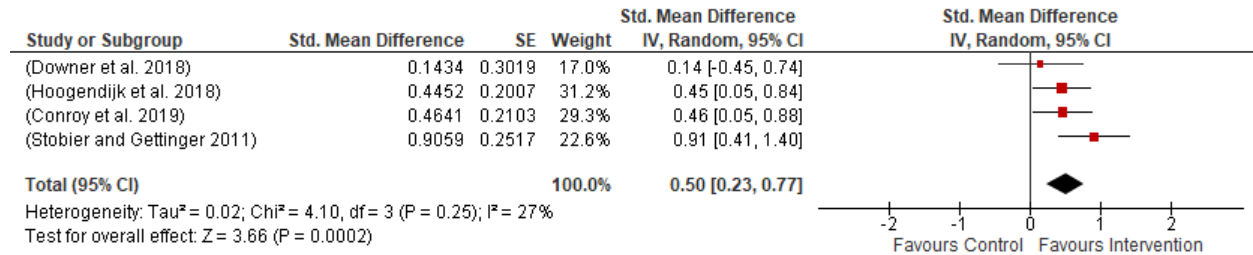
There were only two digital interventions in this review which highlights a gap that needs to be investigated further, more specifically, it highlights a need for the development and evaluation of more digital interventions.

The thesis builds on review findings by exploring teachers' views and needs in a qualitative interview study with teachers of children with ADHD symptoms who are aged between four and eight years old.

It should be noted that the term wellbeing was not included in the search terms for this systematic review, instead self-efficacy was used. It is suggested that high levels of teacher self-efficacy in classroom management can reduce teachers' emotional exhaustion and reduce externalising behaviours in the classroom (Dicke et al., 2014; Pas et al., 2010; Tsouloupas et al., 2010), due to the ability to set and achieve goals, overcome challenges, and feel a greater sense of control in challenging situations. Self-efficacy can influence an individual's beliefs, behaviours, and emotional experiences, all of which can affect overall wellbeing (Zee et al., 2016). Therefore, increasing teachers'

competency can contribute to reducing teacher stress and reducing disruptive behaviours in children (Herman et al., 2020).

Figure 3: Teachers' self-efficacy



2.2 Search terms

Ovid (Embase 1974- present, MEDLINE 1946-present, PsycINFO, PsycARTICLES)

1. ADHD
2. "externalising behaviour"
3. (externali* adj2 behav*)
4. "externalizing behavior"
5. "attention deficit".mp.
6. "attention deficit hyperactivity disorder".
7. "hyperactivity"
8. "behavio#r problem"
9. "behavior* problem"
10. "behaviour* problem*"
11. "Challeng* behavior*"
12. "Challeng* behaviour*"
13. 1 or 2 or 3 or 4 or 5 or 6 or 7 or 8 or 9 or 10 or 11 or 12
14. "teacher* assessing"
15. "teacher* education"
16. "teacher* intervention"
17. "teacher* psychoeducation"
18. psychoeducation
19. "school* base* intervention"
20. "behaviour* modification"
21. "behavior* modification"
22. "teacher* training"
23. "taeche* program"
24. "training teacher*"
25. "teacher* coach*"
26. 14 or 15 or 16 or 17 or 18 or 19 or 20 or 21 or 22 or 23 or 24 or 25

- 27. 13 and 26
- 28. effect*.mp.
- 29. "teacher* awareness"
- 30. "teacher self efficacy"
- 31. "teacher* knowledge"
- 32. "student* achievement"
- 33. "behaviour* change"
- 34. "behavior* change"
- 35. "symptoms reduc*"
- 36. "behaviour* improve*"
- 37. "behavior* improve*"
- 38. 28 or 29 or 30 or 31 or 32 or 33 or 34 or 35 or 36 or 37
- 39. 27 and 38
- 40. limit 39 to "all child (0 to 18 years)"
- 41. limit 40 to english language
- 42. limit 41 to humans

Web of Science:

(teacher* education OR teacher* assessing OR teacher* help OR teacher* training OR teacher* psychoeducation OR school based OR teacher* intervention OR teacher* program OR teacher* support* self efficacy OR Teacher* confident OR teacher* knowledge OR teacher* awareness OR behaviour* improvement OR behavior* improvement OR behaviour* development OR behavior* development OR Student* achievement OR student* attainment OR student* performance OR academic performance)
 (ADHD OR at risk of ADHD OR attention deficit OR attention deficit hyperactivity disorder OR hyperactivity OR challenging behaviour* OR challenging behavior* OR behavior* problem OR behaviour* problem)

Chapter 3: Exploring the unmet needs of teachers of young children with ADHD symptoms: A qualitative study

3.1 Chapter Introduction

Chapter 2 presented the systematic review and meta-analysis, establishing that teacher-delivered interventions have positive effects in terms of reducing children's behavioural problems, as well as enhancing teachers' positive behaviours and relationships with children with ADHD symptoms. This supports teacher interventions' effectiveness and significance in terms of supporting teachers of children with ADHD symptoms. Accordingly, this chapter qualitatively assess teachers' views gathered using semi-structured interviews, to enable exploration of teachers' experiences and unfulfilled needs regarding children with ADHD symptoms and classroom management. It will explore how supporting children with ADHD symptoms may affect their wellbeing and what assistance they believe they need, alongside their current level of support. A greater understanding of these issues is essential to provide teachers with appropriate support to enhance their classroom management abilities for children with ADHD symptoms.

3.2 Introduction

3.1.1 Impact of ADHD symptoms on teachers' wellbeing

Teachers play an essential role in forming a conducive and positive classroom environment (Bridget & Robert, 2010; Jennings & Greenberg, 2009), but they often suffer from stress and negative emotions due to various

work-related factors (Fernet et al., 2012; Klassen & Chiu, 2011; Skaalvik & Skaalvik, 2011). It was noted previously in Chapter 1 that children with ADHD symptoms typically demonstrate challenging behaviours in the classroom setting. Herman et al. (2020) introduced the 3C Theory of Teacher Stress, which links students' disruptive behaviour to teachers' stress. A tense or hostile classroom environment poses risks to children's emotional and academic development (Hamre & Pianta, 2006), which can lead to a cycle of disadvantage for the teacher and the child. Despite the important role of teachers in students' lives (Sherman et al., 2008), teachers usually struggle with supporting and educating those children due to the classroom disruption (Herman et al., 2017), which can often interrupt and interfere with the teaching process. A qualitative study in the US with teachers who had left teaching found that the challenges of maintaining discipline and handling challenging behaviour were perceived as significant factors contributing to their decision not to return to teaching (Gonzalez et al., 2008).

A meta-analysis exploring the relationship between students' misbehaviour and teachers' burnout indicated a significant effect on teachers' sense of personal accomplishment, depersonalisation, and emotional exhaustion (Aloe et al., 2014). Prolonged feelings of daily stress can negatively impact wellbeing (Lazarus & Folkman, 1987).

3.2.1 The role of stress on functioning and coping

As previously discussed in Chapter 1, this study will apply the Transactional Model of Stress and Coping (Lazarus & Folkman, 1987), to help explore teachers' experiences and emotions regarding teaching children with

high levels of ADHD symptoms and their perceptions of any unmet needs, given the daily stress teachers face at work. Balancing the demands placed on teachers with the practical and emotional resources to manage those demands can help in building resilience to stress to alleviate daily stress for teachers while also ensuring a good learning environment for children. This study will explore teachers' views regarding what they need in order to feel confident in using an intervention that can help them support children and enjoy their work.

3.2.2 Evidence for the best time to deliver school-based interventions

Interventions aimed at preventing or alleviating behavioural problems before they develop or cause aggravation in the classroom are crucial in early years schools. Early school-based intervention to prevent the accumulating effects of stigma and educational deficits is key to breaking the cycle of disadvantage for children (see Chapter 1) According to the DSM-5, the minimum diagnostic age for ADHD is four years (American Psychiatric Association, 2013), which is the time when the risk usually emerges during the preschool period (Doepfner et al., 2004). At age eight years children start Key Stage 2, a stage at which the school increasingly demands self-regulation skills from children (Keown, 2011). Thus, the period from age four to eight years is a very crucial developmental phase that starts with the possibility of ADHD symptoms emerging (Doepfner et al., 2004) and the expectation of showing school readiness (Campbell et al., 2000), and ends with the transition to Key Stage 2 (Keown, 2011). Effective management of early emerging symptoms in young children with ADHD symptoms is important to prevent

adverse social and academic adverse effects (DuPaul & Stoner, 2014). DuPaul et al. (2015) tested the hypothesis that pre-academic skills in reading and maths would increase if the behaviour of children with ADHD changed in response to early psychosocial intervention provided for children and parents. The research has demonstrated the benefits of early intervention in young children rated by teachers and parents using the Conners Rating Scales-Revised and meeting ADHD criteria at aged three to six years old after 12 and 24 months of the psychological intervention. Compared to the 16 children in the control group, the 26 children allocated to the intervention had improvements in both pre-academic skills and ADHD and ODD symptoms (DuPaul et al., 2015).

Children with ADHD often face more rejection and difficulties in their relationships with peers and teachers than typically developing children (Grygiel et al., 2014). Early intervention can help them in improving their social skills. The effectiveness of teachers' interventions on children aged between three and eight years was examined by providing a behaviour management program supported by coaching and providing feedback for teachers. The results indicated an increase in children's social skills and concentration, while also showing a reduction in disruptive behaviour. The result also indicated an increase in teachers' use of positive strategies towards at-risk children (Reinke et al., 2014).

The PATCHWORK study qualitatively investigated the feasibility of 'PArents, Teachers and CHildren WORKing Together' and interviewed parents

and teachers about a range of strategies aiming to help children with ADHD from ages four to eight years old (Sayal et al., 2012). The qualitative research confirmed the acceptability of PATCHWORK for parents and teachers of children aged between four and eight years old; however, that intervention was primarily aimed at parents, and there was less understanding of teachers' need for support. Some teachers complained that they did not learn anything new, while others were interested in learning some strategies from the intervention (Taylor et al., 2015). It is clear that teachers' interventions can be effective; however, it is important to consider teachers' experiences and unmet needs, which is the focus of this study.

3.3 Research Question

How do teachers describe their experience with children with ADHD symptoms and how do they feel about the demands of managing children with ADHD? How do they perceive these demands, and what do they require to meet their unmet support needs?

3.4 Research Aim

This study aims to understand teachers' experiences of teaching children with ADHD symptoms and their unmet needs for support. It also looks at how teachers respond to children with ADHD symptoms, the emotional impact for teachers of managing symptoms of inattention and hyperactivity in the classroom, and the current support provided. Finally, the study explores views on the optimal way to deliver support to teachers of children with ADHD symptoms.

3.5 Method

3.5.1 Design & Justification

This qualitative study uses semi-structured interviews to explore teachers' experiences and unmet needs with regards to managing children at risk of ADHD. This study focused solely on qualitative data to help in providing a rich exploration and meaningful view of participants' perspectives (Boyatzis, 1998; Braun & Clarke, 2019). This understanding is important to the development of interventions to enhance the management skills of teachers of children with ADHD symptoms in the classroom.

The study design will allow in-depth exploration of teachers' experiences when working with children with ADHD: how this can affect them, what support they feel they need, and the level of support currently provided. For this study, reflexive thematic analysis was appropriate as it is suitable for inductively analysing data for exploratory research that focus on people's experience and views. The role of the researcher's subjectivity in the data analysis process is emphasised in reflexive thematic analysis, enabling the researcher to engage in critical self-reflection in each step of the data analysis. It allows the formation of themes from data while encouraging reflexivity to acknowledge the bias that can influence the interpretation of the data (Braun & Clarke, 2019).

3.5.2 Materials:

An interview schedule was developed to help guide the interviewer (see Appendix 3) which enabled the researcher to gather data about teachers of children with ADHD symptoms in terms of their unmet needs and experience.

In the beginning, the researcher introduced herself to teachers as a PhD student within the Division of Psychiatry & Applied Psychology, School of Medicine, University of Nottingham. She also mentioned that she had previously worked as a teacher at a school in Key Stage 1, before deciding to take a Master's degree in special education and behaviour support and soon after working on a 1:1 level with children with ADHD and autism.

The interview schedule comprised four semi-structured questions focused on teachers' experiences with children with ADHD symptoms, including their approach to responding to these behaviours. The interview questions were developed by identifying the research topic and purpose and creating an interview guide by asking open-ended questions followed by prompts to encourage the participant to provide further information (Rubin & Rubin, 2011). To help participants speak openly and freely and use prompts in way that can help to clarify the answers, the conversational approach was used (Kvale & Brinkmann, 2009). This approach involves starting with a general conversation and asking some general questions before moving on to more specific ones. This approach helps in building a rapport with participants and allows them to openly express their concerns and needs. The questions allow participants to share their personal experiences and perspectives regarding children with ADHD symptoms and their unmet need for support. The questions also focus on the current resources for teachers that can support managing these behaviours and explores any unmet needs that teachers described. The interview schedule was developed in collaboration

with an expert on ADHD interventions (DD). It was piloted with an experienced teacher and revised in line with her comments. For example, in the pilot interview we referred to children 'at risk of ADHD'. According to the teacher, this term was confusing as she teaches children who are diagnosed with ADHD and others who only display ADHD symptoms. Accordingly, the term was changed to 'children with ADHD symptoms'.

Below is the list of questions:

1. How do teachers respond to children with ADHD symptoms in the classroom? What is the impact of those children on the classroom?
2. In your opinion, what are the needs, and the supports teachers require regarding children with ADHD symptoms?
3. What type of support do teachers get to help manage their classrooms?
4. If we want to develop an intervention to support teachers, what are your suggestions for the type of intervention needed? And what is the acceptable amount of time you can spend on this intervention?

3.5.3 Recruitment

Initially, an email was sent to Nottingham City Council, who had agreed to act as gatekeepers for the study, with a study advertisement and details about the aim of the study and the inclusion criteria for participants (see Appendix 4). The advertisement was included in weekly bulletins to all SENCOs at Nottingham City Council schools. After two weeks, another email was sent from the research team to Nottingham City Council to resend the advertisement. Then, the researcher started to contact headteachers via email

and telephone, and to visit schools to share details about the study with staff. A total of twenty-four schools were contacted. A follow-up email was sent to the schools that had not responded to the researcher's first email two weeks after sending the first one. To ensure attracting more teachers to reach the target number of participants, an amendment was made to the ethical approval, and the recruitment method was expanded to include snowball sampling methods with participants asked to pass on the study advert to friends and colleagues.

3.5.4 Participants

The study used a purposive sampling technique via gatekeepers or snowball sampling to interview teachers of children aged between four and eight years with ADHD symptoms. Teachers were eligible for inclusion in the study if they currently or previously had experience of teaching children aged four to eight years old with ADHD symptoms. There will be no fixed number of participants because, for qualitative research, it is important to collect rich and meaningful data that can serve the purpose of answering the research question (Creswell et al., 2004; Lincoln & Guba, 1985). Therefore, sufficient teachers will be recruited until no new findings are evidenced and data saturation is reached (Fusch & Ness, 2015; Glaser et al., 1968).

Out of the twenty-four schools that were contacted via headteachers, only five responded. Two schools declined to participate, and three schools agreed to send the advertisement to their teachers. For the schools who had agreed to send the advertisement, eight teachers emailed from one school,

two from another school, and one teacher replied from the third school. Seven teachers were recruited using snowball sampling from six different schools. No teachers responded to the advert that was distributed through Nottingham County Council. The data collection started on the 11th of December 2018 and was completed by 2nd of May 2019.

RD started coding the transcripts after the fifth interview. After interviewing 15 teachers, RD felt that no new patterns or information was found in the interviews that could generate new themes. A further two teachers were interviewed to ensure that no new information could be obtained. After that, data saturation was considered adequate and the interviews ceased (Fusch & Ness, 2015; Glaser et al., 1968).

In total, seventeen teachers from nine schools were recruited for the study. Nine teachers were from a faith school, eight of which were Muslim schools, and one was from a Church of England school. The rest of the teachers were from secular schools. The participants' role at the school varied; three were teaching assistants and two were Special Educational Needs Co-ordinators (SENCOs), and the rest were teachers. Only one of the participants was male and the rest were female.

Eleven interviews were conducted face-to-face and six were conducted by telephone. Eight interviews were conducted in schools in the meeting room, and three were conducted face-to-face in a quiet location off the school premises. The interviews lasted between thirteen and thirty minutes with an average of eighteen minutes. Interviews were conducted by one of the

research team (RA). Teachers were provided with £10 shopping vouchers as an appreciation token for their time.

3.5.5 Procedure

RD conducted the interviews from the 14th of December 2018 until 10th of March 2019 individually in a quiet place. The interview appointments were held with the participants in their free time, 11 face to face and six via telephone. The participant information sheet (see Appendix 5) was sent by email previously to teachers and they were given another copy on the day of the interview. Before each interview, the researcher went through the process of the written consent (see Appendix 6). Written and verbal consent were obtained from all the participants either face to face or by email in case of the telephone interviews. Around five to 10 minutes at the start of the session was spent with each participant to introduce the aims of the project and the researcher's background and motives. Another five to 10 minutes were spent with some of the participants after the interview to reflect on the interview. All interviews were recorded using a digital audio recorder with built-in USB to facilitate moving the interviews to the cloud. Recorded interview files were transferred to a password protected secured database using the University of Nottingham cloud. All the records were then deleted from the recorder. The interviews were transcribed verbatim by RD by listening to the full recording, then listening again in parts, writing a draft and combining this with any additional comments that were written during the interview. Finally, the whole file was proofread and finalised. Any names and any personal identifiers were removed from the transcript. Each participant was assigned a code to ensure

confidentiality and anonymity. A £10 electronic gift voucher was given to all participating teachers following completion of the interview. For phone interviews e-vouchers were emailed to participants or sent via WhatsApp based on participant preference.

3.5.6 Ethical Consideration

The study was approved by the Division of Psychiatry and Applied Psychology Research Ethics committee on 10/10/2018 reference number (DPAP-2018-0127-2) (see Appendix 7). Before conducting the study, participants were asked to read and understand the participant information sheet then consent for participating in the study. The purpose of the study was explained verbally, and they were reminded of their right to anonymity and that their name or school name will not be identified. Teachers were asked not to identify children by name. All data was anonymised when rescripting the interviews including school, teachers, and children's names. The researcher focused on making the interview friendly and encouraged participants to talk freely. At the same time, teachers were aware that they had the right to withdraw at any time of the study. While it is the researcher's ethical responsibility to protect the privacy of any information provided by teachers, according to the Code of Research Conduct, Research Ethics of the University of Nottingham (University of Nottingham, 2021), researchers would immediately report to the ethical committee in their department if they had reason to believe that a participant was experiencing emotional distress and refer them to contact the Education Support Partnership helpline to get the appropriate support (Powell, 2023).

3.5.7 The Social Constructivist Framework

The social constructivism theory considers social interactions and how they contribute to forming our reality. To clarify, the social constructivism approach focuses on understanding how people create their social realities in their environment by interpreting the constructed reality (Amineh & Asl, 2015). This form of reality and knowledge are continuously subject to be changed and reshaped by different social interactions, including environment, individuals, and experiences.

In this thesis the qualitative studies were analysed through a social constructivism approach, which recognised that reality in the qualitative finding in this thesis was constructed between the researcher and participants. Therefore, to offer the reader with a better grasp of the constructed reality in this thesis, it was crucial to use a reflexive approach by acknowledging the researcher's background, experience, and ethos (Dodgson, 2019; Jootun et al., 2009).

3.5.8 Reflexive statement

The author who conducted and analysed the interviews had been working as a teacher for children aged between four and six years in Saudi Arabia (SA). During that time, she would occasionally experience feelings of helplessness and frustration when teaching children with challenging behaviours. In response, she decided to increase her knowledge by studying for a master's degree in special education/behaviour support in the United States. The author was also trained in supporting children with challenging behaviours, including ADHD and autism in schools during her master's

degree. After that, the author went back home to SA to work in the field of applied behaviour analysis with children with ADHD and autism before joining Jeddah University as an established member of the special education department.

Additionally, the author is a mother of four boys (ranging between 8 and 16 years). As well as using plenty of strategies in the upbringing of those active boys, the author also listens to their daily stories about their teachers and how these teachers can appear to children to be inadequate in managing behavioural issues in the classroom. Hearing the problem from the children's viewpoint gives a whole different perspective. Having experienced teachers' helplessness and being involved with children's problems and stories gave her a stronger incentive to support teachers and to try to understand how to improve the classroom environment.

The author also suffers from claustrophobia, which is the fear of being trapped. The inability to control being in an inescapable situation can be compared to the inability to sit still, concentrate, or shout out. Having experienced this condition, which can get better with some strategies and some understanding of one's surroundings and can get worse with anxiety and being surrounded by inexperienced people, provided more insights into what children with ADHD may undergo.

Despite the researcher having studied in the United States, the time she spent in American schools was limited to the masters' degree courses she had undertaken, which required working hours to be completed as part of the

course requirements. Consequently, her engagement with American teachers was minimal and did not permit her to establish a clear view and judgement about American teachers. In SA, cultural expectations assume that Western schools and teachers are comprehensively prepared to support their pupils. Although the literature review evidenced a clear gap in teachers' interventions and their need for support internationally, this cultural expectation was buried somewhere in the researcher's subconscious.

Given the fact that reflexive thematic analysis is a form of subjective interpretation, when another person analyses the same dataset this could potentially yield a different result. The researcher's personality, prior experience, as well as the extant literature, might all affect this analysis. Nevertheless, the researcher was keen to adhere to the interview schedule, acknowledging that semi-structured interviews permit a degree of openness by asking open questions, meaning that the researcher made efforts to prevent her previous preconceptions from affecting the interview. However, it is usually challenging to prevent preconceived ideas at an unconscious level from interfering in the processes of conducting interviews, asking questions and prompts, and analysing the data. The researcher's perspective shifted and it was discovered that teachers in the UK and SA were sharing similar experiences from the view of the participants and the researcher. It was understood that the aim was to objectively explore teachers' unmet needs and experiences with children with ADHD, rather than to validate or invalidate the researcher's preconceptions.

Although the researcher has been a teacher and comprehends what it is like to feel powerless in the classroom, she acknowledges that as a mother of four children, she has struggled to maintain her attention while collecting data, analysing and writing solely about supporting teachers. The researcher has consistently prioritised the rights of all children to equal opportunities. Indeed, every time the researcher faced this struggle, she reminded herself that a well-equipped teacher is critical in students' lives and that she must avoid bias.

3.5.9 Reflexive Thematic analysis

3.5.9 Reflexive Thematic analysis

Thematic analysis (TA) can be conducted using a range of theoretical approaches (Holloway & Todres, 2003). TA is considered the foundation of qualitative research as it requires developing skills for other forms of qualitative analysis (Holloway & Todres, 2003). Therefore, this method is recommended for beginner researchers in qualitative research in Psychology (Braun & Clarke, 2006, 2014). In the past, the framework of TA was not clear; and therefore, this approach used to be criticised by researchers (Roulston, 2001). However, Braun and Clark developed clear six steps to follow when conducting Reflexive thematic analysis (Braun & Clarke, 2019), which can help in making this methodology more replicable. The researcher should apply the steps to the data set in order to generate a systematic development of themes; at the same time, the approach can still guarantee flexibility in its epistemological position, by allowing the author to analyse and judge a large or small dataset collected from interviews, focus groups, surveys, diaries, films, or

observations, then this data can be interpreted by themes using a clear process.

Reflexive thematic analysis can be inductive whereby the themes are derived from similarities that identified from the data, or deductive in which themes are driven by previous research findings or specific theories or predictions (Braun & Clarke, 2019). The analysis can also be on a latent level or on a semantic or manifest level. Latent level focuses on the implied or implicit meanings and interpretation for the dataset (Braun & Clarke, 2019). The semantic, or manifest, level captures what can be derived from what has been explicitly stated in the data.

In this study, TA was guided by the social constructivism paradigm and was used to analyse the data and focus on finding and reporting consistent dataset patterns that are driven by the research question following the phased approach of Braun and Clark (2019) which is described in the next section. TA will be used inductively and will aim to capture meaning at the latent and manifest level, seeking to identify recurrent concepts among transcripts (Braun & Clarke, 2019).

3.5.9.1 Data analysis

Data saturation was considered during the initial analysis of the scripts. RD started coding the transcripts after the fifth interview. After interviewing 15 teachers, RD felt that no new patterns or information was found in the interviews that could generate new themes. Two more teachers were

interviewed to ensure that no new information could be obtained. After that, data saturation was considered adequate and the interviews ceased (Fusch Ph D & Ness, 2015; Glaser et al., 1968).

The data was analysed using the six steps of reflexive thematic analysis using the Braun & Clarke (2019) method. First, RD listened to the audio tapes of the interview and transcribed verbatim. Then RD read and re-read the transcripts several times to gain a broad understanding of the content of the interviews. This step is considered the foundation stage of the analysis (Braun & Clarke, 2019). The whole process was carried out by the same researcher (RD) who conducted the interview and spent time with the participants before and/or after the interviews. Then the researcher engaged with the data through transcription and reviewing the interview notes in order to guarantee prolonged immersion in the data. Second, the initial codes were identified. The data was grouped using meaningful codes that were specific and helped to develop the themes in the following step. The codes were checked in an organised way using Excel (see Appendix 8). Reflective journals were kept throughout the entire data collecting, coding, and analysis processes. Peer debriefing was also used, while member checking was conducted by sending three teachers their scripts to check the coding to ensure credibility (Lincoln (Lincoln & Guba, 1985; Terrell, 2016). Third, RD started to create a broader meaning for the codes presented in themes. The initial themes were checked by team members (RD), (CG) & (DD). Fourth, a thematic map was developed through the researchers having a deep

understanding of the themes (see Appendix 9). Mind mapping was used to connect the themes and make sense of their relationships and keep track of the evolution of the themes. This helped in reviewing the themes and reaching a thorough interpretation. Peer debriefing and member checking was also used in this step. Fifth, the themes were refined and identified by name. Subthemes were also identified. Then the themes were checked by an external auditor (EL) to gather constructive feedback. Feedback was also gathered by presenting the themes at the Centre for ADHD and Neurodevelopmental Disorders Across the Lifespan conference (CANDAL). Finally the report was written including the final themes and subthemes and textual extracts to illustrate how themes were selected. Negative case analysis was also applied to the analysis, which involved investigating opinions and arguing against the meaning interpreted from the data (Lincoln & Guba, 1985; Terrell, 2016). Excel was used in the analysis to facilitate the ongoing use of reflective journals throughout the whole process of data collection, coding and analysing. Example quotes from the scripts were provided for each theme, as recommended by Consolidated Criteria for Reporting Qualitative research (COREQ) for reporting qualitative research (Tong et al., 2007) (see Appendix 10), and the American Psychological Association (Levitt, 2020) to provide the analysis with transparency (APSA, 2012).

3.5.10 Trustworthiness

Qualitative research is inherently subjective, and findings can be influenced by researcher bias. Social constructivism proposes that there are multiple realities, and the reality in this study is co-constructed between the

researcher and the participants based on their social experiences and views (Kim, 2001). It should be borne in mind that constructivist epistemology depends on deeper understanding of a group of people's views, beliefs, knowledge, and experiences through interviews (Kim, 2001). Constructivism acknowledges that the researcher's background and social interpretation can influence the constructed reality. It thus aims to minimise that influence and ensure trustworthiness by adopting a reflexive approach where researchers reflect on their experience and values (Dodgson, 2019). Nevertheless, the author's ethos and background can provide a greater depth of understanding and can enrich the analysis of the teachers' views and concerns (Jootun et al., 2009). (COREQ) were followed while conducting the qualitative research (Tong et al., 2007), (see Appendix 10). This checklist covers three main domains: Research Team and Reflexivity; Study Design; and Analysis and Findings including 32 criteria. Using this checklist throughout conducting qualitative research is suggested to enhance transparency (Tong et al., 2007). Demographic questions from participants were not collected in this study to provide teachers with a sense of anonymity, however, it is considered a limitation in this study.

Employing thematic analysis in a systematic and rigorous way is key to ensuring the trustworthiness of the data (Nowell et al., 2017). Trustworthiness can be achieved by applying four factors knowing that they may overlap with each other: credibility, confirmability, transferability, and dependability. These four factors were applied while conducting the analysis. Nowell et al. (2017)

explained the guidelines that can be followed through the process of TA to ensure consistency and thus increase the validity and credibility of the analysis (Nowell et al., 2017). The guidelines consist of a series of strategies that accompany the six phases of reflexive thematic analysis. Table 1 explains the steps of the reflexive thematic analysis recommended by Braun and Clarke (Braun & Clarke, 2019) and the trustworthiness guidelines that the author followed to ensure trustworthiness while conducting TA. Dependability, which involves checking the analysis by an external auditor and getting constructive feedback in a conference or by external committee (Lincoln & Guba, 1985; Terrell, 2016) was conducted by presenting the study at a CANDAL conference. Triangulation involves using multiple data sources to support credibility of the themes (Lincoln & Guba, 1985). It was not possible to collect data from additional sources due to time and resource limitations but themes were linked to previous research findings and to theory in the discussion.

Table 1: Trustworthiness steps

	Step of TA	Trustworthiness strategies while conducting TA steps
1	Familiarising oneself with the collected data	This step was conducted to ensure trustworthiness (Nowell et al., 2017) and credibility (Terrell, 2016).
2	Initial code identification	Excel was used (see Appendix 8). Reflective journals were kept to ensure credibility and transferability (Lincoln & Guba, 1985; Terrell, 2016). Peer debriefing and member checking to ensure credibility (Lincoln & Guba, 1985; Terrell, 2016).
3	Theme development	The initial themes were checked to ensure credibility (Lincoln & Guba, 1985; Terrell, 2016).
4	Theme reviewing	Mind mapping can guarantee trustworthiness. Peer debriefing and member checking can ensure reliability (Lincoln & Guba, 1985).
5	Theme refining and	External auditor provided constructive feedback and CANDAL conference

	naming	feedback was gathered to ensure dependability (Lincoln & Guba, 1985),
6	Generating the report	Negative case analysis can ensure reliability (Lincoln & Guba, 1985; Terrell, 2016). In addition Excel and reflective journals can certify credibility and transferability (Lincoln & Guba, 1985; Terrell, 2016). Examples from the scripts are also used in the report to ensure transferability (Terrell, 2016).

3.6 Results & Themes' Description

After analysing the data 6 themes and 14 subthemes were created, The themes are summarised in Figure 4.

Figure 4: Summary of the overarching themes and subthemes

1- ADHD behaviours can disrupt the learning environment.

- 1a) Short attention span and hyperactivity can interrupt the flow of the lesson.
- 1b) Impulsive behaviour can jeopardise the learning environment and classroom safety.
- 1c) The impact can depend on the individual characteristics of the child.
- 1d) ADHD behaviours are more disturbing in restrictive settings.
- 1e) ADHD behaviour is a catalyst and a distractor for the behaviour of other children.

2- Teachers are facing practical demands on their expertise and practical skills.

- 2a) Time and effort is required to support the needs of children with ADHD symptoms.
- 2b) Children need individualised objectives and to utilise effective ADHD strategies.
- 2c) Teachers need to foster strong relationships.

3- Supporting ADHD behaviours is overwhelming.

4- Interactions in the classroom can be stigmatising and harmful for children with ADHD symptoms.

5- The existing support for teachers is limited.

- 5a) The Special Educational Needs Coordinator is the designated source of support.
- 5b) Training is not focused on ADHD in and outside the school.
- 5c) Teaching assistant support is essential and needs to be managed carefully.
- 5d) Lack of financial resources to support children's ADHD symptoms.

6- Teachers need more specific training about ADHD.

- 6a) Training should be brief and precise.
- 6b) Teachers want the training to be interactive and visual.

3.6.1 ADHD behaviours can disrupt the learning environment.

It was evident from the analysis that ADHD behaviour management is challenging to teachers. Teachers commented on children's ADHD-type

behaviours in the classroom and the disruption caused due to such behaviours.

1a) Short attention span and hyperactivity can interrupt the flow of the lesson

Teachers highlighted that children with ADHD exhibit a range of behaviour that can have a negative impact on the classroom. Teachers identified poor attention as the most challenging aspect of children's behaviour. The child with ADHD symptoms can be easily distracted and go off-task, which results in an inability to finish their work sufficiently. A poor attention span can also negatively impact on their learning process. Almost all the teachers in this study described the difficulties they face with inattentiveness in children with ADHD symptoms.

T7: "Another challenging thing is getting them to focus on a task for a required period of time. I'm teaching the early years, the tasks we do are already really short, but some children are not even able to focus for a really short time... And so, they kind of jump from one thing to another."

T10: "Lack of concentration, moving in the classroom, lack of focus whenever we are sat on the carpet. Like if we are explaining something, they are in a different world."

Not only can these symptoms distract their learning, but they can also distract other children's learning and concentration. It is challenging for children with ADHD symptoms to keep their attention going for a long time as they can easily go off-task and find another thing to do instead, like fidgeting and squirming, chatting, or even leaving their place, which can act as a distraction for other children. Teachers stated that other children kept nagging

about not being able to focus because of the behaviours of the child with ADHD symptoms.

T10: "If they can't sit, they move about in the classroom. They'll be distracting other children."

T12: "If they've gone off task, or their focus is not sustained, so therefore that is when they start fidgeting or making a noise, which is distracting to others. They quite often say: he's "moving tables", "I can't! I can't work!" Or, "He's tapping the pencil or making a noise" and stuff like that. So, as well, you have to be careful where you position them in the classroom."

T13: "There is one little boy I had in the past. He used to walk up and down the classroom, usually quietly, but it is just that constant walking backwards and forwards while you are trying to get the other 25 children's attention."

1b) Impulsive behaviour can jeopardise the learning environment and classroom safety

Teachers highlighted that impulsiveness or acting without thinking, such as calling out or throwing an object in the classroom, can pose one of the most distracting behaviours children with ADHD symptoms may perform. It is also challenging when teachers cannot anticipate children's behaviour because of their impulsiveness, as in when they leave their place, walk in the classroom, or even throw an object at someone randomly. Teachers said they were easily distracted by this and it directly impacted on the quality of the lesson.

T8: "The concept of interrupting the lesson can definitely get the classroom to be disturbed."

T16: "Shouting out when it's not their turn to speak, especially if it's another child's turn to talk. That can be quite overwhelming."

T8: "Some behaviours, such as calling out, impulsive behaviour where they've got their eye on something, or something's happened, which they will have a reaction to, which can happen so quickly, definitely gets the classroom to be disturbed."

Teachers felt that children with ADHD symptoms can be aggressive, which can affect both other children and teachers. They described that some children cannot control their anger as they might hit, push or throw an object at other children. Others might perform this behaviour accidentally and impulsively. However, some teachers suggest that sometimes aggression is due to the social challenges that children might be facing, which can impact on their behaviour alongside their ADHD symptoms.

TA11: "Like we had at some point children that would throw things at other children using scissors and things like that."

T4: "Then they can be actually quite violent. They can hurt other children and things like that."

Teachers described how children could become frustrated and aggressive if they had to contain their impulses to speak or act.

T16: "If they can't voice their opinion, they may show their opinion in different ways - physically, and by aggression, as well as emotions."

Two teachers also emphasised that aggression might also affect teachers negatively.

T7: "Older students have no sense of danger; they can really hurt the teachers."

T6: "So, depending on the severity. I actually dealt with a child that was so severe that the teacher needed to restrain him sometimes. He broke the toe of a teacher because he stepped on her foot and ground it."

1c) The impact can depend on the individual characteristics of the child

Teachers highlighted the age group of children as a factor that may influence the strategies that should be used in the classroom.

T13: "It depends on the age group we are targeting because what is suitable for one age group may not necessarily be suitable for another."

Teachers find it more difficult with older children than with younger counterparts. The reason is that the expectations for older children revolve around focusing more in the classroom, whereas younger children have more freedom to move and play at will.

T4: "The smaller children have lots of good activities. They are involved in the activities and can move to places that you're not...When they get older, and you need them to be focused, that's when sometimes it can be a bit more difficult."

One of the teachers emphasised the risks involved in working with older students.

T7: "I'm lucky that I'm with younger students, if I were with older students, they would have no sense of danger and could really hurt the teachers."

The participants also emphasised the nature of the child as a vital factor that can impact on the management of the classroom.

T6: "Even though they have all this disruption going on, they still want to help, and then there are others that just want to challenge."

1d) ADHD behaviours are more disturbing in restrictive settings

Almost all teachers agreed that managing these challenging behaviours is harder in the classroom compared to the playground. According to the teachers, the goal of the classroom is usually to deliver lessons and achieve the learning goals. They stressed that it is challenging to keep the attention of children with ADHD symptoms for long enough to achieve the learning outcomes, or it might be that the behaviour is more recognised in the classroom because of the confined space.

T4: "In the playground, they are fine, they know they are free, they move around, they play with their friends, but inside the classroom it is hard."

T5: "More challenging inside the classroom because they are boxed up in a classroom, to less space, routines are tighter, there are more rules or regulations, so I think the behaviour is seen more in the classroom. The level of the behaviour might be the same, but it's more identified in a classroom."

T3: "Outside, they have the option of whether they want to run or sit down or play by themselves; however, in the classroom, they are aware that there are rules, and it's difficult for them to always follow the rules, and there might be a subject which they don't enjoy, they have no other option but to just let out and shout, unfortunately."

However, a few teachers also expressed concern about the behaviour of children with ADHD symptoms in the playground, as well as in the classroom. Teachers said that the inability to wait for their turn and the impulsive way in which they play might cause issues when it comes to play time. Teachers believed that children would be challenging in both settings, depending on the nature of the student.

T8: "In the playground, it's about trying to get that child to line up and to tell him that the playtime is over. I think it poses challenges at both ends. They have to know the limits and what's expected from them."

T16: "Some children's ADHD may affect how they react to others. And maybe in the environment, the outdoors, because they've got more space to kind of run and express themselves, they may take that (reaction to others) too far..."

1e) ADHD behaviour is a catalyst and a distractor for the behaviour of other children

Teachers commented that ADHD behaviour in young children may sometimes appear provoking to their peers. They may imitate these behaviours, which can add more load to the classroom and cause distraction.

T1: "I've also seen children with ADHD in the younger years to be quite popular, because it seems like this is quite interesting."

T7: "And then they start to play the same way, and it's like, oh my goodness, I don't want this to happen with you as well. I mean one is enough to deal with."

Two teachers also stated that, in contrast, other children might help the teacher in managing the behaviour of children with ADHD by reminding them of the classroom rules and assisting them in accomplishing academic tasks.

T2: “You’ll find that they will start helping them anyway, and they are all saying that [name] (whispering), ‘You need to be quiet!’, and saying to them (whispering), ‘No don’t do that! don’t do that!’ (Laughing.)”

3.6.2 Teachers face practical demands on their expertise and practical skills.

2a) Time and effort is required to support the needs of children with ADHD symptoms

Teachers perceived that part of their job involves spending plenty of time planning for children with ADHD symptoms. They recognised the need to consider their needs before the class, which often increases the workload significantly. They also need to spend time talking with teaching assistants to explain their role with that child. They also mentioned that they need to collaborate and talk with parents and with SENCOs about those children, which is considered time-consuming and requires more effort.

T2: “You have to adjust your teaching to every child in the class. There is just another child in the class that you have to do a little bit more for, so that they have access to everything, but you do that with every child.”

T1: “It takes time, and you might have to change the way you deliver your instructions, or you might then do secondary instructions to that child, or you may plan and explain what’s happening or how to teach in a different way to a secondary teacher or class teaching assistant.”

T13: "It is a lot of work. Obviously, you have additional paperwork because you have the IEP (Individualised Education Programme) to do. You might need to have more meetings because you have to keep parents informed. Likewise, they have to keep you informed. So you want that openness with them and to make yourself available."

2b) Children need individualised objectives and to use effective ADHD strategies

Teachers indicated that children with ADHD symptoms need to have different goals and strategies. They might need to be reminded all the time. Similarly, teachers need to think of strategies that can work with them. One participant also highlighted that children with ADHD symptoms have different needs from typical developing children in the classroom. Some of the teachers described them as "demanding". It was also noticed that the majority of the teachers had agreed on the efficacy of one-to-one lessons or small group activities.

T9: "We are doing a plan, especially for him, even if you are teaching or if you are writing the success criteria for the whole students. His own success criteria are not the same, so we have to go to his level."

Teachers explained how they are constantly modifying the curriculum in a way that can fit the children's ability and their level of attentiveness. They might deliver their instruction in a different way or steer their resources towards meeting the children's needs. They may design a particular activity or divide tasks specifically for those children.

T12: "I think it is more strategy of what and how you can tailor the curriculum or how you can reach learning strategies for the child and help them the most."

T15: "I might completely differentiate the work I might need to arrange for my classroom assistant to start them off on a task or monitor them."

T12: "You have a whole class of children. Then those children need extra inputs or instructions, or they need a reminder, or they need a task that is completely differentiated, because they need a small simple task, so they can follow m and also because their concentration is not sustained for a long time. So, they can only do a shorter task, or they need a different task more frequently, so they can do that for a bit, and then they need something else."

2c) Teachers need to foster strong relationships.

Teachers reported that communicating with the child is important if learning goals are to be achieved, because they often lack concentration and cannot follow instructions easily. Thus, clear strategies and rules for the classroom often help.

T2: "You need to give them mechanisms for being able to ask you if they feel they don't know what they're doing. Because that can frustrate them if they don't, as they can't process a whole set of instructions, so, if they get halfway through and don't know what to do, you need to make sure that they know a safe way of dealing with that rather than carrying on and not knowing what to do."

Building a rapport and having a warm and encouraging environment was stated as a significant approach when supporting children with ADHD symptoms and this requires effort.

T1: "I like to try to greet every single child, and I try to engage their emotions, I talk to parents to see if there are any sort of worries as if a child is a bit teary in the morning, they can take it with them the rest of the day."

T4: "You have to build a trust, they know if you're fair, or if you're not fair"

T8: "They need to feel part of the class, I try always to keep them as much as possible, integrated in the class with the strategies I use."

T9: "If you raise their confidence, they are going to like you, and they are going to follow your instructions."

One of the teachers highlighted the need to teach children emotional regulation and strategies to communicate their emotions.

T15: "We try and teach them how to manage those feelings and how they show their emotions and moving from feeling sad to feeling happy and smiling."

Not only do teachers need to build a friendly relationship with the child, but they also have to reflect on the child's behaviours and the factors that can trigger such behaviours or maintain them. Teachers also stated,

T1: "I think the key thing is doing a lot of reflection, so as much as it's about the research, it is about reflection."

T17: "Every child is different, and every situation is different as well.

It's all about trial and error and thinking about the child and their individual traits and what is going to suit their needs the best."

Teachers thought that children with ADHD symptoms need to learn that there will be implications for their behaviour. Teachers emphasised the vital role of having a reward system as a handy tool to be used with children with ADHD symptoms. However, consistency in supporting the child is very important yet challenging. It was suggested that teachers can replace punishment with a reward system, which may result in a better outcome.

T5: "I think strategies, instead of labelling them or giving them detentions or threatening them with 'I will give you this, I'm gonna give you a yellow card, I wanna give you detention, I'm gonna ring your mom, so take away negativity and put it into positive reinforcement, so the child changes their behaviour to positive."

3.6.3 Supporting ADHD behaviours is overwhelming

Teachers described children with ADHD symptoms as demanding, requiring attention, and challenging. The situations that teachers face with these children are considered to be stressful and can result in frustration and helplessness. Some teachers thought it can affect the wellbeing of teachers and lead to reluctance to work, that also shows in their way of talking. However, it was clear that teachers described their stress differently. Comments in the interviews about having children with ADHD behaviour in the classroom clearly reveal the teachers' different levels of predicament. For, example these comments were identified from different teachers

“It’s a nightmare!”; “I want to pull my hair!; “I am gonna shut the door, and I’ll have a little scream, and then, I’m going to spin a smile in again!”

Others described the situation as emotionally exhausting.

“It makes me feel quite sad”; “It’s upsetting me to see that I can’t do anything to stop that child”; “It’s still a challenge every day”; “It’s stressful”; “It’s frustrating, and we’re all human beings and sometimes we get a bit tired.”

T14: “Sometimes when I’m teaching and I’m constantly mid-way through something and being distracted, it upsets me to see that I can’t do anything to stop that child.”

T4: “Exhausting, exhausting! Now it’s less, but especially in the first few weeks, to try and get him, because I needed to get him to work and now, he does really work, so he’s completely turned around, but, it’s still a challenge every day.”

TA11: “So, it can cause a lot of stress because we are just non-stop trying to make sure that the class is a safe environment for everybody else.”

While acknowledging the pressures, one teacher valued the stimulus to learn new strategies.

T7: “It’s frustrating, but it also makes you want to learn more about how to deal with that child; so, it’s kind of a good thing as well, because it opens up, you have to go and do some reading, you have to go and do the research, reach out other professionals as well, so yeah, it’s quite stressful.”

Only one teacher believed that having children with ADHD symptoms in the classroom does not have any impact on teachers.

“T2: I don’t think that there is much of an impact on teachers. If you don’t let it have an impact, it wouldn’t cause you stress.”

Another teacher also pointed to self-regulation and self-calming as a vital technique for teachers that needs to be acquired to cope with the teaching stress.

T4: “If you have some strategies on how to control yourself... that would be good.”

3.6.4 Interactions in the classroom can be stigmatising and harmful for children with ADHD symptoms.

Teachers described a range of ways in which the child’s behaviour can have negative repercussions for the child with ADHD themselves. They also said that when negative responses occur in the classroom children can be labelled by their peers and teachers as “naughty” or as having ADHD with or without diagnosis

T5: “It brings out negativity in teachers.”

T1: “Some teachers and some children just say that the child is ‘naughty’, or, ‘watch how naughty’, or ‘that child is being naughty’. It becomes a label for some children with ADHD when they are not naughty. It is just they’re struggling to cope with their behaviour and they’re doing their very, very best.”

Challenging behaviours can also cause teachers to avoid working with that child.

T8: "I think the... easiest thing is to send them out of the class and call them a naughty child."

T8: "It's easy to push it away from you as a teacher and make it someone else's responsibility."

TA11: "Most of the time the teacher would allocate the Teaching Assistant to work with those children."

One teacher described the ways in which the behaviour disrupted peer relationships, with the child being blamed for any disruption in the classroom.

T14: "They use it, and they abuse it, they'll blame the child and then use the child as a scapegoat."

Teachers also acknowledged that the child with ADHD symptoms can be subject to restrictions, which can impact on their learning and adjustment at school. The child can also receive a lot of criticism or restrictive practices.

T4: "They can be really angry with a child, and then it's like, 'No play for you today...' But it's really not justifiable, that can affect him for the whole day and he, becomes completely depressed, he can't do any work. He can't do anything."

One teacher pointed out the effect of labelling on the child, and how teachers perceive the ADHD label as being naughty.

T16: "There are some teachers, if ADHD is identified, they may think that the child is, I wouldn't say naughty, but, not listening? Whereas there could be an actual underlying cause like ADHD."

One teacher suggested that sometimes the behaviour might be triggered by the teacher, resulting in a reaction from the child.

T5: “Even if they have a very busy schedule, I think we should put in like a morning meeting or an after-school meeting or something in place, if once a week or one task a day, to understand why children’s behaviour may escalate, or if teachers provoke it as well.”

3.6.5 The existing support for teachers is limited

The Teaching Assistant, Special Educational Needs Coordinator and training can support teachers, but there are some limitations.

5a) The Special Educational Needs Coordinator is the designated source of support

Teachers referred to the Special Educational Needs Coordinator (SENCo) as the first-person teachers seek for help. They observe the children, identify their needs and then develop an Individualised Education Plan (IEP) for the child and help the teacher to manage their behaviour.

T1: “For example, our SENCo (the special educational needs coordinator) would develop a plan with teachers and with people who had worked with that child before to sort of develop a behaviour plan.”

Although SENCos are usually involved with the teacher to help children with ADHD symptoms, some teachers mentioned conflicting demands placed on SENCos and that they may not always have the time to help teachers in supporting children with challenging behaviours.

T13: “You know, you have your SENCo in school, and they are generally very good in little ways. You know, it can be like, ‘Oh no! You’ll find a way.’ You know, sometimes you do get that type of response from them, and you just think I’m going to pull out my hair at that moment because I don’t know what else to do.”

TA11: "Usually, it is easier to chat with other teachers...You could get hold of them a lot easier than the SENCo because at that moment the SENCo would actually be deputy head, so she's got two hats to wear."

T10: "I talk to the SEN teacher, she is really supportive and helpful, and she gives me a lot of advice on what I should do, but sometimes they are busy."

5b) Training not focused on ADHD in and outside the school

Almost all teachers emphasised the role of training in ensuring that teachers are up to date in their knowledge. According to the teachers, school training can encompass various subjects that are linked to their work, and not only to children's behaviours.

There are also some courses that are offered outside the school, but for financial reasons, schools have to limit and manage the attendance for these training sessions.

TA11: "We have ongoing training, so, we have some days where there's always training happening, but sometimes the training is not really the one needed. Sometimes, it's got to do with teaching materials, new technological systems. Well, it is not really about the children, so I think what we need to be aware of is that we focus on the training that is needed for how to deal with children."

T12: "We do have staff meetings and they tell us what to do with autistic children. So, we do have in-school training to tell us what resources we should be using, what strategies to use in making the learning relevant and making it visual and allowing them to take

breaks and have a fidget toy, having visual reminders to remember, breaking it down into steps, setting the children on work, and then going back to them, and just reinforcing what they are doing... Yeah, but other than that, not much really."

5c) Teaching assistant support is essential and needs to be managed carefully

Many teachers expressed concern about the limitations of having a teaching assistant, such as moving teaching assistants from one class to another. They thought that having the TA's support in the classroom is crucial for those children, as the teacher needs to concentrate on delivering a good lesson. Teachers sometimes need time out to calm down before coming back to their classroom, but if they are the only adult in the classroom, it would be impossible to benefit from such a break, which can affect their wellbeing.

T17: "Support is needed for teachers in these schools where funding is being cut all the time, and there's not necessarily teaching assistants in every class anymore. It can be really hard for that teacher and their mental health and their wellbeing as well.

Sometimes, they need a minute to just go and cool down and come back and address the situation. But when you are the only one in the room and there is nobody to come and help you, then yeah, there is nobody to come and help."

One of the teachers said that passing the child's responsibility completely to the Teaching Assistant may result in the child being a dependent learner, whereby the child gets used to having an adult around.

T1: "It's really important to have a good understanding of ADHD because it's very easy if you get support in your class, and push that

support on them, and then they lose their independence and become a dependent child.”

One of the Teaching Assistant mentioned that she had to work with a child with ADHD most of the time, which would limit her availability for other children who were also in need of support.

T11: “I’m a teaching assistant, so most of the time the teacher would allocate the Teaching Assistant to work with those children. So, to be honest, as a teaching assistant, I would have most of the responsibility to try and calm them down by sitting with them, speaking to them, or doing the exercises that we have to do in the class with them. So, it takes my role to assist the other children in the classroom into providing assistance one-to-one.”

5d) Lack of financial resources to support children’s ADHD symptoms

Teachers also emphasised the need for more school funds. Some teachers raised concerns about the lack of resources for children with ADHD symptoms, the limited number of teaching assistants, and the dearth of training courses. They also argued that the funds depend on the location of the school, not on the need of the children.

T15: “Last year, I had to buy things with my own money. So, I think the schools need to be better equipped for those things. So, they’re all in place for the child, our school is a very small village school, and we have no extra money for lots of training. So, money is a big problem which means we can’t employ extra classroom assistants because we can’t afford them.”

T13: "I just wish there was more funding for them. The school I'm working in, although it's in Leicester, it is right on the border. And it's actually Leicester County Council. So, they have no funding. In the city, they get funding for everything."

The teachers also underlined the need to provide some tools for the children which are not available in schools and that teachers are buying them to help children. Children with ADHD symptoms always feel the urge to fidget and squirm or tap the pencil on the table. Some tools and equipment that can keep them being occupied, such as stress balls or a fiddle toy, might help with the restlessness feeling and cause less distraction than leaving the chair and moving in the classroom.

T15: "I bought several bands to go around the chair legs. Big stretchy elastic bands which really helped. I had three boys with ADHD last year, and they just take off their shoes and basically bounce their feet on this elastic band... They actually came up to me and said, 'Oh it really helped me stay in my seat.' And it just stopped them from wandering around in the class, it was amazing, it was really good."

T5: "They need something even when the teacher is talking, they need to do something with their hands, something to occupy themselves with so as to cause less distraction."

3.6.6 Teachers need more specific training about ADHD.

Teachers pointed out the need for more training and professional help regarding classroom management. Similarly, the need for more knowledge about ADHD was accentuated in the analysis. Teachers need to identify the

signs of ADHD, in addition to learning a few more techniques to control the behaviour of children with ADHD symptoms and the whole classroom.

T11: "I'd say training, training, training is a must for everybody that works with children because you never know when you have those challenges or these problems in classrooms."

Ongoing training is vital to keep building up knowledge and professional development. Regardless of teachers' tiring schedules, they pointed out to the need for acquiring more knowledge about ADHD.

6a) Training should be brief and precise

Teachers acknowledged that they have a very busy and tiring schedule and therefore the intervention should be brief and precise.

T13: "At the end of the day the brain capacity is gone. So, the training should be brief..."

T12: "I think if the intervention is strong and short, that probably would be better."

One teacher suggested having the intervention in her spare time.

T10: "Maybe at the weekend, if you leave it (the training) flexible to the teacher because, you know, teachers are really overloaded with work."

6b) Teacher want the training to be interactive and visual

As mentioned previously, teachers emphasised the need for training and acquiring more knowledge about ADHD. Therefore, suggestions for a type of intervention and duration were explored in the interview. Most of the teachers highlighted the heavy workload and the busy schedule. They suggested that visual aids can achieve the goal of the training since they can

engage teachers who can easily get bored or overwhelmed at the end of the school day. Providing information can be achieved through videos or applications that can integrate some examples, and most crucially, provide access at the teacher's convenience rather than in school time. Teachers described the strategies and tips that are the most important part of any intervention; they need strategies that can work and information that is powerful and to the point. Some teachers also suggested having interactive training. They believed that asking questions may clarify ideas. Teachers would also like to have the opportunity to talk to professionals and ask about some specific cases.

T13: "I haven't got the time to sit and read a book after I've marked twenty-six maths books. There's got to be something quick, videos are good because they are quickly accessible. Whereas if you put a book plan, you think really "I've had a day and a half."

T7: "I think more interactive kinds of thing, I think for books you had enough of reading when you were at university"

T4: "If there are counsellors that we can ask, 'This is happening, what could I do?' I think they can give some expert ideas on how to deal with these things."

3.7 Discussion

This study used qualitative data collection and reflexive thematic analysis to allow a deep exploration on teachers' experiences and unmet needs regarding children with behavioural difficulties. Six main themes and eleven subthemes were developed. The six main themes were as follows: (1)

ADHD behaviours can disrupt the learning environment; (2) Teachers are facing particular practical demands on their expertise and practical skills; (3) Supporting ADHD behaviours is overwhelming; (4) Interactions in the classroom can be stigmatising and harmful for children with ADHD symptoms; (5) The existing support for teachers is limited; and (6) Teachers need more specific training about ADHD.

In the analysis relating to Theme 1, "ADHD behaviours can disrupt the learning environment" teachers indicated that ADHD behaviours such as hyperactivity, inattention and impulsivity may interfere with the classroom, thereby interrupting the learning environment and lesson flow. These findings are in accordance with a meta-analysis that investigated the relationship between ADHD symptoms and associated functional impairment, with the results indicating that hyperactivity and impulsivity may lead to classroom disruption (Garner et al., 2013). Furthermore, ADHD behaviour is potentially a catalyst and distractor for other children's behaviour in the classroom. This may be connected to and explained by further qualitative analysis by Ward et al. (2021), who investigated the optimal type of training required to support children with ADHD in primary school in the UK. According to the study, teachers think it is difficult for peers to accept the notion that a child in the classroom is being rewarded for basic behaviour (Ward et al., 2021). Therefore, certain children might intend to behave differently causing greater disruption in the classroom. Such classroom disruption might lead to other ramifications for both teachers and children with ADHD symptoms.

In the analysis pertaining to Theme 2, the teachers emphasised that they are facing demands on their skills and expertise, with children with ADHD symptoms increasing their workload due to requiring additional time and effort to establish particular expectations and special techniques. This is unsurprising, because according to The Teaching and Learning International Survey (TALIS) completed by 260,000 teachers from 15,000 different schools across 48 countries, over 60 per cent of teachers expressed dissatisfaction with the amount of time they spend managing classrooms with disruptive behaviours (Jerrim & Sims, 2019). Similarly, a survey from Finland based on 1,456 primary school teachers was conducted to determine whether children with special needs require extra work and receive sufficient support. The teachers were asked about five different special needs groups, including those with ADHD. The greatest impact across all groups was related to the children with ADHD, with 95 per cent of teachers stating that this condition exacerbated their workload. Additionally, the lowest percentage of teachers expected to receive support for working with this group, at just 20 per cent (Saloviita, 2019).

Further relating to Theme 2, teachers highlighted the need to make an effort to foster strong relationships with children, recognising that this is particularly crucial and can assist with managing students' unacceptable behaviours, which may prove fruitful for both the child and the teacher. As proposed in a previous meta-analysis, a negative teacher-child relationship may undermine children's school attainment and cause emotional and social

problems for the child with ADHD (Ewe, 2019). Moreover, a negative teacher-child relationship can detrimentally affect teachers' wellbeing over the long-term (Huang et al., 2019; Spilt et al., 2011) .

It was evident from the strength of feeling in Theme 3 'Supporting ADHD behaviours is overwhelming', that working with children with ADHD symptoms places significant emotional demands on teachers and exacerbates their stress levels. The majority of teachers in the analysis indicated their feelings of exhaustion due to the children's demands. These findings reflect those of previous research that quantitatively investigated the stress experienced by primary school teachers of children with ADHD using the Index of Teaching Stress instrument which demonstrated that primary school teachers considered teaching children with ADHD to be considerably more stressful than teaching children without ADHD (Greene et al., 2002). Furthermore, the negative effect of student behaviour on teachers has been summarised in a meta-analysis (Aloe et al., 2014), which found that challenging behaviours are linked to emotional exhaustion and low self-efficacy for teachers (Aloe et al., 2014). The Transactional Model of Stress and Coping can facilitate the interpretation of teachers' emotional responses, which may stem from increased demands that surpass teachers' available resources (Lazarus & Folkman, 1987).

Regarding Theme 3, "Supporting ADHD behaviours is overwhelming" teachers described their stress in various ways and with different phrases that indicated different levels of stress, while one teacher did not consider it

stressful. The variation in teachers' stress levels emphasises the strong correlation between each teacher's coping capability and their tolerance of managing these behaviours, as explained by the 3C theory of the competent pathway (Herman et al., 2020). Furthermore, the quotes indicate that teachers respond differently to such behaviours (demands) in accordance with the Transactional Model of Stress and Coping (Lazarus & Folkman, 1987), with some attempting to apply emotional coping by regulating their feelings by reacting emotionally to problems. Meanwhile, others adopted problem-focused coping by actively working to solve problems.

The analysis shows how teachers can feel overwhelmed by ADHD behaviours. Consequently, children may be negatively affected by the powerless feeling of the teachers, thereby potentially indirectly leading the teacher to implement ill-considered strategies and labelling of children as being naughty as discussed in Theme 4, "Interactions in the classroom can be stigmatising and harmful for children with ADHD symptoms". These findings are in accordance with research investigating Korean pre-service teachers' perceptions of labelling, which confirmed that labelling may arise prior to and following diagnosis (McMahon, 2012). Stressed teachers may be less tolerant and more aggressive when working with students with ADHD symptoms, producing a negative impact on the student (Barabanshchikova et al., 2014). Additionally, it has been suggested that people label and stigmatise as a form of self-defence when feeling anxious or intimidated by a certain situation (Thornicroft, 2006). This can also be a sort of emotion-focused coping in order

to reduce negative appraisals of their teaching abilities (Lazarus & Folkman, 1987). This emphasises the crucial nature of fostering resilience in teachers to assist them with managing rising pressure and avoiding negative consequences for both teachers and students.

During the analysis, certain teachers indicated that children with ADHD may feel emotionally devastated for the entire day due to the teacher's treatment (Theme 4). Moreover, they stated that children's behaviour may occasionally be provoked by their teachers. The "burnout cascade", proposed by Jennings and Greenberg (2009), the 3C theory of teachers' stress (2018), alongside the competence pathway, are consistent with the findings of Theme 4. These suggest that stress among teachers is associated with an increase in harsh and reactive behavioural management strategies, which may exacerbate students' disruptive behaviours, leading to an endless spiral of teachers' stress, insufficient classroom management, as well as an escalation of students' challenging behaviours (Herman et al., 2020; Jennings & Greenberg, 2009) (see Chapter 1).

Additionally, this theme can be compared with a previous qualitative analysis of interviews with 13 students diagnosed with ADHD, where the results showed that students had indicated that certain teachers' reactions may traumatise students and provoke their anger (Honkasilta et al., 2016). Stressed teachers may feel less patient when working with children, leading to unpleasant experiences for children (Barabanshchikova et al., 2014). Previous research has also determined that school setting complexity and routines may

prompt ADHD behaviour and detrimentally affect the teacher-student relationship (Gwernan-Jones et al., 2016). The previous point highlights that the teacher-child relationship is dyadic in nature, potentially causing a cycle of disadvantage. Increasing teachers' understanding of the nature of ADHD and its impact on children, alongside effective classroom management strategies, is essential for creating classroom harmony.

Concerning Theme 5 "The existing support for teachers is limited" teachers stated that their access to specific training and resources is limited, although teachers appreciate the SENCo's support. However, they pointed out that SENCos are usually wrestling with a burdensome workload, making them inaccessible. Previous research has indicated that a lack of training and resources is associated with higher levels of teacher stress (Agai-Demjaha et al., 2015; Eres & Atanasoska, 2011). Moreover, lower self-efficacy levels in relation to classroom behaviour management can predict higher levels of stress (Dicke et al., 2014). Interventions aiming to enhance teachers' classroom management skills can provide a sense of capability, as well as reducing teachers' stress (Cheon et al., 2014; Dicke et al., 2015; Dicke et al., 2014). It is crucial to balance between the demand on teachers and the available resources, in order to provide teachers with a sense of control over their work environment, thereby reducing stress. This is in accordance with the Transactional Model of Stress, which proposes that the level of stress experienced is affected by both perceived demands (cognitive appraisal) and resources, for example coping skills (Folkman & Lazarus, 1984).

Given that certain teachers feel challenged by managing ADHD behaviours, it is noteworthy that all teachers emphasised their requirement of professional development specific to managing ADHD behaviour (Theme 6). Such findings are consistent with other studies which evidence that the majority of teachers and teaching assistants would like greater training on managing children with ADHD (; Guerra et al., 2017; Moore et al., 2017; Ward et al., 2021). Specifically here, teachers requested that the training they receive should be precise and to the point due to them being overworked. Additionally, they emphasised the need for training to be available via videos or gadgets which they can use when convenient. Similarly, Ward

et al. (2021) indicated that teachers need training to be accessible when required, as opposed to simply during school hours (Ward et al., 2021). Tracing back to the problem-focused approach from the Transactional Model of Stress (Folkman & Lazarus, 1984), this enables teachers with the essential skills to benefit from a less disruptive classroom environment, which can strengthen their feelings of competency; this is considered as a protective factor against stress. Balancing between risk factors and protective factors is significant for teachers' wellbeing (Prilleltensky et al., 2016).

Teachers in this study discussed the difficulties they face in accommodating the needs of students who exhibit symptoms of ADHD. The fact that teachers emphasised the need for training shows that working with children who have symptoms of ADHD acts as a motivation for teachers to improve their skills. Hoogman et al. (2020) found a link between ADHD and

creativity in children and therefore teachers need strategies for working with these students so that they can showcase their true talents in the classroom. A main driver for teachers is often helping children achieve their ambitions. Interventions may improve teachers' interactions with these students and their ability to support children in successfully realising goals and ambitions. The next study in this thesis builds on this finding and explores how to help teachers to improve their skills in supporting children with ADHD symptoms through improved appreciation of the positive qualities and the positive attributes that children with ADHD can bring in the classroom.

3.7.1 Strengths & Limitations

The author who conducted and analysed the data worked as an early years teacher. She was also trained to work with children with behaviour problems during her master's degree and had worked with children with ADHD and Autism. Being a mother of four boys also predisposed the author to see the other side of the coin, (i.e. allowed her to understand the child's perspective). Being a parent and a teacher provided a broad perspective that may have enriched the data by co-constructing the reality between her knowledge and the teachers' views.

Previous research has stressed the need for qualitative research to explore teachers' experience of working with children with ADHD symptoms to learn about the barriers and the facilitators in providing those teachers and children with better services in the UK. The participants in this analysis were all certified teachers, teaching assistants or SENCOs. Strong themes were

identified and no new patterns were evident in the later interviews suggesting data saturation (Fusch & Ness, 2015).

Furthermore, themes were compatible with quantitative and qualitative findings from other studies in the literature, supporting their validity.

This study has presented potential limitations that ought to be considered when interpreting these findings. First, eight of the participants worked at the same (Muslim) faith school, which was due to the fact that the gatekeeper in this school was particularly supportive of the study. Although this may have reduced the diversity within the sample, it might be helpful in future research as the author is planning to conduct more studies in SA. Teachers from Islamic schools might contribute to the researcher's understanding of teachers in SA as they share similar religious views. It should be noted that most of the teachers from that faith school were native English speakers. The second limitation is that the recruitment was performed using not only gatekeepers but also snowball sampling, which may include selection bias which can reduce representativeness and generalisability (Sharma, 2017). However, this choice was taken due to the difficulties we faced in recruiting teachers by gatekeepers. Snowball sampling can facilitate engaging participants who are hard to reach (Sharma, 2017). Another limitation was that only one of the sample was male which can potentially be explained by the fact that only 15 per cent of primary school teachers in the UK are males (Gender Trust, 2020). Repeating the research with a sample of male teachers would allow contrast of perspectives between genders.

3.7.2 Conclusion & Implications

In conclusion, this study provides a more in-depth insight into teachers' experiences with children with ADHD symptoms. The findings from this study suggest teachers are struggling to support children with ADHD symptoms, which can have a detrimental impact on both teachers and children due to a lack of resources and training. Teachers require more training in managing externalising behaviour in the classroom. Since teachers' workload is a high priority, it is crucial to provide teachers with the appropriate intervention that can fit their limited time. Teachers also prefer a source of education that can be used in their spare time. The lack of teacher-related intervention regarding classroom management of children with ADHD symptoms should be a focus of future research. This study had implications for supporting and providing teachers of children with ADHD with interventions, these findings support the findings of Moore (2017) and Ward (2021) who suggested that more specialized interventions are required by teachers to support children with ADHD. It also detected a gap in the ability of teachers to support all children in the classroom.

Future studies should also focus on teachers' wellbeing because our analysis revealed that teachers' management of children with or at risk of ADHD can have a significant effect on their wellbeing. It would be important to explore the impact of improving teachers coping on classroom management, teacher-child relationships, and children externalising behaviour.

Interventions to help teachers support children with symptoms of ADHD are likely to improve outcomes for children and teachers and improve the

teacher-child relationship. Enhancing teachers' skills in management of ADHD in the early school years could help create a protective cycle of reduction in disruptive child behaviours, lower levels of teacher stress and a more responsive teaching style.

Chapter 4: Evaluating the Feasibility and Acceptability of a Digital Intervention to Support Teachers of Children with ADHD Behaviours: A Qualitative Study

4.1 Chapter Introduction

The findings from the systematic review and meta-analysis of interventions that target teachers of children with externalising behaviours found that they have a positive effect in reducing ADHD behaviours (see Chapter 2). The studies included in the analysis showed a significant positive change in teachers' use of positive strategies (SMD 0.71, 95% CI 0.29–1.14). Also highlighted is the fact that school-based interventions could increase the level of closeness and warmth between teachers and children significantly and moderately (SMD 0.48, 95% CI 0.15–0.81). Interventions targeting teachers of children with ADHD symptoms were also effective in reducing children's negative behaviours towards teachers and increasing prosocial behaviours in addition to their impact on ADHD symptoms.

In Chapter 3, we qualitatively explored teachers' perceptions and experiences with ADHD symptoms in the classroom. Many barriers in effectively managing classrooms with children who have ADHD symptoms were highlighted, and the unmet requirements of teachers were investigated. The lack of funds in schools is reflected in the reduced provision of specialised training for supporting children with ADHD symptoms, while high teacher workloads, and the additional burdens that children with ADHD symptoms may

add to these, affect teacher wellbeing. These barriers highlight a need to develop teacher training that fits within their already-full schedules in order to empower them with the tools to manage their responsibilities more effectively. Digital technology offers the possibility of delivering evidence-based training at learners' own convenience and capacity. This chapter will explore the feasibility and acceptability of improving teachers' capacity to support children with ADHD in the classroom using a mobile app-based training resource.

4.2 Introduction

4.2.1 Interventions to promote teachers' classroom management strategies

Gwernan-Jones and colleagues (2016) highlighted in their systematic review of school factors relevant to successful support for children with ADHD that those children can struggle with the school context. ADHD symptoms could be aggravated and increased by the structured environment and the educational demands placed on those children compelling them to concentrate and follow the classroom expectation. It also can lead teachers to formally or informally label children which can negatively impact on the relationship between the child and teacher (Gwernan-Jones et al., 2016). Labelling and stigmatising is known as a self-protective mechanism when people feel frightened or intimidated by specific situations (Thornicroft, 2006), which emphasises the importance of intervention with teachers to prepare them to face children with challenging behaviours to avoid labelling. It is advised that teachers aim to rebalance the demands on children and integrate them with classroom strategies to create a better classroom environment (Gwernan-Jones et al., 2016).

Despite the importance of school-based interventions, few studies have explored the perceptions of teachers towards their implementation. A systematic review conducted by Moore and colleagues in 2016 of 33 qualitative studies exploring views on non-pharmacological interventions for ADHD in children found that only 10 studies explored the views of educators, seven had explored teachers, parents, or students' views, and none of those were conducted in the UK. This is a concern since the context in which school-based interventions are delivered, including teachers' mental health and attitudes, is likely to impact their effectiveness. The review study findings show that interventions should be flexible and tailored and at the same time should consider a wider school context (Moore et al., 2016). In fact, Moore after his review, went on to conduct qualitative research in the UK to explore teachers' experience with regards to managing students with ADHD. The qualitative study findings of UK educators regarding children with ADHD in schools confirmed the importance of child-teacher relationships and how it can play an important role in classroom management. These findings were consistent with the views of educators from other countries in Moore's first review (Moore et al., 2017), and highlight the role that teachers play in school with regards to children with ADHD symptoms.

4.2.2 Rationale for teachers' classroom management training

4.2.2.1 Workload

An educator's job is considered demanding, both emotionally and intellectually, and teachers as a group work long hours compared to those in other professions (Jerrim & Sims, 2019). Teachers in the UK also work more

hours than teachers in other countries according to the Teaching and Learning International Survey (TALIS) for 2018 (Jerrim & Sims, 2019). Consequently, teachers' workloads have been a source of debate in the UK since at least 2015, when the Department of Education DfE carried out the national Teacher Workload Survey (TWS). Further surveys have been undertaken since that time in an attempt to reduce the workload of teachers. Although the last survey prior to the pandemic showed a general reduction in workloads, seven out of ten teachers still reported workload as being a significant problem (2019). This survey also made it evident that managing poor student behaviour adds significantly to teacher workload. In this study, we will assess the feasibility of using a digital intervention to reduce stress by alleviating the workload on teachers and providing strategies that can support classroom management and facilitate the learning process in the classroom.

4.2.2.2 *Lack of resources*

As discussed in detail in Chapter 1, ADHD is one of the most common childhood disorders, and it is thus commonly found in schools (DuPaul, 2016), with a prevalence rate of about 5 per cent (Polanczyk et al., 2014), while another 5 per cent of children have some ADHD symptoms but do not meet the diagnosis threshold (Sayal et al., 2018). This suggests that around one to three children in every standard class will exhibit challenging behaviour that may highlight any educational and behavioural problems in schools (Daley & Birchwood, 2010). Managing classroom behavioural strategies is thus as important as educational interventions for children with ADHD, based on the functional difficulties they may face in daily life (Piffner & DuPaul, 2015).

However, children with ADHD currently receive more educational support than behavioural support (DuPaul et al., 2019).

According to the Organisation for Economic Co-operation and Development (OECD) (2018), only around half of all teachers in the United Kingdom obtain behaviour management training. This indicates a clear gap, particularly in light of the TALIS survey results, which show that approximately 63 per cent of teachers were unsatisfied with the amount of time they had to spend managing disruptive students (Jerrim & Sims, 2019). In addition, teachers have expressed the crucial need for tailored professional development, based on a qualitative study conducted in 2018 as a response to the attempts to reduce workload in the UK by the DfE. This study included in-depth interviews with 75 teachers, 25 of whom were primary school teachers (2018). One primary school teacher who has been working for about 11 years commented on a training they attend regarding workload management

"We thought we were going to go and receive lots of great tips and helpful advice, and ideas of the sorts of things that we could do. But there was nothing practical said to us at all...the speaker was from industry. They didn't have an educational background, they hadn't been a teacher and none of it was relevant to us at all. We thought we were getting the support we wanted and there was nothing. So the thought is there to help us, but nothing practical is coming out of it." (2018, p. 51).

This concern is reflected in Chapter 3 (subtheme 5b "Training not focused on ADHD in and outside the school") when teachers stated that the training teachers receive during an inset day can be related to

technology or other newly assigned systems in the school rather than classroom management. This study aims to provide teachers with a specialised intervention to support ADHD behaviour in the classroom, trying to fill this identified gap.

4.2.3 Behavioural Interventions

As mentioned earlier in Chapter 1 (1.8.1), Positive Behavioural Interventions and Supports (PBIS; 2022) is a three-tier framework of behaviour support that is implemented in a large number of schools worldwide (McDaniel et al., 2015; 2022). The goal of this framework is to tailor interventions for children according to what they actually need. Tier 1 is concerned with school-wide intervention and support for all children, whereas Tier 2 is concerned with a smaller number of children who have chronic behavioural problems. Tier 3 intervention is focused on children who require a high level of coordination and includes complex strategies such as functional behavioural intervention plans for non-responding students with severe behavioural problems (O'Neill et al., 1990). Tier 3 interventions are highly individualised and are intended for non-responding students with severe behavioural problems.

All of these interventions require time to train teachers on using them which will need to be taken from working hours. It also requires travelling expenses which will require funds (Blonigen et al., 2008). The proposed intervention the researchers are evaluating is digital which offers an optimised usage of available funds. The intervention fits between Tier 2 and Tier 3 as it focuses on tailoring strategies for children with challenging behaviour, but it

requires less coordination as it lacks the feature of monitoring and tracking the behaviour.

4.2.4 Digital interventions

Over the past two decades, the use of digital and computer-based interventions has become increasingly widespread (Andersson, 2018). Moreover, technological innovations such as iPads, tablets, and laptops have been incorporated into the education system. According to the Education Technology survey (CooperGibsonResearch, 2021) approximately 86 per cent of primary schools in the UK possess at least one tablet or laptop per teacher. These mobile devices are convenient to use in a classroom setting due to their small size and long battery life (Engen et al., 2014). However, access to digital technologies for educational purposes increased dramatically in 2020 due to the COVID-19 pandemic, as an enabler of remote study and online education. This has subsequently generated a potentially permanent shift in education systems (Li & Lalani, 2020).

Technology can be used to provide education and knowledge and can be expanded to reach a wide audience, regardless of their physical location (Waldrop, 2013). Due to a reduction in regulatory constraints technological interventions are more accessible and cost-effective than their face-to-face counterparts (Christensen et al., 2002). Users of digital intervention can also complete the training at any time of the day. This provides flexibility for teachers and other professionals who are typically overburdened with work. Health-based treatment interventions have

demonstrated success and can provide highly accessible, economic, and scalable outcomes (Ritterband & Tate, 2009). Such interventions may help alleviate barriers to evidence-based intervention in the school setting.

There are few published digital interventions aimed at teachers to assist in implementing classroom-based therapies for students with ADHD symptoms. These interventions have also been proven effective in improving social and behavioural outcomes (Andersson, 2018; Corkum et al., 2019; Sutherland et al., 2018) however, it is still unclear how teachers view the use of these applications and whether their use requires specific skill sets.

Following the of the Best in Class intervention using face-to-face intervention and coaching, as shown in an RCT with 186 teachers and 208 children with behavioural problems aged 3-5 years (Sutherland et al., 2018), Conroy et al. (2021) replicated it using a web-based version with 22 teachers and 39 children with behavioural problems aged 3-5 years. Teachers were randomly allocated to Best in Class on site or Best in Class Web and the study indicated that both methods were effective. Moreover, the web-based version had a greater impact on teacher-reported closeness relationships, with an effect size more than double that of the in-site group, with 1 and 0.45, respectively. However, in terms of reporting conflict, the web-based version was lower than the onsite version, with effect sizes of 0.26 and 0.29, respectively. The study also indicated that problem behaviour improved in both groups, although the effect size for the onsite

group was greater than the web-based group, with 0.71 and 0.42, respectively. The study concluded that web-based training can offer a convenient approach to professional development in evidence-based practices (Conroy et al., 2021). The means and standard deviations were not reported in this study, contrary to CONSORT standards, hence these results were not included in the meta-analysis in this thesis.

Another RCT investigated the effectiveness and acceptability of a teacher's web-based intervention on 58 teachers and 58 children with ADHD in primary schools. The results indicated that this approach proved its efficacy in delivering strategies regarding children with ADHD and is considered financially beneficial compared to traditional training methodologies. The intervention was also effective in reducing ADHD symptoms based on teacher ratings with SMD of 0.44 but not for parent ratings (Corkum et al., 2019), which may suggest that the strategies are helping teachers cope better and manage the classroom more effectively.

Păsărelu et al. (2020) conducted a systematic review that focused on ADHD applications for a wide range of user groups, including children or adolescents, adults, parents, teachers, or professionals, 108 applications were identified in the apple store, Google Play, and one in the literature. The study only reported the top four most downloaded apps on Google Play. 1. ADHD Assessment 2. ADHD Adults 3. ADHD-Lite Test 4. ADHD Self Test, which focuses on self-assessment. 16% of the applications were empirically based or based on theories. Only seven applications were designed for teachers. The

study concluded that there are a large number of applications on the commercial market, but more research is needed to investigate the content of the apps in terms of theories, and therapeutical strategies (Păsărelu et al., 2020).

4.2.5 Introducing the proposed intervention

This study utilises an application from the Toolbox Behavior Kit (Erickson, 2022), a web-based educational platform. This educational platform, which aims to deliver knowledge to families and professionals, including teachers using technology, was established around 15 years ago in Canada by the psychologist David Erickson, (Erickson, 2022) a specialist in counselling and applied psychology. The strategies in the platform were collected during Dr. Erickson's work in childrens hospitals in Canada for more than 20 years, and the strategies were categorised based on the population of children. The platform has been used by Oxfordshire County Council for about ten years, specifically by the Oxford School Inclusion Team (OXSiT), to support students' families with all the resources in the website using a school passcode (Team, 2022). The platform consists of six products, of which the most recent is the ADHD Behavior Toolbox for Home and School <https://www.behaviortoolbox.com/> (Erickson, 2022) which is available as an application in the Apple Store (IOS). The app provides teachers with strategies to address 30 behavioural and learning concerns associated with the symptoms of ADHD to help deliver a suitable learning environment for children aged 5-8 and 9-12 years. It takes approximately 4-8 minutes to read each set of strategies.

The ADHD Behavior Toolbox contains suggestions for managing the behaviour and learning environments of children aged 5-12 years with ADHD. The mobile application covers strategies for supporting children with a wide range of behavioural difficulties including aggression, distractibility, difficulties following-directions, hyperactivity, impulsivity and disorganisation. The platform includes plenty of evidence-based strategies for children with behavioural problems that had been collected and tested in clinic for more than 20 years. The application was designed to support teachers with strategies for the classroom and help them to deal with children's behavioural problems and cultivate a suitable learning environment for children aged 4-8 and 9-12 years, usable at any time and anywhere - school, home, bus, etc.

The developer was inspired by the theoretical approach of the social learning theory by Bandura (Bandura & Walters, 1977). Social learning theory proposes that individuals learn behaviours by observing influential role models in social contexts, such as teachers, parents, and peers, and imitating them. The key issue is that the behaviours must appear to be reinforced. Bandura proposes four types of mediational processes: the first one is attention, which means that the behaviour needs to be influential to attract the individual's attention. For example, teachers are encouraged to be entertaining, enthusiastic, vary tones, and make jokes to grab children's attention and build friendly relationships with the child. The second one is retention. Attracting attention should be followed

by remembering the behaviour in order to be able to acquire it. The third process is reproduction. This step relies on the first two steps (Attention and Retention). The individual should be able to imitate the behaviour. For example, (1) teachers are expected to exemplify acceptable anger management skills by remaining calm and dealing with frustration. (2) Teachers can introduce the child to a structured peer group where they can observe problem-solving techniques. (3) Teachers can also teach the child to pay attention by emphasising the importance of keeping their eyes on the speaker and their bodies calm while listening. (4) Teachers show the child how to use proper words to communicate feelings, manage conflict, and express frustration. (5) Teachers cue the child verbally when he or she is using inappropriate language and teach the child to utilise words to describe their emotions by teaching them little phrases. Finally, motivation is important to learn, consider, and retain the observed behaviour. This can happen through reinforcement and punishment. For example (1) To demonstrate and document progress, use a progress chart. (2) If the child exhibits impulsivity reward instantly any calm and reflective behaviour. (3) When children are able to stay at their workstation, make sure to give them positive feedback for their control. (4) Reward children who are controlling their behaviour to serve as models for other children with behaviour problems. The ADHD Behavior Toolkit application focused on positive and negative reinforcement for motivation instead of punishment.

4.2.6 Adapting the intervention

The evidence-based strategies in the application can be linked to the theoretical framework of this thesis. The strategies can be linked to the ABC model (Ellis & Grieger, 1986) as they explain the reasons behind children's behaviour, which provides a comprehensive understanding of children's actions (Ellis & Grieger, 1986; Skinner, 1935). They also intend to motivate an improvement in the child's behaviour by using negative and positive reinforcement to increase desired behaviours and decrease unwanted behaviours.

Strategies are also based on emotional understanding, which can be linked to the SEC model (Jennings & Greenberg, 2009). The approach encourages teachers to use positive strategies with children, potentially resulting in the development of a positive relationship between teachers and children. In addition, the aim is to alter the teachers' mindsets resulting in an increase in coping abilities. This can be linked to the 3C model (Herman et al., 2020).

The strategies can be tailored to individual children. The toolkit is widely available at a small cost (£2.49) and is a potentially convenient and relevant training tool. However, to date, there has been no evaluation of its acceptability or effectiveness when used by teachers to help them improve their ADHD management skills.

Teachers can pick the behavioural problem and read a brief description of this problem (see Appendix 11). Then, a list of strategies will appear for the teacher to choose from. Teachers will also have the option

to: (1) Take notes (2) Record the child's nickname (3) Name the file (4)

Read the file on a device, email it or print it.

To use the ADHD Behavior Toolbox in this study, we liaised with the application's developer. He cooperated with us and expressed his willingness to receive recommendations to improve the application's usability (see Appendix 12 for the developer letter). The programming team helped in the technical part, and we purchased 60 sign-ins (accounts) to cover both the qualitative interview study and the pre-post quantitative study. After modifying it to meet our needs, the programmer generated a new app in iTunesConnect intended solely for TestFlight and not for release in the public App Store. For testing and evaluation purposes, we kept the interface minimal, with only the age option and instructor or parent selection required. As a result, only behaviours in the 4-8 year old range would be chosen by default, and instructor strategies would remain. The option of writing the child's codename was also made available. The option to record a week number was included as teachers were encouraged to test new tactics on a weekly basis. The number of behavioural problems chosen to be addressed during the study was reduced to 12 (see Appendix 13 for intervention content). These behaviours were chosen because they corresponded to the behavioural items on the T-SDQ hyperactivity and conduct scale (see Table 2). The tool can also assist the teacher in creating a personalised book for the target child (see Figure 5). This would facilitate future quantitative research to explore effectiveness. The parents'

option was removed, and the age range 9-12 was removed.

Figure 5: Application user guide

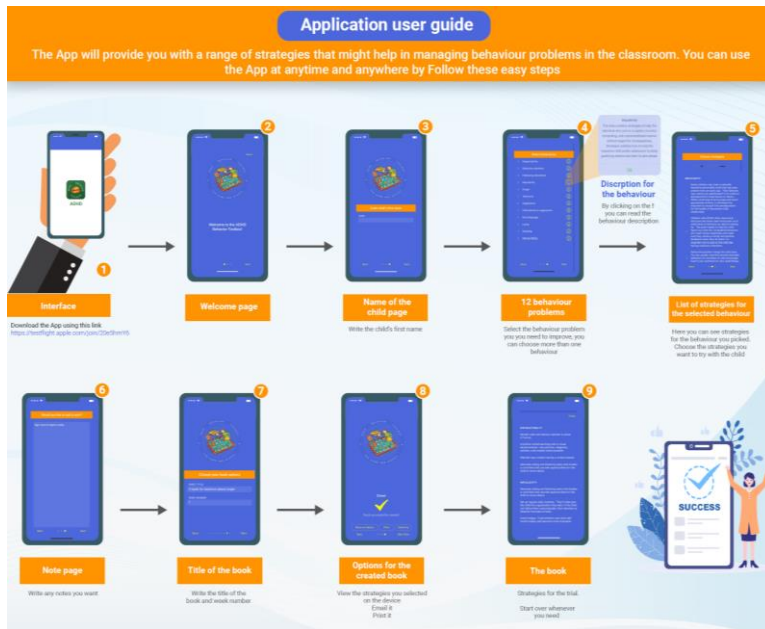


Table 2: Matching the SDQ with the behaviours from the application

SDQ Hyperactivity scale		
Item	The child behaviour	Behaviour from the ADHD Behavior Toolbox
2	Restless, overactive	Hyperactivity
10	Constantly fidgeting or squirming	Hyperactivity
15	Easily distracted, concentration wanders	Selective attention Following direction
21	Thinks things out before acting	Impulsivity
25	Sees tasks through to the end	Selective attention
SDQ Conduct scale		
5	Often has temper tantrums or hot tempers	Angry Tantrum
7	Generally obedient	Following direction Tantrum
12	Often fights with other children	Aggression Alternative to aggression Bad language
18	Often lies or cheats	Lying
22	Steals from home, school or elsewhere	Stealing

We used the Template for Intervention Description and Replication (TIDieR) checklist (Hoffmann et al., 2014) (see Appendix 14), which was developed to report evidence-based health interventions to report the ADHD Behavior Toolbox as described. These reporting standards help to provide a clear outline for the intervention and can increase transparency and enhance the fidelity and implementation of the tool (Woodford et al., 2021). They can also facilitate the replication of the intervention in future research (Appelbaum et al., 2018).

4.3 Research Aim

This qualitative study aims to gain insight into the feasibility and the potential effectiveness of using the ADHD Behavior Toolbox with teachers of children aged 4-8 years with ADHD symptoms. Although the application states that it is targeting children 5-8 years, we were able to include children aged 4 years after checking the strategies are appropriate for this age. We felt it important to lower the age range as children in the UK usually turn 5 during their first year of school, although education is not mandatory until their fifth birthday.

4.4 Research Questions

1. How do teachers feel about using the ADHD Behavior Toolbox to improve management of ADHD symptoms in the classroom?
2. What are their recommendations to further improve the ADHD Behavior Toolbox application?

4.5 Method

4.5.1 Design & Justification

A qualitative study was conducted using semi-structured interviews to gain insight into teachers' views regarding the feasibility and acceptability of the ADHD Behavior Toolbox. The qualitative design allows the exploration of teachers' viewpoints on using the ADHD Behavior Toolbox when working with children with ADHD. The interviews explored teachers' thoughts toward using the app, the design, and the content. Their recommendations for improving the app were also gathered. Collecting this information can help to improve the app and facilitate conducting an RCT in future studies which can increase the potential of implementing the app in schools with a wider range of participants based on the MRC framework (Craig et al., 2008; Skivington et al., 2021) .

4.5.2 Materials

The interview schedule (see Appendix 15) was developed to guide the interview. It was designed to meet the needs of the study by asking semi-structured questions about the design and content of the ADHD Behavior Toolbox. The interview focused on questions about teachers' feelings regarding the intervention and recommendations to improve it, in addition to teachers' demographic information that can be used in describing the sample. The questions focused on usability and functionality of the application. They also asked teachers about whether they had suggestions to improve the application. The conversational method was used to form the questions (Kvale & Brinkmann, 2009) starting with broader questions then moving to more specific ones (Rubin & Rubin, 2011). The questions allow participants to share their opinion and experiences in using and reviewing the ADHD Behavior

Toolbox application. The interview schedule was piloted with one teacher, prior to conducting the interview, and appropriate adaptations made. For example previously the interview started with questions about the content of the app and then moved on to exploring the features of the app; this was changed in the final version of the interview guide to begin with the downloading process and feature then the content and strategies of the app.

Interview questions were as follows:

1. When did you download the app? Was that onto your phone? How did you find the process of installing the app?
2. How did you find navigating the app?
3. What about the process for keeping notes?
4. What aspects of the app's design did you like?
5. What aspects of the app's design could have been improved?
6. Can you tell me a bit about how often you accessed the app and in what circumstances?

7. How did you feel about the app's approach to supporting children with symptoms of ADHD?
8. How does it fit with your own practice?
9. How does it fit with your training in classroom support for ADHD (if applicable)? What did you think about the content of the app?
10. How would you use the app to support children with symptoms of

ADHD?

11. Were you able to apply some of the strategies with children in the classroom?
12. Are there any features that you feel would be particularly useful?
13. Is there anything that would be difficult to use? How can you see yourself using the app in the future?
14. Can you see this app becoming part of routine practice in your school?

4.5.3 Recruitment

Initially, emails were sent to three gatekeepers (headteachers or SENCOs), explaining the study. Two gatekeepers expressed frustration due to the COVID-19 pandemic and the workload pressure on teachers; therefore, they were not able to help. The third gatekeeper distributed the advertisement and the short infographic clip explaining the study to teachers <https://youtu.be/zSJ9lgTWOQg>. In addition, a snowball sampling technique was used to increase sample size and improve sample diversity.

4.5.4 Participants and Sample Size

A purposive sampling method was used in this study through gatekeepers to gain access to teachers of children with ADHD symptoms aged 4-8 years. The inclusion criteria were teachers or teaching assistants who had access to the application on iPhone or iPad (Apple users) and who were currently working or had previously worked with children aged 4 to 8 years in UK schools. The target sample size was 12 to 20 teachers. Guest et al. (2006) suggested that data saturation can be reached within the first twelve

interviews, at which point no additional information or coding is retrieved from the data (Guest et al., 2006), and the recurrence of the data can ensure the replication of themes (Fusch Ph D & Ness, 2015; O'Reilly & Parker, 2012; Walker, 2012). According to Crouch and McKenzie (2006), a small number of participants, fewer than 20, can “facilitate the researcher’s close association with the respondents, and enhance the validity of fine-grained, in-depth inquiry in naturalistic settings” (Crouch & McKenzie, 2006, p. 483). However, this number can be increased if data saturation is not reached.

In total 15 interviews were conducted as the researcher determined that sufficient data had been obtained and that additional interviews would result in redundancies (Fusch & Ness, 2015; Morse, 1995; O'Reilly & Parker, 2012; Walker, 2012). Three teachers were not eligible for the study as they were not Apple users. Two teachers withdrew from the study, one of whom texted the researcher and apologised for failing to participate as she was overloaded with work and at the same time, she was a part-time student. The other teacher did not provide any reason and did not respond to the email reminders. Each interview lasted between 15 and 30 minutes, with an average of 19 minutes. In total fifteen teachers participated in the study, all of whom were working with children with symptoms of ADHD (see Table 3 for demographic characteristics). Due to a school closure a few weeks after the study began, only five teachers were able to implement the strategies with children.

Table 3: Demographic information

Gender	
Female	15
Male	0
Role	
Teachers	9
SENCO	2
Teaching Assistants	4
Age	
20-29	4
30-39	8
40-49	3
Educational Qualification	
QTS	4
PGCE	11
Teaching Experience (years)	
0-5	5
6-10	3
11-15	3
16-20	1
21-25	3
Specialist training in ADHD	
Only school training	11
Specialist training	4

4.5.5 Procedure

To join the study, interested teachers emailed the researcher. After verifying their eligibility to participate in the study, a link to the study was sent to teachers using the Jisc Online surveys tool (formerly BOS). This gave them access to the participant information sheet and enabled them to electronically sign the consent form (see Appendix 16). The teachers had to provide their email addresses and mobile phone numbers on the consent form to enable the researcher to confirm their consent and facilitate communication with them. A link to download the application, the application user guide and the short infographic manual clip appeared after the electronic consent form <https://youtu.be/V0qrEaYTUas>.

Teachers were encouraged to text the researcher if they experienced any problems when downloading or using the application. The first few teachers faced some technical issues when downloading the application. We were advised by the Apple Store to invite teachers by email using another link, which resolved the issue. This email also contained the application user guide and the short infographic manual clip.

Once a teacher had successfully downloaded the application, they were asked to text the researcher to confirm the download. As the study was carried out during the Covid19 pandemic, teachers were encouraged but not compelled to use the strategies on children. Teachers were encouraged to read through the application and try some of the strategies with a student exhibiting one of the 12 listed behavioural problems.

Prior to the start of the study, the infographic manual clip was sent to the teacher, (<https://youtu.be/V0qrEaYTUas>) it explained how to use the application by describing a step-by-step guide on how teachers can use the app to learn behaviour strategies. Teachers can choose from the list of behaviour topics and strategies that they think are suitable for them. Then the app will put the selected behaviour strategies in one folder, which the user can access, print, or email to themselves. Teachers are encouraged to use the selected strategies with children. At any time, teachers can restart the selection process. Teachers are advised in the information sheet that they can text the researcher at any time if they have any questions.

4.5.6 Ethical considerations

The study gained approval by the Division of Psychiatry and Applied Psychology Research Ethics committee on 16/04/2020 and was amended in two subsequent submissions (02/06/2020 & 03/11/2020) based on COVID-19 restrictions [DPAP - 2020 - 0429 - 2] (see Appendix 17). In order to proceed with the study, participants were required to read the Participant Information Sheet and Consent form. Participants were given a verbal explanation of the study's goals and assured that teachers, children and schools would not be identified in any way. When transcribing the interviews, no identifying information was kept, such as children's or teachers' names. The researcher tried to make the interview comfortable for the participants, for example they were given the option to pick the type of interview to be video or audio. At the same time, researchers made sure that participants knew they could withdraw at any time. If the researcher suspected that a participant was distressed, they would report immediately to the supervisor and ethical committee in their school, in line with the Code of Research Conduct, Research Ethics of the University of Nottingham (2021). If deemed necessary, they may advise the teacher to contact the Education Support Partnership helpline (Powell, 2023).

4.5.7 Data Collection

After three weeks of using the application, the researcher texted the teachers to schedule an interview appointment at their convenience and then details of the interview appointment were texted to them. RD conducted the interviews between 1/12/2020 and 06/05/2021 and were recorded using ZOOM application (nine video and six audio), based on teachers' preferences.

The interview started with the researcher introducing herself to the teachers as a PhD student within the Division of Psychiatry & Applied Psychology, School of Medicine, University of Nottingham. She also mentioned that she was a teacher in KS1 and that she had completed a master's degree in special education and behaviour support. After that, she worked one-to-one with children with ADHD and autism. In three interviews, a third-year medical student was present for training purposes and with the permission of the teachers. The researcher spent about five minutes engaging with each participant to explain the study aims and the researcher's background and intentions as well as obtaining verbal consent from participants. In some cases, a conversation with the teacher reflecting on the experience was carried on after ending the interview for about 10 minutes. A £30 thank you voucher was sent by post to teachers after the interview. Recordings were transcribed verbatim by RD (see Chapter 3 for detailed methodology for transcription).

4.5.8 Reflexive Statement

As noted, I used to teach children in the age range of concern, and I am thus painfully aware of how hard it can be to work with children with challenging behaviour. This experience encouraged me to return to my studies to get a master's degree in Behaviour Management for Children with Special Needs as I mentioned earlier in Chapter 3.

Moreover, during the time of the data collection, having seen the huge amount of work teachers undertook during the pandemic, and being myself confined at home with four children, I noted how hard teachers were working to gain children's attention and to motivate them to participate, do homework

and send them to their teachers, and this confirmed to me once again that supporting teachers with sufficient resources is vital, as teachers are naturally eager to help students. The difficulties imposed on schools due to Covid-19 restrictions has also increased the need for support for virtual learning, not only for children, but also for teachers. I am thus eager to report the results of this study to the application creator to improve it, based on its potential for supporting teachers, and based on teachers' recommendation, as I believe that digital interventions have the potential to facilitate teachers' personal development and minimise engagement problems, particularly those that have been imposed by responses to the Covid-19 crisis.

4.5.9 Reflexive Thematic Analysis

The current study used reflexive thematic analysis to analyse the collected interview data and report the main themes utilising the six phases of Braun and Clark (2019), which have been previously described (see Chapter 3). Reflexive thematic analysis seeks to examine patterns of meaning in the data (Braun & Clarke, 2019). It aims to capture meaning at the latent and manifest level, seeking to find the recurrent concepts among transcripts (Braun & Clarke, 2019). TA was considered suitable for this exploratory study as it aims to understand people's experiences or understanding (Creswell et al., 2004). Reflexive thematic analysis will be used inductively in this study.

The Computer Assisted Qualitative Data Analysis Software (CAQDAS) NVivo was used to aid the analysis process, and works as a data management program that can help in reducing human error (Welsh, 2002). The NVivo software package facilitates users in managing and organising

data, it also can provide technological support which can make coding easier. NVivo allowed the researcher to rearrange codes by providing visual understanding, facilitating the code pattern and relations recognition and assisting in generation of themes. The main purpose of using NVivo was to help the researcher in organising the qualitative data during the qualitative analysis but not to analyse the data (Zamawe, 2015). NVivo and other CAQDAS cannot ensure full support for the analysis (Maher et al., 2018). In this study NVivo was used as a tool to store, retrieve, and organise the data. It was used in conjunction with traditional tools such as paper, highlighters, and sticky notes to allow deep immersion in the data and a rigorous analysis (Maher et al., 2018).

The researcher (RD) conducted the interviews, transcribed the scripts and kept interview notes. She also conducted the interview and met with the participant before and in some cases after the interview.

Three teachers' scripts were checked as part of participant validation to verify credibility (Lincoln & Guba, 1985; Terrell, 2016). The initial themes were checked by two team members RD and CG while documenting all meetings discussing the themes (Cooper, 1997; Terrell, 2016). Mind mapping helps to connect codes and themes, understand their relationships, and track their progress (see Appendix 19). This helped in reaching full interpretation, while ensuring trustworthiness (Lincoln & Guba, 1985). The analysis also included negative case analysis. This involved locating the opinions which argue against the meaning derived from the data (Lincoln & Guba, 1985; Terrell,

2016). Script quotations were also included for each theme, as recommended by the American Political Science Association to ensure transparency (APSA, 2012), and transferability (Terrell, 2016).

4.5.9.1 Data Analysis

After the fifth interview, the transcription and coding process began. After interviewing 12 educators, RD felt there was redundancy in the codes, consequently, three more teachers were recruited to ensure data saturation, and the data was deemed sufficiently saturated (Fusch & Ness, 2015; Glaser et al., 1968).

Braun and Clarke's (2019) six-step method of reflexive thematic analysis was used to conduct the analysis. To begin, RD listened to the interview audio recordings, transcribed them verbatim, read them, and read them again to get a feel for the material. Any names were removed to ensure confidentiality. Second, Nvivo software was used to identify and organise the codes. Throughout the entire process of data collection, coding, and analysis, reflective journals were kept using NVivo. The initial themes were checked by two team members, RD and CG, and all meetings discussing themes were documented. The reliability of the group was checked through peer debriefing and member checking. Third, RD began developing a deeper significance for the themes' presented codes. The relationships between the themes were mapped out using NVivo to help in connecting codes and themes, and understanding their relationships, and tracking their progress (see Appendix 18). This helped in reaching a full interpretation. This phase also made use of peer debriefing and member checking. An external auditor

(EL) confirmed the themes after they were named and refined. Themes were presented at the CANDAL conference, where feedback was also collected.

The completed themes and subthemes were gathered into a report. Reflective journals were made easier with the help of NVivo, and the analysis also included negative case analysis. This involved locating the opinion arguing against the meaning derived from the data. Script quotations were also included for each theme, as recommended by (COREQ) for reporting qualitative research (Tong et al., 2007) and the American Psychological Association (Levitt, 2020) to ensure transparency (APSA, 2012), and transferability (Terrell, 2016).

4.5.10 Trustworthiness

To ensure trustworthiness, it is important to follow a rigorous method for analysis of the data (Nowell et al., 2017) and TA steps can provide a systematic way of analysing data. Furthermore, as explained in detail previously (Chapter 3) section 3.5.10 four factors can contribute to trustworthiness: credibility, confirmability, transferability, and dependability. In this study, these four factors were enabled as much as possible. Prolonged immersion in the data, can ensure trustworthiness (Nowell et al., 2017) and credibility (Terrell, 2016). The study followed COREQ guidelines for reporting qualitative research (Tong et al., 2007) (see Appendix 19), and used NVivo, member checking, and mind mapping to certify credibility and transferability (Lincoln & Guba, 1985; Terrell, 2016).

4.6 Results & Themes' Description

After analysing the data gathered from the interviews with teachers, six themes and related subthemes were developed from the data, (see Figure 6).

Figure 6: Overarching themes and subthemes study 3

1- The ADHD Behavior Toolbox strategies are perceived as effective.

2- Educators are comfortable leveraging modern technology.

3- The concept, layout, and functionalities of the ADHD Behavior Toolbox are appreciated.

4- The functionality and presentation of the app could be improved.

- a) The app could be adapted to record more than one child.
- b) The app could measure the progress of the child's behaviour and be a centralised shared platform.
- c) The presentation of the app could be improved by adding visual materials and clickable subheadings

5- Strategies are helpful for teachers at different stages in their career.

- a) The app can support Newly Qualified Teachers.
- b) The app can be a good reminder for experienced teachers.

6- The ADHD Behavior Toolbox could be incorporated into practice.

- a) Brief trainings can help busy teachers to manage classroom behaviour.
- b) There is a lack of resources.
- c) Teachers want to use the app after the trial.

1- The ADHD Behavior Toolbox strategies are perceived as effective.

The app's strategies were well received by teachers. It was a limitation of the study that although all teachers had viewed the app only five teachers had been able to utilise the strategies with their students due to the Covid-19 restrictions. Teachers who had the opportunity to use recommended strategies with children gave more in-depth and nuanced responses in which they shared their experience with the app in addition to their opinion and view of the app. However, the majority reported they appreciated the app's techniques and the concepts presented. They also mentioned that the app's strategies were adequately described, succinct and easily understood.

T 7: "All the strategies are very well explained. It was very easy to follow, and it doesn't give you all the fluff and all the hassle. "

One of the teachers particularly appreciated the strategies that addressed coping mechanisms for children that can aid their regulation of their impulsivity. For example, you may teach the child to create a C with their thumb and index finger to remind them to be calm when needed, or you could tell the child that they would be rewarded after the surprise spot check in the classroom or during an activity.

T 11: "I loved the strategies. They had fantastic coping mechanisms for the children that the teacher could go through with the children to make them cope with the impulses. I found the strategies really good for that."

Teachers indicated that the strategies in the app can help in the establishment of a teacher-child bond. One teacher pointed out that although

improving teacher-child relationships was not an explicit aim, the strategies did help to strengthen this relationship.

Teacher 12: "The focus on relationships is strong, I think there are a lot of concepts around relationship building, but not discrete, so it doesn't tell you have to build this relationship, but it gives you these sorts of strategies."

Teacher 11: "The strategies focus on building the relation with the child, and even going through the situations with them is really useful."

One of the teachers described the target child who is experiencing behavioural issues as follows:

T 1: "He's been the one that's had that star next to his name because I've found it really difficult to find the connection."

She applied one of the strategies that encourages teachers to conduct 1:1 conversation regularly with the targeted child. Every day, she would spend a few minutes with him as the kids were getting ready for lunch. She would let him wash his hands ahead of the other children, and then he would stay with her while the other children waited in line. She saw that the child grew to need and request this quality time. He knew that she was not an opponent.

T 1: "Despite him being really standoffish with adults, he actually really wants that adult attention. He's craving that now, so he will ask if we've not had that time together, like if we've been really busy, 'Can we talk?'. He likes to walk down to the dinner hall and hold my hand, and that's something new."

The teacher also expressed how her perspective on the child had shifted and how this improvement affected her self-esteem as a result, noting,

T 1: "I got to know him as a little boy, as a child in my class that's presenting with these behaviours, which is really nice and it's something that I'm really proud of myself and of my relationship with the child."

She also elaborated on the efficacy of the strategies she used with the student on reducing his unwanted behaviour, and how she succeeded in forming a friendly relationship with that child by expressing,

T 1: "The strategies helped me to look into it more and the strategies helped to kind of build that, and we're seeing progression now, so it's definitely something I'm going to continue to do. I found that helped, and his aggression kind of calmed."

Another teacher used one of the strategies targeting a child who experienced difficulties in concentration by breaking down tasks. The strategies also suggested that fatigue can provoke a lack of concentration and hyperactivity, and showed how breaks can prevent fatigue.

T 2: "We actually had breakout tasks for the child. So we had like, short bursts of time-timetabled tasks, focus tasks, and then we took the child outside as well. That was quite a valid point."

One teacher noted that she highlighted potential difficulties with a child who had difficulty following instructions, but by simplifying the little requests she gave him, he responded positively.

T 6: "Actually, I applied the strategies of following directions to a pupil. He is six years old. I tried to change my way of dealing with

him and I found it effective. For example, when I used simpler requests, he reacted exactly as I wanted."

Another teacher attempted to use eye contact with the child and gestures to remind him of what they were doing in the classroom. She found that making eye contact and engaging gestures while teaching could divert a child's behaviour without embarrassing or frightening them.

T 5: "This child in particular just doesn't always take instructions very well and it is just his attention. And I think one of the things that I found very useful with him was constantly trying to kind of maintain my eye contact with the child, I don't like to be direct. I don't want to say something in a way that will almost scare the child. That will make it more uncomfortable. I think the gestures and stuff that I've read through here and just redirecting has been really useful."

One of the teachers used some of the lying strategies on a child and found them helpful. The teacher's approach centered on not punishing the child when they were caught lying, but rather on determining the cause for the behaviour, whether it was seeking attention, avoiding punishment, or simply that the child couldn't tell the difference between imagination and reality. After that, the teacher established communication to explain why we should still tell the truth, and taught the child to acknowledge mistakes by praising them when they tell the truth.

T 13: "I liked that the strategies explained why children lie, and then provide strategies. I used a few of the strategies when I did find out she was lying. I didn't make a big deal out of it, and I just talked to her about it and explained to her why it's wrong and the negative

association as well. I don't make it such a big deal and I reward her when she does tell me the truth, like telling me the truth is much better than lying. She's much better when it comes to lying."

2- Educators are comfortable leveraging modern technology.

One common viewpoint expressed by interviewees was that teachers find the idea of using and downloading the app to be quite natural, given that they now use iPads (in schools) and iPhones on a daily basis. For example, one teacher said:

T 1: "I think that probably comes from being quite technologically-minded. I can put my mind to a lot of technical things."

T 12: "We are in the age and days where we are used to downloading apps."

T 9: "We're in the 21st century. Everyone has access to their phone, so it's very useful."

Teachers also alluded to the concept of transitioning from paper-based processes to electronic ones not only in school but in everyday life by saying,

T 1: "We're moving away from paper in everything, not just in the academic world and education, it's moving away in day-to-day life. You don't receive bank statements through the post anymore, it's done online."

T 12: "Most schools that I know are using iPads and moving away from notes."

They also prefer to read on devices rather than paper or email, one teacher said,

T 9: "Instead of giving lots of papers, a lot of comments or sending emails with lots of information, some people tend to not really access and read all the information. You read on your phone rather than having lots of documents to read."

One counter-quote was identified in which a teacher argued against having the app on the iPhone because iPhones are not permitted in their school.

T 4: "We're not allowed our phones in school at all."

However, another teacher emphasised that although iPhones were not allowed in schools, iPads are readily accessible.

Teacher 2: "In schools now, we use a lot of technology. We cannot use phones, but with iPads, teachers do have access to iPads, and iPads are with them all the time anyway, to carry around."

3- The concept, layout, and functionalities of the ADHD Behavior Toolbox are appreciated.

Teachers in the study liked the idea of the app and the design's simplicity of use. They valued the easy-on-the-eye colours and typography which is simple to read even for people with dyslexia or vision problems.

T 5: "It's relatively user-friendly."

T 10: "I like the font, because you are always thinking about what is the good readable font you know for people who have dyslexia or visual things. I like the contrast between the blue and the white. It's easy to read. "

T 15: "I think overall it is a nice simple model that everyone can get on board with."

Teachers appreciated the features of creating PDFs, adding notes, and simply emailing the PDF. They suggested these features can help in building an exclusive plan for the child, enabling teachers to keep track of what they are using with the child. That way, teachers can check on a student's file at any time which can facilitate their job.

T 2: "The good thing here is that you can actually save that child. You can save the behaviours that they're doing, which is useful, because then you've got a reference point which you can go back to."

They also appreciated the app's ability to assist in the curation of a collection of strategies for dealing with a child who exhibits more than one behaviour problem, so that you will have suggestions for how to deal with that specific child and you can add your notes to the child profile in the app.

T 7: "I think it's good that you could select more than one behaviour because it kind of gives you a profile for that student rather than, you know, dipping in and out to check. It's useful for a classroom teacher because you can directly write in, 'This student has this or this'. You've created a bank of resources."

Teachers can provide evidence to SENCOs, using the note function and compiling book. It can help expedite the referral process, which can facilitate diagnosis and the allocation of funds to children in need.

T 2: " It's good to collect that evidence. And obviously, give to the SENCO, who can obviously find out whether there's any funding for the child or next step collaboration for parents. It's really good so far."

It can also aid in getting parents to collaborate, as teachers described sometimes struggling to persuade parents to collaborate as some parents may view the teacher as an adversary.

T 1: "This is our evidence, because sometimes it's really hard to get the parents on board because of the time that we're working against them."

Teachers also noted that the app can be an excellent source of information for principals and even Ofsted, as Ofsted requires schools to record every behaviour event that occurs in school. Utilising this app enables you to provide evidence that the school is working on resolving the incident.

T 11: "It's a bonus point for the school, I hate to talk about Ofsted, or the local authority, but we're all under scrutiny. That would be showing them that we're actually not just recording the incident, we were actually coming up with ways to deal with situation."

4- The functionality and presentation of the app could be improved.

Teachers identified different ways in which the ADHD Behavior Toolbox could be improved.

4a) The app could be adapted to record more than one child.

Teachers said they would prefer to have the application save more than one child's record. This could help them manage all children exhibiting problematic symptoms, as they usually have more than one child in the classroom.

T 4: "You've got these six children, all with differing needs, but they've all got behaviour issues. You then can't see them all at once."

T 10: "If you're tracking more than one. it would just be nice to be able to see the list of children that you have got, without effort."

Some teachers even advocated for a class-based level. They stated that they teach more than one class, and each class may have more than one child with behavioural issues. Notes for each class that a teacher is teaching might be kept in the app, with easy access by class name and then by child's name.

T 13: "As a teacher, I'd like it all to be in one place, and then if I can compile them to make one book, for example, I teach year two. I have one for year two with a group of children."

T 4: "It would be much better if I could click on my class profile.

Child A and Child B were two of those children that I wanted particular attention drawn to for behavioural issues. That was the function that was lacking."

4b) The app could measure the progress of the child's behaviour and be a centralised shared platform.

Teachers also proposed that a behaviour tracker option be added to evaluate the child's behaviour. This can aid in the documentation of the start date which can help teachers in assessing the situation and tracking the child's behaviour as well as in judging the effectiveness of the set of strategies they are employing.

T 1: "Having a progress tracker gives you that extra bit of reference to say if the child is listening to those instructions, the child worked really well on that day, and then what was the difference between

that day and three days later? So I think it would be quite nice if there was an element of being able to track."

Teacher 9: "The app can have a section where it can track how the child did with his behaviour."

T 2: "To know how successful you were, like maybe even the date that you started trying the strategy, or some sort of tracking to say which of the things that you've chosen are working."

Teachers also advised that the application be linked to other applications currently in use at the school to provide a more comprehensive picture. Some teachers mentioned using software to track their students' academic goals and compare them to their accomplishments. As a result, they advised that this app be linked to it to track educational goals alongside behavioural ones.

T 15: "We are using a programme called Tapestry. It keeps track of a child's skills and growth in school. Having the app linked to Tapestry would be great because it would be able to show you how to solve any kind of behaviour problem and keep track of your progress."

Another teacher recommended linking the app's techniques to a system used at their school to track students' behaviour, knowing that this programme does not give any strategies and is solely intended to track behaviours.

T 11: "In our school, we use a tracking system for behaviour. It's a behaviour grid. If it could be linked with the strategies on the app, other than just making this recording for the child, that would help the school."

The teachers also recommended that the app be more interactive in order to facilitate information sharing among the team members working with the child. To clarify, the app can be a centralised platform shared between teachers, parents, SENCOs. This also allows parents and anyone working with the child to use the same methods as teachers, which can help maintain consistency and effectiveness.

T 1: "We work as a team around the children, other teachers, pastoral, SENCO, and parents. If the child can have an account and all the team can log in to it then for example, parents can get on board. Sometimes it's really hard to get the parents on board. So I think having just maybe the option for other people to be involved, not only parents but other professionals, so we're all working on the same page, which is really key for continuity."

T 2: "The only thing is, if there is a way that this information could easily be passed on to someone else? So, in school, we have to send information to the next year's teacher. So obviously, this is on my device, but if there is a way of sharing this with headteachers or person staying in post so they could see what he's done, something you can add."

T 11: "You have the music teacher and the French teacher, they all need to know what to do with that child, you need a way to share information."

Another idea was to involve the child, which would give them a sense of control and authority over the situation.

T 11: "Linking children, parents as well... because you don't want them to be isolated, it's all about empowering children right, so if you like them having sight of the strategies that we're trying for them, I think that a child voice in the app might be something."

4c) The presentation of the app could be improved by adding visual materials and clickable subheadings.

Some interviewees thought the programme to be somewhat wordy. It was suggested to place the top five strategies first and a link to the rest of the strategies last, as teachers are busy and want to pick the most important ones. It was also proposed that the approaches be turned into clickable subheadings, leading to more detailed description.

T 13: "I think if each point was a little bit shorter, or there was a title for each point that you could click into, and they give you more information. Each one seems a bit lengthy."

T 14: We haven't got time to read words."

It was also recommended to use images to demonstrate the behaviour rather than writing the name of the behaviour. Teachers also commented that the application lacked sufficient illustrations and suggested adding some links to clips or printable templates. The use of images can make it simpler for teachers to recognise the behaviour while adding the printable templates or clips can make it more visual.

T 2: "The only thing I thought was just having some picture symbols. It's not imperative, but it's quite nice for teachers if they are looking through and you want something quite quickly, you can get, 'oh - that's definitely angry'."

T 12: "I think it'd be good to have more visuals. It's got to be something that's really quick to access and really quick to identify visually...The only thing that I would add, practical examples of activities that might promote this, printable downloadable resources, or maybe a video clip of that being shown in action."

5- Strategies are helpful for teachers at different stages in their career.

Teachers at various stages of their careers have highlighted the necessity for classroom management in order to create a healthy learning environment in the classroom. The majority of educators agree such techniques are beneficial for both novice and experienced classroom teachers.

5a) The app can support Newly Qualified Teachers (NQTs).

Participants perceived the app to be beneficial for less-experienced teachers because they lack experience working with children who have behavioural problems.

T 9: "It's very interesting, especially if you give this approach to, for example, new employees, and teachers who don't really have experience working with children with behaviour problems."

T 3: "Strategies are good for newly qualified teachers. "

T 5: "I think it's brilliant for people that are going in to teaching for the first time. I think it's fantastic and necessary."

They also mentioned that counsellors might use the app to offer ideas and provide inexperienced teachers with useful strategies to utilise in their classroom.

T 14: "I could see it being used by newly qualified teachers or their mentor, and the mentor can then say, 'Try these strategies!'."

It was also suggested that the app can offer an inexperienced teacher an explanation for why the child is engaging in this behaviour and what can encourage or prevent that behaviour.

T12: "Practitioners who are new into the profession or have little experience with children for example don't understand why children would lie. I think being able to access that information at your fingertips will be quite useful."

The importance of the app for freshly graduated teachers was acknowledged by new teachers. Teachers said that new teachers want to be up to date with techniques, and they spend a significant amount of time looking for ways to help students in the classroom. They felt that such an app may be particularly useful to them.

T 7: "As a teacher, I'll just have it straightaway because I'm still new in the position I'm in. I always want to be sort of at the forefront of the research and strategies, so I want to do everything that I can as much as I can. "

T 15: "As a newbie to teaching, I find it time consuming to search for strategies for certain behaviour; this app can save me time."

Some teachers with experience acknowledged the need for the app and strategies for new teachers but felt they had enough experience with children or enough training in classroom management and would not need the app.

T 10: "I have that lens and have special educational needs training. I don't know if I would use it so much, but for a teacher who has less experience with children with SDN, I feel like it's clear. I feel it's useful."

T 4: "I've got 23 years under my belt. If I was newly qualified, I think I'd probably have a very different opinion, in terms of how useful it was as a tool."

However, one counter-argument was expressed in which the teacher believed that the app's strategies were already recognised and that teachers had received training on them.

T 14: "We already know lots of this because that's been our training."

5b) The app can be a good reminder for experienced teachers

Some teachers remarked that it is even useful for experienced teachers as a refresher because they might forget some of the knowledge they have gained in the past.

T 11: "I think it is helpful for all teachers. I think it would really help teachers to have these reminders. Or maybe they don't know about the strategies."

Teacher 5: "I think it's an old wives' tale if people think 'I've been teaching for 15 years and I don't need that training'. I think that's absolutely ludicrous. It's important for us to constantly remind ourselves that things are constantly evolving and changing, and it's good for us because we learn as much as the child learns."

T 3: "The strategies are broken down into each behaviour, and then have suggestions for each behaviour. Sometimes you forget certain things and it's nice to just have that reminder there."

6- The ADHD Behavior Toolbox could be incorporated into practice.

This theme captures how and why the ADHD Behavior Toolbox could be incorporated into teachers' practice and training.

6a) Brief training can help busy teachers to manage classroom behaviour

Teachers felt that the app would help them do their jobs more efficiently.

They believe that the strategies and the usability of the app can help improve classroom management and provide an easy-to-use tool in the classroom if they experience an issue with students' behaviours.

T15: "I think it's good to have fresh strategies and new ideas that I can adapt to how I'm working and how the child behaves."

T8: "It's useful for teachers to use such an app to help us. It's very handy."

It is also believed that the app might be beneficial to the time-pressured lives of teachers.

Teacher 6: " Teachers' lives are really busy, and sometimes you need something that helps you highlight the main issues, so I think this application will be one of them."

Teachers appreciated the concept of having the ability to read at any time and from any location. This can provide a more adaptable approach to learning.

T 13: "It is actually really, really good because you can just go in and out and jump in and out of it, and speak, and just like, you know, see what you can use in your real life situation, whether it's at home or even at work in a classroom setting, so I think it's really good like that. It worked well for me."

Teachers also think that they need training as they can forget what they had learned previously.

T 7: "The issue is, whether when I was a student or even now as a teacher, is that sometimes we forget."

6b) There is a lack of resources

One of the most prominent issues among participants was a lack of training. Teachers suggested that the training they receive is insufficient to help them manage their classrooms. According to teachers, the causes of a lack of resources might be financing or the limited time teachers have due to their duties.

T 2: "We should have more training. I think it's the time, I think it's funding, I think it's the situation that we have got. I do feel if we had the time, if we were trained correctly. We would really benefit from having known all of this information prior to teaching children with these issues."

T 7: "We do struggle with having enough knowledge and enough resources available to us to be able to deal with children effectively."

T 11: "We don't get a lot of training on that, you think we do, but we don't."

6c) Teachers want to use the app after the trial

Teachers demonstrated their desire to continue using the app by inquiring whether they could continue to use it after the end of the study.

T 3: "Can I continue to use it?"

They were also eager to test new strategies and learn more about them. They believed that having these strategies is beneficial to teachers, and were keen to learn about new strategies.

T 5: "I'm looking forward to reading more about all the strategies."

T 6: "I look forward to using the lying and stealing strategies, I would love to try them".

T 15: "It is really an amazing app, and I would love to use all the strategies."

One teacher expressed regret that she was unable to test the strategies on students in the classroom due to the Covid-19 pandemic and school closure, but she was excited to try them when school reopened.

Teacher 7: "If you were to be able to actually be in the classroom and try these things out, that actually could have been quite good, it could be useful in future as well."

4.7 Discussion

This study used reflexive thematic analysis of semi-structured interviews to acquire insight into the feasibility, acceptability and possible effectiveness of implementing the ADHD Behavior Toolbox with teachers of children aged four to eight years with ADHD symptoms. Six main themes and eight subthemes were developed. The six main themes were as follows: 1) The ADHD Behavior Toolbox strategies are perceived as effective; 2) Educators are comfortable leveraging modern technology; 3) The concept, layout, and functionalities of the ADHD Behavior Toolbox are appreciated; 4) The functionality and presentation of the App could be improved; 5)

Strategies are helpful for teachers at different stages in their career; 6) The ADHD Behavior Toolbox could be incorporated into practice.

In the analysis relating to Theme 1, the application was well perceived by teachers in the study. Five teachers were eager to put the strategies to the test, despite the fact that their use was recommended but not mandated. The rest were not able to use the strategies due to school closure. Teachers who tried strategies with children with ADHD symptoms to determine their effectiveness provided more thorough interview focusing on the effectiveness of the strategies. Generally, most teachers in the study appreciated the strategies including those five who tried it. This finding is consistent with that of earlier research from Corkum et al., (2018) Conroy et al. (2021), and Owens et al. (2019) on digital interventions that are intended to enhance teachers' classroom management strategies. Although research on digital interventions for classroom management strategies is still in its early stages, the results appear to be promising and compare favourably to traditional methods (Conroy et al., 2021; Owens et al., 2019). Despite the positive outcomes of the randomised control trials of Corkum et al. (2018), and Conroy et al. (2021), and the pre-to-post study of Owens et al. (2019), the sample size for these studies was considered limited, with only 58, 29, and 54 teachers participating, respectively, which may affect results. Furthermore, in Owens et al. (2019) not all teachers completed the SDQ following the trial; the results for children's behaviour in this study may not be representative.

One compelling finding from Theme 1 was the perception that the ADHD Behavior Toolbox applicant's strategies enhance the relationship between the child and the teacher, which was an implicit rather than explicit objective. Teachers also liked how the strategies explain the underlying reasons for some of the behaviours. This helped the teachers to understand the causes of children's behaviour and the circumstances that can provoke this unwanted behaviour, which is crucial in classroom management. This is explained by the ABC model which states that the environment influences behaviour, so identifying the cause of undesirable behaviour may help to prevent it (Ellis & Grieger, 1986; Skinner, 1935).

In fact, teachers who employed the strategies in the app reported an improvement in children's behaviour and strengthening of their rapport with students. Understanding the underlying reasons for the behaviour can also affect the way teachers respond to the child which in turn can reshape the unwanted behaviour and reduce teachers' stress, as SEC suggests (Jennings & Greenberg, 2009). This can break the negative downward spiral in the classroom leading to a better classroom environment and better teacher-child relationship.

In the analysis relating to Theme 2, the idea of employing a digital intervention to promote teachers' professional development was recognised and praised. Teachers in the analysis were comfortable leveraging modern technology. It was easy to download and utilise the app because teachers now use iPads (in schools) and iPhones on a regular basis. They also discussed

how our daily tasks are transforming from paper to digital versions. These findings are broadly in line with Corkum et al. (2019) who examined the acceptability of digital intervention for primary school teachers of children with ADHD using a randomised control trial with 58 teachers. The intervention was delivered virtually and included six sessions on evidence-based strategies to help teachers in supporting children with ADHD. The study discovered that internet delivery had great acceptability and satisfaction. Given the extremely hectic schedules that teachers have, they believe that this form of intervention will provide flexibility. This is not surprising as the TALIS 2018 report stated that teachers in the United Kingdom (UK) work longer hours than their counterparts in other countries, according to (Jerrim & Sims, 2019). Teachers also reported that utilising iPads in school is now very prevalent, which is consistent with the findings of an education technology survey (CooperGibsonResearch, 2021), which found that over 85 per cent of UK primary schools have at least one iPad per teacher. This explains this study's findings that teachers were comfortable with downloading and using the app, which made the process of installing and exploring its functionalities quite natural to them.

Further relating to Theme 2, teachers who tried the strategies felt good about themselves and their positive experience made them want to continue to use the app in the future. Regarding the changes they witnessed in the relationship between the teacher and the child, one of the teachers said, "I am incredibly proud of myself and my relationship with the child". This indicates

that teachers' competency may increase as a result of using the ADHD Behavior Toolbox, leading to a rise in teachers' self-efficacy. This needs further investigation in future research. As mentioned in Chapter 1, according to the competence pathway of the 3C model, increased teacher competency can help to break the loop that is driving the child's disruptive behaviour (Herman et al., 2020). This is also consistent with the SEC model, which suggests that disruptive behaviour in children may grow when teachers under pressure employ ineffective ways to manage undesirable behaviour (Jennings & Greenberg, 2009). When teachers feel they are well equipped, they feel competent to manage the classroom effectively. Puente-Díaz and Cavazos-Arroyo (2017) advise that when teachers employ a creative mindset in which they can improve their skills, this improves self-efficacy and satisfaction, while Karwowski (2014) suggests that this can indicate better problem-solving skills.

Teachers appreciated the concept, layout, and functionalities of the ADHD Behavior Toolbox as explored in Theme 3). However, they were also eager to suggest ways to improve and enhance the application, as expressed in Theme 4. For example, they highlighted that the application lacks the ability to add more than one child. They proposed adding a feature that allows them to add more than one child at a time or to be able to access the whole class and then add any strategies they believe a child requires. Arguably, the ability to add more than one child should be limited to a very small number of children which will allow teachers to devote their full attention to the most challenging child, as studies suggests that ADHD prevalence in school children is

approximately 5% (Polanczyk et al., 2014), while another 5% can exhibit some symptoms of ADHD (Sayal et al., 2018). This means that the classroom of 30 children may have 1-3 children with ADHD symptoms who needs more attention than the rest of the classroom. Interacting with only one child with challenging behaviour in a classroom may produce excessive stress (Abidin & Robinson, 2002). Therefore, focusing on a few children who need the support could provide better outcomes, as a simple and handy application with simple features could be crucial given the teacher's busy schedule. Covering a larger number of students with less intensive care needs, fits with Tier 1 interventions that work as preventive mechanisms for typically developing children and not for children with more challenging behaviour (Bradshaw et al., 2012).

Teachers also believed that including a behaviour tracker as a feature in the programme could help to gauge how the child is responding to the techniques and determine whether the strategy being employed is optimal. It was also proposed that if the application was used as a shared platform for teachers, parents, SENCOs and children, this would facilitate better communication between all parties. Other systems or programmes that can track the behaviour progress could ideally be used in conjunction with the ADHD Behavior Toolbox application to evaluate, record and monitor the behaviour. This would be more in line with a Tier 3 intervention. Other technologies have recognised the value of recording and monitoring the change in the behaviour such as the Web Health Application for ADHD

Monitoring (WHAAM) mobile application (Spachos et al., 2014). This application is based on Functional Behaviour Assessment (FBA), which is a process in which a behaviour is identified and then an intervention is developed to reduce the behaviour problem (Gresham et al., 2001). The WHAAM app also provides a collaborative sharing platform among teachers, parents and health professionals, as well as offering a tracking feature to track unwanted behaviour. The application can be used by teachers, health professionals or parents of children with ADHD. The application also provides some information that focuses on FBA, for example explaining behavioural concepts such as negative and positive reinforcement, the merits of ignoring inappropriate behaviour, consistency, etc. The WHAAM application uses guidelines, but it does not provide strategies. Using a case study design, the WHAAM application was evaluated, and significant improvements in two children's problem behaviours were discovered (Merlo et al., 2018). However, these two cases were monitored by parents not teachers. Using the WHAAM or any system that the school is already using that can record and track behaviour and share it between different parties can help in meeting teachers' requirements.

Theme 5 outlines that teachers at various stages of their careers have stressed the importance of classroom management training in order to establish a healthy learning environment in the classroom. In the analysis, both newly qualified and experienced teachers acknowledged this need. NQTs, according to teachers, may require the application more because they lack the

experience to support such students. Although this contradicts with the findings of the annual DfE survey in 2017, in which more than half of NQTs reported feeling well-prepared to support children with special needs (Steven, 2017). Our findings are consistent with the TALIS survey that reported that only about half of UK teachers have received classroom management training (2018). Similarly, a study of 1200 novice primary and secondary teachers who graduated from University College London (UCL) Institute of Education investigated their opinions regarding teaching and their intentions to stay or leave the profession. The survey contained an open question section in which teachers were asked about the most challenging aspects of their job. Children's disruptive behaviour was the most often highlighted challenge, followed by workload. Teachers in the survey expressed their dissatisfaction with behaviour systems that do not support disruptive behaviour and how disruptive behaviour can impact on teachers by saying,

“if the school does not have enough support or a system in place to manage disruptive behaviour then it takes all the pleasure out of teaching’

‘I was very badly treated there and had no support in dealing with the very challenging behaviour of the children’

It should be mentioned, however, that these two quotations were from secondary school teachers. Furthermore, approximately 50% of teachers in the survey stated that they intended to leave their profession within 10 years of beginning their employment due to a workload that created a stressful environment. The Organisation for Economic Co-operation and Development

(OECD) (Schleicher, 2018) stated in their report that teachers' stress induced by their employment should be taken seriously as workplace climate can reflect negatively on teachers' wellbeing.

In Theme 6, teachers indicated that the ADHD Behavior Toolbox could be used in practice. The application has shown preliminary usefulness and acceptability in assessing teachers of students with ADHD symptoms. This demonstrates that digital intervention can be an effective option given the lack of resources such as training and funding. As a brief digital intervention, busy teachers can regulate classroom behaviour, and host a large number of teachers, in addition to providing timely access to information. The application also has the potential to reduce children's undesired behaviour and enhance teachers' wellbeing, which is consistent with earlier research by Corkum et al. (2018), Conroy et al. (2021), and Owens et al (2019).

4.8 Strengths & Limitations

This study has several strengths and limitations. The study was performed entirely online and teachers had the option of conducting the interview by audio or video call, the majority of them chose to be interviewed via video call, which improved communication. The study participants included certified teachers, certified teaching assistants and SENCOs of various ages with different levels of work experience. This diverse group of participants provided a more holistic view regarding the practicality and use of the ADHD Behavior Toolbox. However, interestingly, this study's sample included only female teachers as no male teachers were recruited, possibly due to the UK's

low male teacher percentage of just 15 per cent in primary education (Gender Trust, 2020). The lack of male teachers obviously limits this study's findings.

Teachers were recruited using a snowball sampling technique as the researcher was unable to recruit using gatekeepers due to COVID-19. Besides, only five teachers were able to test the app and try the strategies on children, this can be considered a limitation in this study. Another effect of the COVID-19 pandemic on this study is the small number of teachers. However, the number is sufficient for a qualitative study and this paper reached data saturation, although the original plan was to recruit 20 teachers.

4.9 Implications

This application was developed by the psychologist David Erickson who was inspired by the theoretical approach of the social learning theory by Bandura (Bandura & Walters, 1977). The application was also modified by the researcher and was linked to the ABC model (Ellis & Grieger, 1986) and the (SEC) (Jennings & Greenberg, 2009). This will contribute to the limited number of intervention applications for training teachers of ADHD children in the commercial market as recommended Păsărelu et al. (2020) conducted a systematic review of ADHD applications for a variety of user groups and discovered that only 16% of the applications were based on theories, with only seven designed specifically for teachers (Păsărelu et al., 2020).

This feasibility study has highlighted many implications and the findings are interesting and require additional research. While this study was limited to qualitative data, the usability and impact of the ADHD Behavior Toolbox

application should be assessed using quantitative data at the child and teacher level since the findings cannot be generalised without such data. The subject of digital professional development for teachers has recently become a hot topic and also warrants further study (Bragg et al., 2021). Moreover, additional research should focus on the efficacy of these types of interventions for teachers of children with ADHD. Replicating the same study with a male sample would also be beneficial in understanding male perspectives toward the ADHD Behavior Toolbox application and comparing such findings to the female viewpoint.

The majority of the teachers who took part in this study showed an interest in engaging in more research to try out the ADHD Behavior Toolbox. Since this study could not acquire quantitative data due to the COVID-19 pandemic, it would be important to quantitatively evaluate the ADHD Behavior Toolbox. As previously noted, the teachers in this study were happy to utilise the app's strategies. It would be useful to determine whether using the app's strategies improved teacher wellbeing, and reduced the child's undesirable behaviour. A protocol for a pilot study to investigate the feasibility and pre-post impact evaluation of the ADHD Behavior Toolbox to support teachers of children with ADHD behavior in the classroom, is proposed and discussed in Chapter 5. Furthermore, the findings from this study and the following studies will be used to improve the ADHD Behavior Toolbox application in order to test it in a larger sized RCT.

4.10 Conclusion

This study evaluated the feasibility and acceptability of the Behavior Toolbox application among teachers. This study interviewed 15 teachers of children aged four to eight years with ADHD symptoms three weeks after downloading the application on their devices. Reflexive thematic analysis was applied to the data, and six main themes and eight subthemes were developed. The six main themes were as follows: 1) The ADHD Behavior Toolbox strategies are perceived as effective; 2) Educators are comfortable leveraging modern technology; 3) The concept, layout, and functionalities of the ADHD Behavior Toolbox are appreciated; 4) The functionality and presentation of the app could be improved; 5) Strategies are helpful for teachers at different stages in their career; 6) The ADHD Behavior Toolbox could be incorporated into practice.

Teachers were generally pleased with the application and provided suggestions about how it could be improved to be more beneficial and suitable to meet their needs. The findings from the study are promising and indicate that digital intervention can be an acceptable option. A brief digital intervention can provide busy teachers with timeless access to information and resources while, at the same time, it can host a large number of teachers, giving them the opportunity to support children with ADHD and enhance their own wellbeing. Further research is required to explore the potential efficacy of the Behavior Toolbox application using quantitative data and to pilot recruitment and outcome measures prior to a randomised controlled trial.

Chapter 5 Assessing the Feasibility and Pre-Post Impact Evaluation of a Digital Intervention to Support Teachers of Children with ADHD Behaviour in the Classroom: A Study Protocol

5.1 Chapter Introduction

Chapter 3 in this PhD thesis has established the crucial facilitators of and barriers to understanding the symptoms, experiences and unmet needs of teachers of children with ADHD, as well as those of the children themselves. Earlier findings from a meta-analysis conducted as part of this PhD research on interventions targeting teachers of children with externalising behaviours found that teachers' interventions exert a positive effect in reducing ADHD behaviours. Moreover, it was noted in the meta-analysis that only a few studies to date have focused on teachers' outcomes. In addition, in Chapter 4 the semi-structured interviews revealed that teachers felt that working with children with ADHD symptoms is overwhelming and they require more support and training on ADHD classroom management strategies. Therefore, further research in this area is warranted and online learning can provide a convenient way for teachers to continue their professional development in this regard. This Chapter is proposing a protocol to further quantitatively evaluate the feasibility of teachers using the ADHD Behaviour Toolbox Application and the pre post impact and potential effectiveness in enhancing teacher self-efficacy, well-being and ADHD symptoms in children.

5.2 Introduction

As noted previously in Chapter 1, ADHD behaviours can affect children's academic attainment (Daley & Birchwood, 2010) and children's and teachers' psychological wellbeing (Hamre & Pianta, 2010). Teachers often experience stress and negative emotions due to students' disruptive behaviour (Liu & Onwuegbuzie, 2012b) and work-related pressures (Liu & Onwuegbuzie, 2012a; McCarthy et al., 2016; Skaalvik & Skaalvik, 2011). Teacher burnout has a negative impact on personal accomplishment and self-efficacy and can drive emotional exhaustion (Aloe et al., 2014).

Previous studies have investigated the effect of interventions on students' educational outcomes (Arnold et al., 2020; Sayal et al., 2020) and behavioural outcomes (Daley et al., 2014; Iznardo et al., 2017) but less attention has been paid to supporting teachers' wellbeing including enhancing their self-efficacy and reducing stress levels. As discussed in detail in section 1.12.1, the teacher-child relationship is dyadic: both can impact each other. To illustrate, teacher self-efficacy in utilising classroom management strategies can play an essential role in motivating children to learn and to achieve their goals (Alexander, 2020), and child misbehaviour can impact teacher self-efficacy (A. Aloe et al., 2014). Feelings of competence can predict superior problem-solving abilities (Karwowski, 2014), and as discussed previously in Chapter 4, teachers' mindsets can also reflect their levels of self-efficacy and satisfaction (Puente-Díaz & Cavazos-Arroyo, 2017) in that teachers who believe their competence is malleable view adversity as an opportunity to learn (Jennings & Greenberg, 2009).

Consistent with the Transactional Model of Stress and Coping (Lazarus & Folkman, 1987), teachers require interventions that target their classroom management abilities, improve their understanding of the causes of children's misbehaviour, and improve the necessary school resources. Such interventions will equip them to face the demands of the classroom, and appraise stressful situations, which can help to reduce stress and regulate challenging behaviour in the classroom.

5.3 The Proposed Intervention

This study employed a web-based educational package application: The ADHD Behavior Toolbox <https://www.behaviortoolbox.com/> (Behavior Toolbox, 2022). This platform comprises six products. The most recent addition is the ADHD Behavior Toolbox for Home and School, an application available on the Apple Store (iOS). The application was modified to provide instructors with techniques to address 12 behavioural difficulties linked with ADHD symptoms that aim to provide teachers with effective strategies to support children aged 4–8 years old with ADHD symptoms in the classroom. For more information about the intervention and the modification that was applied to it to be used in this study, (see Chapter 4).

5.4 Research Aims

This study aims to evaluate the feasibility, usability and potential effectiveness of using the ADHD Behavior Toolbox application, along with text message reminders and encouragement to enhance teachers' classroom management strategies, improve self-efficacy, and thus reduce stress and

child ADHD symptoms. The ADHD Behavior Toolbox application will be used to support teachers in managing classroom behaviour in children aged 4–8 years old focusing on 12 main behavioural concerns. To address these behavioural concerns, strategies for 12 different behavioural problems will be delivered via an iPhone application that has been specially modified for this study, and in which teachers can tailor the strategies required to meet the needs of each specific child. (see Section 4.2.6) for more details about adapting the intervention.) Text message reminders will be used to increase the fidelity of delivery of the intervention. Teachers' questions and comments will be posted on a shared blog.

5.5 Research Objectives

- 1) The feasibility study aims test recruitment methods, measures and outcomes, determine sample size, and test the procedure and inclusion criteria in preparation for RCT evaluation.
- 2) The study aims to explore the usability and potential effectiveness of using the ADHD Behavior Toolbox in enhancing teacher's self-efficacy, and reducing teachers' stress, and children's ADHD behaviours.

5.6 Method

5.6.1 Design

This study uses an uncontrolled, single-arm, pre-to-post test design (Alessandri et al., 2017). Single-arm trials can provide preliminary efficacy evidence, which can then be used to design larger randomised trials It is

important to note, however, that single-arm trials have limitations, and their results should be interpreted with caution (Evans, 2010).

According to the MRC Framework for Evaluating Complex Interventions (Craig et al., 2008; MRC, 2000; Skivington et al., 2021), it is suggested researchers use both qualitative and quantitative research methods. Qualitative research can aid in understanding people's experiences and opinions, whereas quantitative research data can aid in identifying generalizability in findings. The MRC framework recommends mixed methods research because it can provide a deeper comprehension of the research phenomenon. It may also help in the comparison of data collected from various sources, ensuring credibility (Craig et al., 2008; MRC, 2000; Skivington et al., 2021). In this study protocol we focused only on quantitative data as we had previously gathered stakeholders' perspectives on the intervention in study 3, which was supposed to be a mixed method study, but due to the Covid 19 pandemic, the study was amended and split into two separate studies(see Appendix 2).

5.6.2 Measures

According to DeVellis & Thrope (2021), it is important when selecting a questionnaire for a study to consider validity, reliability, length, ease of use, and ethical considerations. Validity ensures that the questionnaire was developed using well-established guidelines and has been validated in previous studies. Reliability ensures that the questionnaire measures the variables consistently. The length of the questionnaire is important to ensure that it is appropriate for the study. Ethical considerations are necessary to

ensure that the questionnaire follows ethical guidelines. Here are some reasons why questionnaires are useful for single arm pre-post design research (DeVellis & Thorpe, 2021).

According to the findings of study2, teachers are overburdened with work, and lengthy questions can cause boredom and cause greater attrition (Galesic & Bosnjak, 2009). In this study, short questionnaires will be administered while taking in consideration the important of the content (Rolstad et al., 2011). The questionnaires can be used to assess the intervention's initial efficacy by comparing pre- and post-intervention responses. The measures will be administered via an online survey, using Jisc online surveys. The measures will be administered at baseline and again at an eight-week follow-up after using the ADHD Behavior Toolbox.

A study investigated stress, depression, and anxiety in primary school teachers who participated in mindfulness-based stress reduction training. The study aims to explore the potential benefits of the intervention using the in reducing reported stress, anxiety, and depression among 10 primary school teachers. The intervention aims to change teachers relationship with tress by enhancing cognitive appraisal. The study used pre-post intervention and used the Dass 21 measure showed experienced significant reductions in stress, depression, and anxiety following the training which suggest that the intervention maybe beneficial in enhancing primary school teachers ability to cope with the work demands. However, the
The lack of a control group in the study limits the ability to determine whether

any observed change is directly related to the intervention itself. The study also had a small sample size, which leads to preliminary result and tentative conclusions (Gold et al., 2010).

5.6.2.1 Strengths and Difficulties Questionnaire - Teacher version (SDQ-T)

The SDQ is a brief questionnaire is a brief emotional and behavioral tool used to screen behaviours in children aged 3-16 years old (Goodman, 1997). The SDQ-T contains 25 statements divided into five subscales, with five items in each subscale that can be used by teachers. The five subscales comprise: emotional symptoms (5 items); conduct problems (5 items); hyperactivity and inattention (5 items); prosocial behaviour, and peer relationship problems (5 items). Items are rated on a three-point scale (0, 1, 2). Emotional symptoms, conduct problems, hyperactivity and inattention, and peer problem scales are aggregated to produce a total difficulties score. The conduct disorders and the hyperactivity and inattention scales can be aggregated to produce an externalising behaviour score. The SDQ-T was widely used in the included studies in the systematic review in this thesis (Baker-Henningham et al., 2009a; Baker-Henningham et al., 2009b; Hickey et al., 2017; Hoogendijk et al., 2018; Hoogendijk et al., 2020; Hutchings et al., 2013). Validity ratings on the SDQ-T among teachers were investigated, and the measure was found to be valid across 387 primary school children aged 4–10 years, with internal consistency obtained demonstrating internal reliability for hyperactivity and inattention (Cronbach α = 0.84), but low internal validity for conduct problems (Cronbach α = 0.44). However, the SDQ-T correlates with the Teacher's Report Form

(TRF)(Achenbach & Edelbrock, 1991) with good concurrent validity score of (range 0.54–0.73)(van den Heuvel et al., 2017). The TRF is the teachers' version of the CBCL Child Behavior Checklist (CBCL) which is considered a well-validated but lengthy measure for children emotional and behavioural problem (Achenbach et al., 2001).

5.6.2.2 *Depression Anxiety and Stress Scale 21*

DASS-21 is the abbreviated version of DASS-42 (Lovibond & Lovibond, 1995); It has been shown to measure emotional states of depression, anxiety, and stress in non-clinical populations. DASS-21 is a self-report scale that consists of seven statements within each psychometric scale, with responses based on a four-point Likert scale from 1 (Did not apply to me at all) to 4 (Applied to me very much or most of the time). DASS 21 has been used with primary school teachers in the UK to evaluate the effectiveness of mindfulness interventions in reducing a range of psychological difficulties (Gold et al., 2010) as mentioned in Chapter 1 section (1.11.1). The reliability of the measure was reported by Henry and Crawford (2005) for the subscale of depression ($\alpha = .88$); this result was based on a sample of 1,794 respondents from the general adult population aged 19–91 years old in the UK (Henry & Crawford, 2005).

5.6.2.3 *Teachers' self-efficacy (TSE)*

TSE (Schwarzer et al., 1999) has been shown to measure teachers' self-efficacy in four main areas that can determine their achievements: (1) achievement at work; (2) job-related skill development; (3) relationship with students, parents, and co-workers; and (4) handling job stress (Schwarzer & Hallum, 2008). The scale has 10 items such as, “ When I try really hard, I am

able to reach even the most difficult students, Even if I get disrupted while teaching, I am confident that I can maintain my composure and continue to teach well, I am confident in my ability to be responsive to my students' needs even if I am having a bad day". This measure was used previously to examine the relationship between teachers sense of self efficacy and the 6 dimensions of psychological wellbeing (Bentea, 2017) see Chapter 1 section (1.12.2).

The validity and reliability of this measure were found to be acceptable. Cronbach's alpha in the three samples ranged between .76 and .82, test-retest reliability over one year was $r = .76$ ($N = 193$). High TSE scores correlate with low job strain scores and low job burnout scores, which were found to support the scale's construct validity. Furthermore, any additional time teachers voluntarily spent with students was highly correlated with TSE scores (Schwarzer & Hallum, 2008).

5.6.2.4 Adapted mHealth App Usability Questionnaire (MAUQ)

MAUQ (Zhou et al., 2019) is a questionnaire established to evaluate the usability of mHealth digital applications provided for patient and care providers. The Standalone Mobile Health App for Health Care Providers will be used in this study. The questionnaire consists of 18 items with three subscales: Ease of use; Interface and satisfaction; and Usefulness. Based on the MAUQ for health care providers the items in the Usefulness subscale were adapted to reflect the aims of the ADHD Behavior Toolbox. The Ease of use subscale has five items (Cronbach's alpha =0.84), the Interface and satisfaction subscale has seven items (Cronbach's alpha=0.90), and the

Usefulness subscale includes six items (Cronbach's alpha=0.72). The three subscales have a good level of internal consistency. Responses are based on a 7-point Likert scale (1 = strongly disagree to 7 = strongly agree) with higher scores indicating greater usability (Zhou et al., 2019). The written feedback section will not be used as Study 3 has already qualitatively investigated teachers' opinions about the ADHD Behavior Toolbox.

5.6.3 Participants & Recruitment

Power calculations were not performed prior to starting the study as this intervention is novel and had not previously been evaluated. The target sample size will be 30-40 teachers of children aged 4–8 years residing in the United Kingdom (UK). This is a pragmatic target which was considered sufficient to estimate SD for powering a future trial and provide an estimate of recruitment and response rates as recommended by National Institute for Health Research (NIHR)(Lancaster et al., 2004; NIHR, 2022).

5.6.4 Inclusion Criteria

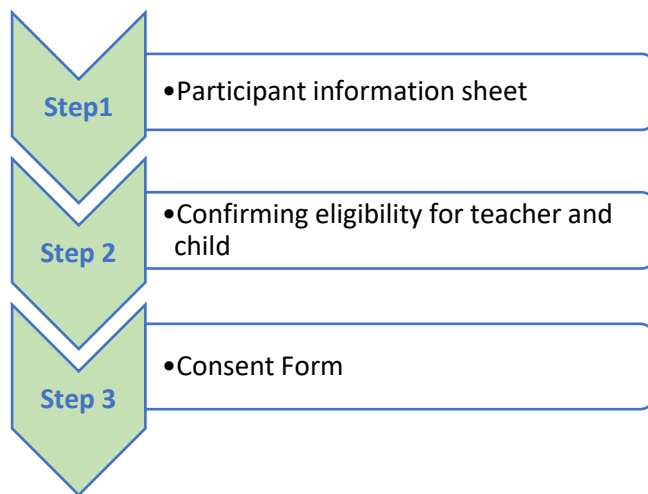
- 1) Teachers or teaching assistants working with children aged 4–8 years old in UK schools.
- 2) Ability to identify one child in the classroom who would exhibit one or more of the following behaviours: following instructions, controlling impulses, having difficulties with sitting still, concentration or compliance.
- 3) Access to the application on an iPhone or iPad (Apple user).

5.6.5 Procedure

An email will be sent to gatekeepers (headteachers or special education needs coordinators [SENCOs]) outlining the details of the study

and including a short infographic familiarisation clip to explain its aims <https://www.youtube.com/watch?v=qmxKlrj2DBo>. If the gatekeepers agree to cooperate and support the study, they will distribute the study advertisement to teachers. Following agreement with headteachers, an opt-out form for parents will be distributed to the classes whose teachers are participating in the study. The form will describe the research aims and give parents the opportunity to remove their children from consideration for the study (see Appendix 20) by filling in the form and returning it to school within a specified timeframe. Teachers who are interested in the research and wish to participate will be invited to email the researcher directly within a specified time frame. An email will then be sent to these teachers, including a link to the survey tool hosted on JISC (see Figure 7 for the steps). The first page of the link will contain participant information and the consent form (see Appendix 21). The teachers will subsequently be asked if they are Apple (iPhone/iPad) users. They will be asked to anonymously select one of their students whose behaviour they find challenging. They will be asked if the child is exhibiting one or more of the following behaviours: following instructions, controlling impulses, having difficulties sitting still, having difficulties with concentration or compliance. The child must be exhibiting one of these behaviours to confirm the teacher's eligibility for the study. If eligibility is confirmed, they will be requested to sign a consent form electronically, and consent will be identified by email and mobile numbers.

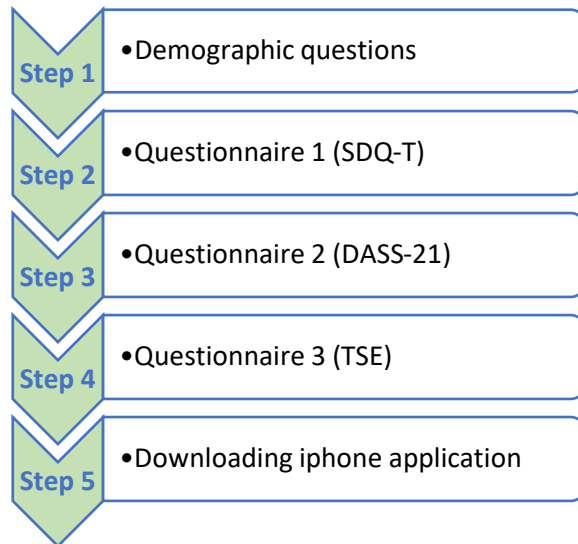
Figure 7:Steps in the first link



The entire study will be conducted online. Once the researcher receives consent, another link, using the Jisc online surveys tool and including the baseline questionnaires (see Appendix 22), will be sent to the participants (see Figure 8 for the steps). First, demographic questions will be gathered (age, job title, gender, years of experience). Then teachers will take part in the first (baseline) online questionnaire, in which they will rate the selected child using the SDQ-T, which focuses on hyperactivity or inattention and conduct problems. They will then move to the second questionnaire, in which they must complete the DASS-21. Finally, they will be asked to complete the third questionnaire, which comprises the TSE Questionnaire. Participants will be asked to create an identity code password using the date of their birthday and the last three digits of their mobile phone number so that the baseline responses can be linked to the follow-up questionnaire in this anonymous questionnaire. The next step will be for participants to download

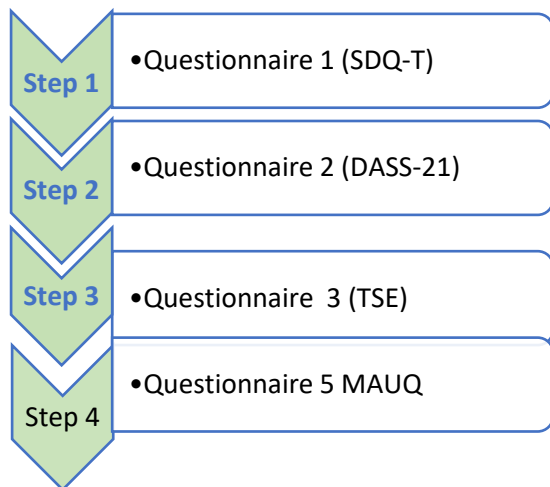
the ADHD Behavior Toolbox application (a link will be provided to download this app). The teachers will be required to try some of the strategies for at least one of the 12 listed behavioural problems with the selected child.

Figure 8: Steps in the second link for baseline measures



Eight weeks following the completion of the first survey, a link to the follow-up survey (see Appendix 23) will be emailed to teachers inviting them to complete four questionnaires (TSDQ, DASS-21, TSES, and MAUQ) (see Figure 9 for the steps).

Figure 9: Steps in the follow-up link



5.6.6 Ethical approval

The study gained approval by the Division of Psychiatry and Applied Psychology Research Ethics committee (see Appendix 17), Reference Number: [DPAP-2020-0429-1] on 16/04/2020 and was amended in two subsequent submissions (02/06/2020 & 03/11/2020).

5.6.7 Analysis

The SPSS software package 28.0.1 will be used to analyse the data after importing it directly from the baseline and follow-up surveys.

Participants will be matched using their uniquely created IDs. To evaluate the intervention the changes over time in self-efficacy, child behaviour, and teacher wellbeing will be calculated using the compute function. Paired t-tests will be used if data is normally distributed which can be explored using Kolmogorov Smirnov Tests. Wilcoxon signed-rank test will be used if data is not normally distributed. T-tests will be used to explore hypotheses and evaluate the intervention. The maximum ranges for each measure will be

measured to identify the mean and the P value. For teacher self-efficacy significantly higher levels of teacher self-efficacy at T2 would indicate that the intervention might be effective at enhancing teachers' self-efficacy. A significant lower level of teachers' stress at T2 would imply that the intervention may be effective at reducing teachers' stress. However, due to the lack of control group we cannot ensure that the change over time in teachers' self-efficacy, stress, and child outcomes are due to the intervention as we cannot control of other confounders.

Recruitment rates (proportion of teachers agreeing to participate and reporting an eligible child) and response rates (proportion of participants completing follow-up measure) will also be recorded and reported as percentages. MAUQ scores will be reported using descriptive statistics (means, SDs and range of scores). The log in information and behaviour sets for completion will be provided to the researcher by the programmer to assess adherence (Ritterband et al., 2005). Adherence can also be determined by the number of participants who completed the measures at post intervention.

Chapter 6: General Discussion

6.1 Chapter introduction

This chapter summarises and integrates each study's findings and their contributions to the overall thesis. It will also cover the practical and clinical implications, as well as future plans. This thesis followed the MRC framework for evaluating complex interventions (Skivington et al., 2021). Thus, the framework guided the thesis to reach the main aims. The current study aimed to assess the feasibility, acceptability, and potential effectiveness of a digital intervention to help primary school teachers support children with ADHD symptoms in the classroom, which can reduce teachers' stress. The thesis also aimed to provide preliminary evidence of the efficacy of digital interventions in reducing teacher stress and improving children's outcomes. The aim of this thesis was achieved through these following chapters.

6.2 Summary of Chapters

6.2.1 Chapter 1: Literature review

The goal of this literature review was to gain a deeper insight into children with ADHD and their teachers wellbeing, as well as to determine teachers' needs with regard to children with ADHD and to review some of the theories that can explain teachers' stress with regard to supporting children with behavioural problems in order to reduce teachers' stress.

6.2.2 Chapter 2: Systematic Review and Meta-Analysis of the Effectiveness of Teacher Delivered Interventions for Externalising Behaviours

The Meta-Analysis provided evidence to support the effectiveness of teacher interventions for teachers and children with externalising behaviours

on both teacher and child outcomes. A large and significant improvement in teacher use of positive strategies was evidenced in the analysis as a result of interventions. moderate but significant increases in teacher-child closeness and small decreases in teacher-child conflict as a result of interventions. The results also showed a reduction in children's externalising behaviour problems, and ADHD symptoms, as well as an improvement in prosocial behaviour in favour of interventions. Teachers' self-efficacy analysis was based only on 4 studies and had medium but insignificant improvement in favour of intervention. Teachers' wellbeing analysis was not able to be conducted as there were insufficient data to generate a result. This demonstrates that it is a neglected area that need more attention.

6.2.3 Chapter 3: Exploring the unmet needs of teachers of young children at risk of ADHD: A qualitative study

In this qualitative study, semi-structured interviews were conducted with 17 primary educational practitioners of children with ADHD symptoms aged four to eight in the UK. Six overarching themes and 11 subthemes developed from analysing the interviews. The overarching themes were as follows (1) ADHD behaviours can disrupt the learning environment; (2) Teachers and children may treat children with ADHD negatively, which can impact on their emotions and lead to labelling; (3) managing ADHD behaviours can be overwhelming for teachers; (4) teachers face practical demands on their expertise and particular skills; (5) the existing support for teachers is limited; and finally, (6) teachers need more specific training about ADHD.

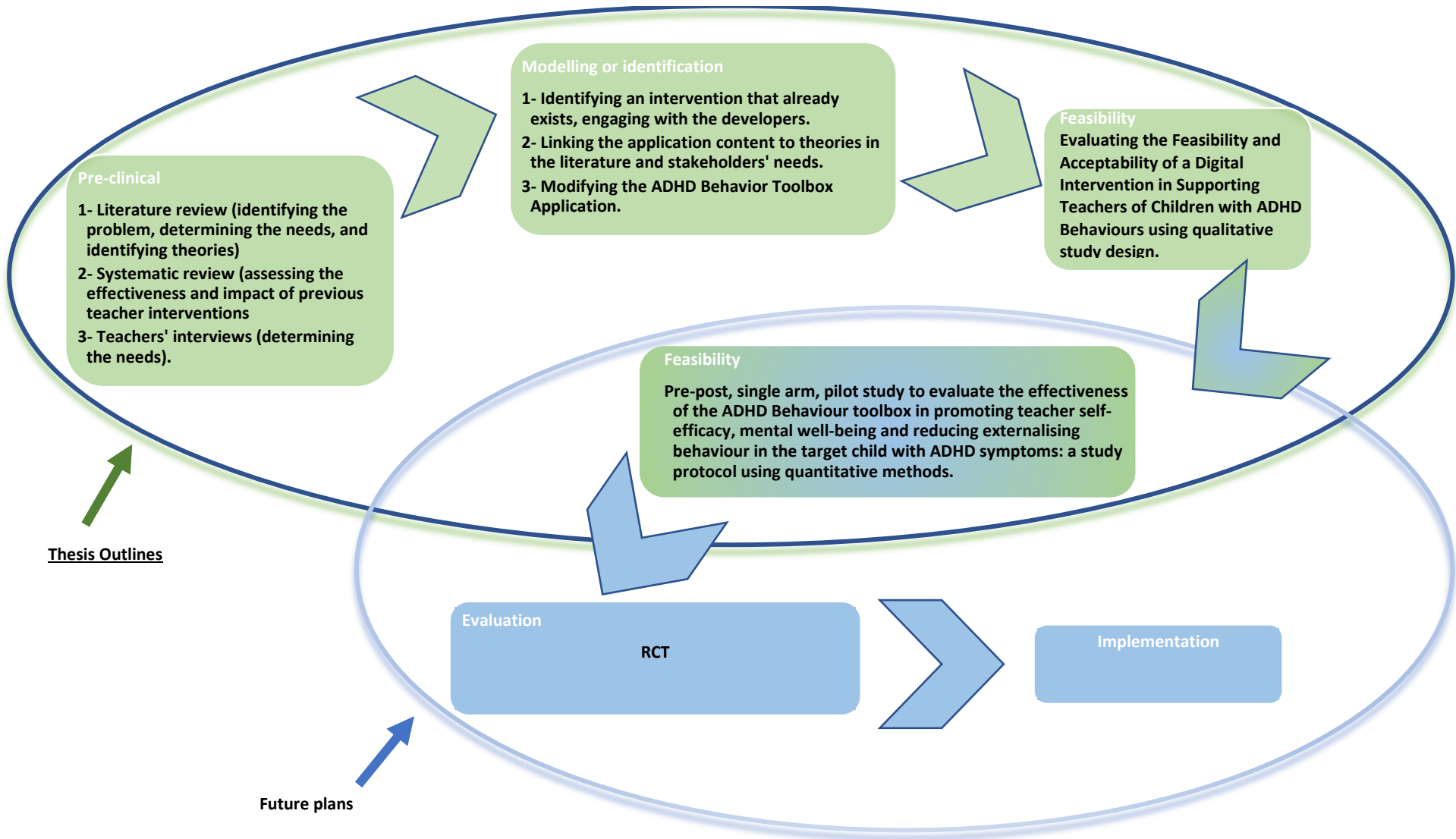
6.2.4 Chapter 4: Evaluating the Feasibility and Acceptability of a Digital Intervention in Supporting Teachers of Children with ADHD Behaviours: A Qualitative Study

The purpose of this qualitative study is to assess the feasibility and acceptability and perceived effectiveness of using the ADHD Behavior toolbox application in supporting teachers of children with ADHD behaviours. Six main themes and eight subthemes have developed. The six main themes were as follows: 1) the ADHD Behavior Toolbox App strategies perceived as effective. 2) Educators are comfortable leveraging modern technology. 3)The concept , layout, and functionalities of the Behavior Toolbox are appreciated. 3)The functionality and presentation of the App could be improved. 4) Strategies are helpful for teachers at different stages in their career. 5) Behaviour Toolbox app could be incorporated into practice.

6.2.5 Chapter 5: A feasibility study protocol Evaluability assessment

This protocol was developed to further evaluate the feasibility of teachers using the ADHD Behaviour Toolbox Application and the pre post impact and potential effectiveness in promoting teacher self-efficacy, mental well-being and reducing externalising behaviour in the target child with ADHD symptoms. This feasibility study protocol adopts a quantitative approach and aims to test implementation, sample size for future study, measures, procedure, and inclusion criteria in preparation for RCT. Figure 10 shows a summary of the thesis plan and future research.

Figure 10: Summary of the thesis plan and future research



6.3 Key findings

6.3.1 Study 1

This PhD began by investigating teachers' interventions that uses classroom management strategies and their effectiveness in supporting both children with ADHD symptoms and their teachers, as there were no systematic reviews and meta-analysis collating the overall evidence of their effectiveness. To identify key uncertainties and refine hypotheses based on the MRC framework for evaluating complex interventions (Skivington et al., 2021). A meta-analysis and systematic review were conducted to integrate evidence on the effectiveness of teacher delivered interventions for children with ADHD symptoms on children's and teachers' outcomes. Thirty-one studies met the inclusion criteria, but only 22 contributed to the meta-analysis. The evidence from the systematic review and meta-analysis concluded that teacher interventions are beneficial for both teachers and children with externalising problems. However, more focus was provided on children's behaviour than on teachers outcomes. While it is important to focus on children's behaviour as it can significantly impact teachers' wellbeing (Jennings & Greenberg, 2009), teachers' outcomes had less focus in the findings of the systematic review and the meta-analysis in this thesis. The results for externalising behaviour were drawn from thirteen studies, which together suggested that intervention has a moderate and significant effect on reducing externalising behaviour. Observational measurements of child conduct problems were also provided by five studies, and these showed

that interventions have a large and significant impact on children's behaviour problems. Nine studies provided measures of children's prosocial behaviour, and the effects of the interventions on prosocial behaviour were moderate and significant. Six studies were included in the analysis that focused on ADHD combined symptoms. Their results indicated a moderate but significant impact from interventions on ADHD symptoms. With regard to teacher outcomes, teachers' interventions significantly increased teachers' use of positive strategies. Also, a significant though moderate impact on teacher-child closeness as well as a small but significant effect in terms of reducing teacher-child conflict were evidenced in the meta-analysis. While the few studies that examined self-efficacy noted a medium but non-significant improvement in this aspect after teacher interventions. In addition, most interventions delivered face-to-face only two online interventions were included with small sample size but the results were promising on teachers and child outcome. One of them examined teacher's wellbeing and discovered that employing teacher web-based intervention reduced teachers' emotional exhaustion. Given the fact that teachers' workload and children's disruptive behaviours are considered stressors for teachers, digital interventions may be a solution that can contribute to teachers' professional development while at the same time providing a convenient way that can prevent adding to teachers' workload. Digital interventions can also be tailored to meet the needs of teachers, are cost-effective, and can be accessed at the user's convenience.

6.3.2 Study 2

Study 2 aimed to interact with 17 teachers (stakeholders) and explore the difficulties they are facing regarding supporting children with ADHD symptoms age 4–8 years using reflexive thematic analysis to analyse the collected interviews. According to the MRC framework for evaluating complex interventions the aim of study 2 served the overarching aim of the thesis to evaluate the feasibility of digital intervention. The qualitative analysis of teacher interviews revealed that both teachers and children experience negative effects from difficult classroom interactions, which indicates that this relationship has a dyadic nature and illustrates how both teachers and children can affect each other. Teachers' wellbeing can be adversely affected by ADHD symptoms in the classroom, as many teachers believe that students with ADHD add to their workloads and supporting them effectively demands both additional time and extra skills from teachers. Thus, teachers need more training and support in how to effectively support children with ADHD symptoms since teachers play a very important role in the classroom. It is also important to provide teachers with forms of intervention that can fit into their heavy workloads.

6.3.3 Study 3

This thesis adds to the small body of research on the acceptability and feasibility of teachers' use of digital intervention to support children with ADHD symptoms. Thus, the third study in this thesis was a feasibility study using qualitative methods to evaluate the feasibility and acceptability of ADHD behavioural toolbox application with respect to supporting teachers of

children with ADHD behaviours. The study revealed initial acceptance of the idea and the layout of the digital intervention, with teachers being comfortable leveraging modern technology and incorporating it into their practice. The teachers in the analysis noticed that the strategies in the application were effective and could lead to more positive relationships between children and teachers. They also noted that such an application can help teachers at different stages in their career. Nevertheless, they provided recommendations to enhance the application functionality and presentation. As mentioned earlier, not all teachers were able to apply the strategies in the classroom. However, the five teachers who were able to try some of the strategies perceived their effectiveness.

6.4 Discussion

ADHD symptoms exhibited by children within the confines of the classroom, can significantly disrupt the classroom, impact children's academic performance (Birchwood & Daley, 2012), and impact teachers' psychological wellbeing (Brill & McCartney, 2008). The fact that only about 50% of teachers in the UK have been offered classroom management strategies training (OECD, 2018), while roughly 63% of teachers are dissatisfied with the amount of time they spend dealing with disruptive students (Jerrim & Sims, 2019), suggests that teacher interventions should be more carefully considered in order to avoid a cycle of disadvantage for both teachers and children.

The evidence from the systematic review and meta-analysis in this thesis revealed that teacher-delivered interventions are effective in reducing children's ADHD symptoms and externalising behaviour (as rated by teachers). This is a crucial finding confirming the role of teachers in the classroom and highlighting the importance of training. It is suggested that ADHD is caused by multiple factors both genetic and environmental (Faraone et al., 2021). Identical twins taught in the same classroom, showed stronger genetic effects than those taught in separate classrooms with different teachers and peers (De Zeeuw et al., 2015). Consequently, adjusting the children's environment may alter the trajectory of ADHD by modifying the expression of the responsible genes (Inguaggiato et al., 2017), especially since children in Key Stage 1 and Key Stage 2 spend most of the day with one teacher. Therefore, it is essential to create a stable environment for children with ADHD symptoms, that promote positive strategies (Mirkovic et al., 2020). Interventions that include multiple components, including training the child's parents, teachers and peers, are considered ideal for children with ADHD symptoms (DuPaul, 2016). This emphasises the need to support teachers and provide the necessary resources to facilitate their work since they play a vital role in bridging the gap between various stakeholders.

The systematic review and meta-analysis in this thesis also revealed that earlier research on teacher intervention for classroom management of children with behavioural problems focused more on children's outcomes than teachers' outcomes. Only four studies out of 31 had investigated

teachers' self-efficacy. This is an interesting finding that suggests that this area remains a neglected area of research that requires further attention. The effect size of self-efficacy from the meta analysis was 0.5, which indicates that teacher interventions can have a substantial positive impact on teachers' belief in their own ability to face classroom difficulties and manage the classroom. This is proposed to promote teachers' wellbeing (Huang et al., 2019; Spilt et al., 2011) as the concept of self-efficacy has been linked to eudaimonic psychological wellbeing, which focuses on self-development and value (Ryan & Deci, 2001). Self-efficacy is positively associated with psychological dimensions including environmental competence, autonomy, self-acceptance, positive relationships, personal development, and the meaning of existence (Bentea, 2017). Self-efficacy is believed to be a possible predictor of teachers' psychological wellbeing (Jeon et al., 2018; Ryan & Deci, 2000).

Teachers in study two highlighted that they face demands on their expertise and practical skills, which can be an added stressor. Teachers' quotes described this stress in various ways. Some expressed stress by saying "it's a nightmare," while others said, "It's stressful", "It can cause a lot of stress," and "It's frustrating." The different ways they show how they feel may be because they have different internalising and externalising resources. Some teachers described problem-focused coping, for example, "It's frustrating, but it also makes you want to learn more about how to deal with that child." While others adopted emotional coping: "I am gonna shut the

door, and I'll have a little scream, and then I'm going to spin a smile in again!"

This also demonstrates that teachers cope with situations differently depending on their competencies, as explained by the 3C's hypothesis of the competent pathway (Herman et al., 2020). This can also be due to their appraisal of the situation as explained by the transactional model of stress (Lazarus & Folkman, 1987).

One of the overarching themes from teachers' interviews in Study 2 suggested that teachers feel overwhelmed by the demand placed on them by children with ADHD symptoms. According to the transactional model of stress, problem-solving coping is demonstrated by taking proactive measures to deal with a stressful situation (Lazarus & Folkman, 1987). This coping strategy can help teachers believe they have the power to control and change the stressful situation. Improving problem-solving strategies can be seen as an adaptive mechanism that can help teachers solve the problems they are facing (Wang et al., 2022). Providing interventions to teachers can be viewed as supporting their problem-solving coping in that it helps to expand resources and thus assists teachers in viewing the problematic situations they face in their classrooms less negatively. This balances the demands placed on teachers, leading to a reduction in workload, pressure (Fernet et al., 2012; Klassen & Chiu, 2011; Kyriacou, 2001; Skaalvik & Skaalvik, 2011) and increase in job retention (Wang et al., 2022). On the other hand, emotional coping strategies seek to reduce the severity of adverse feelings (Folkman & Lazarus, 1984; Lazarus & Folkman, 1987).

These strategies can be used when individuals face uncontrollable stressors to accept the situation and reduce the emotional pain caused by the stressor (Folkman & Lazarus, 1984; Lazarus & Folkman, 1987). For example, teachers may engage in emotional coping by using alcohol or refusing the stressful situation (denial) to mitigate distressing feelings. They can also use exercise or yoga to eliminate stress while boosting their mood. Despite providing short-term stress relief, emotional coping strategies fail to address the root cause of the problem and can trigger negative long-term effects, such as increased stress and burnout and they should not be used alone when the stressor is controllable. Consequently, problem-solving coping is generally acknowledged as the most beneficial and productive coping strategy as it can guarantee desirable outcomes (Wang et al., 2022). This thesis focused on problem-solving coping mechanisms as it can be used with manageable situation and can assist with the underlying cause of the stressor, i.e. such approaches recognise that failing to address children's ADHD symptoms will not only affect the teachers but also can influence the child academic and social life (Daley & Birchwood, 2010). More research is needed to understand the effect of supporting teachers with emotional coping strategies (such as meditation, yoga, and breathing), in addition to teachers classroom management interventions.

In Study 3 theme 1 "Behavior Toolbox App strategies perceived as effective" teachers found that using the strategies helped in building confidence when they noticed a change in the relationship with the targeted child. Individuals with high self-efficacy have higher levels of confidence,

satisfaction, and achievement, which can improve teachers' classroom performance and lead to better academic outcomes for students (Lipińska-Grobelny & Narska, 2021). Teachers' self-efficacy in classroom management can also influence students' motivation (Alexander, 2020; Engin, 2020). On the other hand student misbehaviour can negatively affect teacher self-efficacy (A. Aloe et al., 2014). One of the included studies in the systematic review reported self-efficacy at baseline to examine self-efficacy as a moderator and concluded that reporting a decrease in conflict with disruptive children after teacher intervention was associated with higher self-efficacy at baseline (J. Spilt et al., 2012). Similarly, other studies found that teachers with high self-efficacy reported fewer disruption problems in the classroom (Brouwers & Tomic, 1999; Dicke et al., 2014), which may suggest that high self-efficacy can enhance teachers' intervention impact on children with behaviour problems.

The strategies utilised within the ADHD Behavior Toolbox application aim to broaden teachers' acceptance and understanding of children with ADHD symptoms by explaining their actions. The application's strategies also focus on supporting emotional understanding and focusing on positive responses to children, which can contribute to the growth of a strong relationship between teachers and students and the transformation of teachers' mindset. Teachers in Study 3 perceived the intervention as effective; they were able to understand child behaviour and deal with these behaviours appropriately. For example, one of the teachers used breaking

down tasks with a child to solve lack of concentration problems. Another teacher found that explaining the intention of children's lying to be helpful. The strategies approach focuses on determining the reason behind lying. For example, it could be seeking attention, avoiding punishment, or imagination. Then the teacher is recommended to open a conversation with the child and emphasise the value of being truthful.

This can fit with the ABC model, which is focused on studying child behaviour and determining the causes of undesirable behaviour and attempting to avoid it (Ellis & Grieger, 1986). Teachers must have an in-depth understanding of the factors contributing to the problem. This is crucial for children's classroom outcomes because the teacher-student interaction is dyadic and affects each other and teachers' self-efficacy can impact children and reduce conflict between teachers and students (Hajovsky et al., 2020). A study was conducted on 5628 Chinese preschool children to examine the relationship between teachers' self-efficacy and parent rating of child social skills. The study found a positive relationship between teachers' self-efficacy in classroom management and the children's social skills which was mediated by classroom organisation (Hu et al., 2021). This illustrates the importance of teachers' self-efficacy on children since the rating was done by parents not teachers.

A large body of research has emphasised the significance of teacher-child relationships in supporting the idea that a good relationship can improve children's academic and behavioural outcomes (Hamre & Pianta, 2001;

Roorda et al., 2017; Roorda et al., 2013). Teachers in Study 3 felt that the strategies of the ADHD Behavior Toolbox application helped build good teacher-child relationships, and helped to create a warm classroom climate. In addition, the findings from this thesis's systematic review and meta-analysis also suggested that teacher interventions can improve teacher-child relationships (SMD 0.48.) These findings suggest that intervention can help teachers to be more prepared to teach children with ADHD symptoms. The approach of Jennings and Greenberg (2009) proposes that teachers and students affect each other in a recursive relationship, and teachers with high emotional and social competences reduce disruptive behaviours in the classroom and break the cycle of disadvantage for both teachers and children, as ill-considered strategies can increase both disruptive behaviours and teacher stress (Jennings & Greenberg, 2009). Teachers in Study 3 also suggested potential improvement in teacher-child relationships using the ADHD Behaviour Toolbox application. Additional quantitative data are now needed to further investigate the feasibility and acceptability of the ADHD Behavior Toolbox application.

The overall findings of this thesis helped broaden understanding regarding the feasibility and acceptability of using a digital intervention for teachers working with children with ADHD symptoms in in the U.K. Training teachers is crucial to enhance their self-efficacy. Training can also help break a cycle of disadvantage by increasing teachers' social and emotional understanding and equipping teachers with the classroom strategies that can

reduce teachers' stress and enhance children's behaviour (Jennings & Greenberg, 2009).

Study 1, the systematic review and meta-analysis, highlighted a gap in the evaluation of digital interventions as only two RCTs focused on web-based interventions were found in the included studies. The results for these two studies were promising and suggested that digital teacher-focused interventions for children with ADHD can lead to positive outcomes for both teachers and children (Conroy et al., 2021; Corkum et al., 2019). However, both studies were small in scale and as such these results should be considered with caution.

In Study 2, subtheme 6.a "Training should be brief and precise" teachers emphasised that educators have very heavy workloads and emphasised the need for interactive, concise and flexible intervention training, that fit with their busy schedule and can be taken in their free time.

Despite teachers overburdened schedules, in Study 2. theme 6 "Teachers need more specific training about ADHD" teachers described wanting and needing further training to support children with ADHD symptoms.

Teachers who are already overloaded with work may also benefit from digital interventions that provide them with instantaneous access to information and strategies to support students with ADHD symptoms. Using digital interventions can help teachers access strategies and training at any time without significantly adding to the workload. Teachers in the UK work

longer hours than those in other professions, which can result in a hectic schedule (Jerrim & Sims, 2019). Today, 86% of UK primary schools have at least one tablet or laptop for every teacher (CooperGibsonResearch, 2021). Some might argue that face-to-face training is more effective, however, if online interventions can provide teachers with the adequate knowledge to manage their classroom that could bring financial advantages for the education system. According to findings in Study 3, subtheme 6.b teachers also raised concerns about the lack of resource, funding, and time limitations which impacted on their ability to support students with ADHD symptoms.

Empowering teachers by expanding their resources while not increasing the amount of time they spend at school may help reduce teachers' stress. This scheme can also be rolled out to cover a large number of teachers in different geographical locations at minimal cost. Previous studies have suggested that teacher intervention applications for children with ADHD behaviours are very limited and lack evidence-based content (Păsărelu et al., 2020).

6.4.1 Strengths and Limitations

This thesis contributed to the limited literature by investigating the feasibility of reducing teacher stress and building self-efficacy by the use of a digital training application to improve the management of ADHD symptoms in young children. Including the systematic review and meta-analysis in the thesis is considered a strength. It was important to establish a proof of concept and verify the link between teacher-mediated interventions for children with

externalising behaviours effectiveness and child and teachers' outcomes. The systematic review had been updated 2 times during the doctoral program which gave the researcher a better understanding for the available literature. Although this systematic evaluation found that teacher interventions are generally effective, the analysis does not consider long-term effects, due to a lack of data and given the included studies' medium and high risk of bias, these results should be regarded with caution.

The thesis mostly focuses on qualitative research following the social constructivism approach. This suggests that there are multiple realities, and in the scope of the 2 qualitative studies, the reality is co-constructed between the researcher and the participants based on their social experiences and perspectives (Kim, 2001). This implies that researchers' personal experiences and social contexts have the potential to shape their interpretations of reality. Although the researcher focused on increasing trustworthiness through employing reflexive thematic analysis in a systematic and rigorous way (Nowell et al., 2017) following various methods (see Table 1) "Trustworthiness steps" in Chapter 3. The researcher background and ethos along with the participants' views construct and enrich the findings. Using reflexive approach by acknowledging researchers background, experience, and ethos can provide the reader with better understanding for the constructed reality in this thesis (Dodgson, 2019; Jootun et al., 2009). This thesis also adopts a pragmatic approach, that allow the researcher to integrate multiple approaches of view within the framework of a single project in accordance with

the needs-based method (O'Cathain et al., 2007) and therefore the protocol study intend to evaluate the feasibility of the ADHD Behavior Toolbox application using quantitative data.

Study 2 and 3 were conducted, analysed, and written up in accordance with the COREQ guidelines (Tong et al., 2007), ensuring the thoroughness of the research. However, study 2 did not collect demographic questions from participants which is considered a limitation. Although all participants in both studies appeared to be genuinely interested in contributing to the study; it is possible that the £10 voucher offered in study 2 and the £30 voucher offered in study 3, which were employed as a thank you cards for participation, improved recruitment. As a pragmatic decision in the COVID 19 pandemic period, Study 3 was changed from a mixed method study to two separate studies (see Appendix 2). Going through this time and trying to amend the protocol for the study three times was considered a limitation for the study but a strength point for the researcher as she developed her ability to create ways for the research to make it happen and work and recruit teachers and have five of them try the strategies during the COVID 19 pandemic period was very challenging but helped in the development of an independent researcher.

The thesis did not consider the ASD high comorbidity with ADHD in the included strategies in the APP which may also be considered a limitation in this thesis, as strategies designed to respond to ADHD might interfere with ASD. These conditions often differ in terms of aspects such as reward processing. For example, children with ADHD usually prefer small, immediate

rewards, while children with ASD tend to respond better to larger more, delayed rewards (Antrop et al., 2006; De Castro Paiva et al., 2019; Demurie et al., 2012). It is therefore possible that teachers might still struggle to support children who have co-morbid ASD and ADHD.

Only one male participant was recruited across both qualitative studies, this may potentially be explained by the fact that only 15% of primary school teachers in the UK are male, and thus taken as roughly representative of the relevant population (Gender Trust, 2020). Economic analysis was not used which considered a limitation in this thesis that should be considered in future research since it can provide more comprehensive understanding and aid in decision making according to the MRC framework (Craig et al., 2008; Skivington et al., 2021).

6.4.2 Implications & Future Research

The feasibility study findings were promising and indicated a potential acceptance for digital teacher training. The vast majority of teachers positively reacted to the application, and many offered suggestions to improve its functionality. Digital intervention seems to be acceptable and may better support teachers' busy work lives. The next step would be to conduct the feasibility study protocol. The feasibility study protocol intended to measure teachers' stress, and children's externalising behaviours to evaluate the feasibility and effectiveness of the ADHD behaviour Toolbox Application. We hypothesise that the ADHD Behavior Toolbox Application can help teachers effectively meet the demands of children with ADHD symptoms in the

classroom by using strategies and managing their emotions when appraising stressful situations, which can reduce stress, leading to a reduction and regulation of challenging behaviour in the classroom, according to the SEC (Jennings & Greenberg, 2009).

The protocol study aims to quantitatively examine the ADHD Behaviour Toolbox Application in improving their appraisal of their ability to manage their classroom more effectively, potentially improving self-efficacy (Puente-Díaz & Cavazos-Arroyo, 2017). Teachers with higher self-efficacy tend to have less conflictual relationships with students with externalising behaviours (J. Spilt et al., 2012), which is consistent with the idea that a sense of competence predicts better problem-solving abilities (Karwowski, 2014).

Despite the fact that previous research has discovered that high teachers' self-efficacy in classroom management can mitigate the negative effects of disruptive behaviour and lessen teachers' emotional exhaustion (Dicke et al., 2015; Martin, 2012; Pas et al., 2010; Tsouloupas et al., 2010), one of the studies in the systematic review and meta-analysis in this thesis was not in line with the previous RCTs, which investigated a teacher intervention in regards to teachers' self-efficacy and emotional exhaustion, as it found that the increase in emotional exhaustion was not moderated by the increase in self-efficacy (Hoogendijk et al., 2018). The next feasibility research might look into the relationship between self-efficacy, teacher stress, and ADHD symptoms in children.

Although considering the UK culture was not a theme in the study, one of the teachers was disturbed by the Canadian spelling and the yellow school bus since they did not represent UK culture. Therefore, we suggest changing the spelling of the app to UK English, and changing the application logo. We will also add a feature to add more children and save them in the application. We propose to limit the number of students included in the application to five children. This will allow teachers to focus on children with more challenging behaviour in the classroom. Studies suggest that the prevalence of ADHD in school-aged children is around 5 per cent (Polanczyk et al., 2014) , and another 5 per cent can exhibit some symptoms of ADHD (Sayal et al., 2018). This means that out of a class of 30, one to three students may have ADHD and require special accommodations. Given the teacher's hectic schedule, it may be necessary to limit the teacher's attention to only a few children who require additional support, and a user-friendly app with only the most essential and simple functions may be the key to accomplish this. However, more research is needed in the next feasibility study before proceeding to the major RCT. Teachers could be asked to rate one child at a time, while others could rate up to five children depending on their need. We might assess the intervention's influence on teacher and child outcomes to discover if focusing on one child at a time is more beneficial. We are aware that the previous points were not included in the protocol, and an amendment to the protocol is required if it is to be implemented. The findings of this thesis, in conjunction

with the findings of the quantitative feasibility study, can provide us with more comprehensive understanding that can be used and applied in the RCT.

The design of the RCT will be multi-site clustered randomised controlled trial, (at the school level) to evaluate the effectiveness of the ADHD behaviour toolbox application on the wellbeing of teachers of children with ADHD symptoms age 4-8 in the East Midlands area of England. Interested teachers with access to iPhone or iPad will consent and identify children with high levels of hyperactivity/inattention, by completing the SDQ to determine eligibility for participation then parents' consent will be obtained. Then randomisation to the intervention or waitlist control will be done at school level. A meeting in each school that include interested teachers, SENCOs and headteachers will be held to give 2 sessions the first one will provide an introduction about ADHD and provide reasons for children's challenging behaviour as an introduction to the study and another one to explain the aim of the study and how the application work and what teachers needs to do in the study. These sessions were included as the study aim to follow the theoretical framework of the 3Cs model which focus on increasing teachers coping, competency and self-efficacy with regards to classroom strategies (Herman et al., 2020) by using the application and attending the sessions. Researchers will be communicated with SENCOs biweekly in addition to the text message reminders that will be send to all participants and SENCOs to increase the fidelity of delivery of the intervention. Teachers' questions and comments will be posted on a shared blog. SENCOs will be involved in attending the sessions and checking

biweekly on teachers to ensure involving the school system in the trial as involving school context including SENCOs and administrative can create a positive climate that support teachers and share classroom management responsibilities with them which may reduce stress (Herman et al., 2020).

6.5 Conclusion

The findings of the first three chapters of this thesis, including the literature review, systematic review, meta-analysis, and the first qualitative study, reveal a gap in teacher intervention for children with ADHD symptoms. The third study looked into the feasibility and acceptability of the ADHD Behavior Toolbox app for assisting teachers of children with ADHD symptoms and lowering teacher stress. Future research will be conducted to determine the potential efficacy of the application in preparation for the RCT. This can support teachers' wellbeing which is not only important for teachers but also for children with ADHD symptoms at a young age as it can contribute to improving the teacher-child relationship and altering the trajectory of the disorder for the child. This may result in improved academic and social outcomes.

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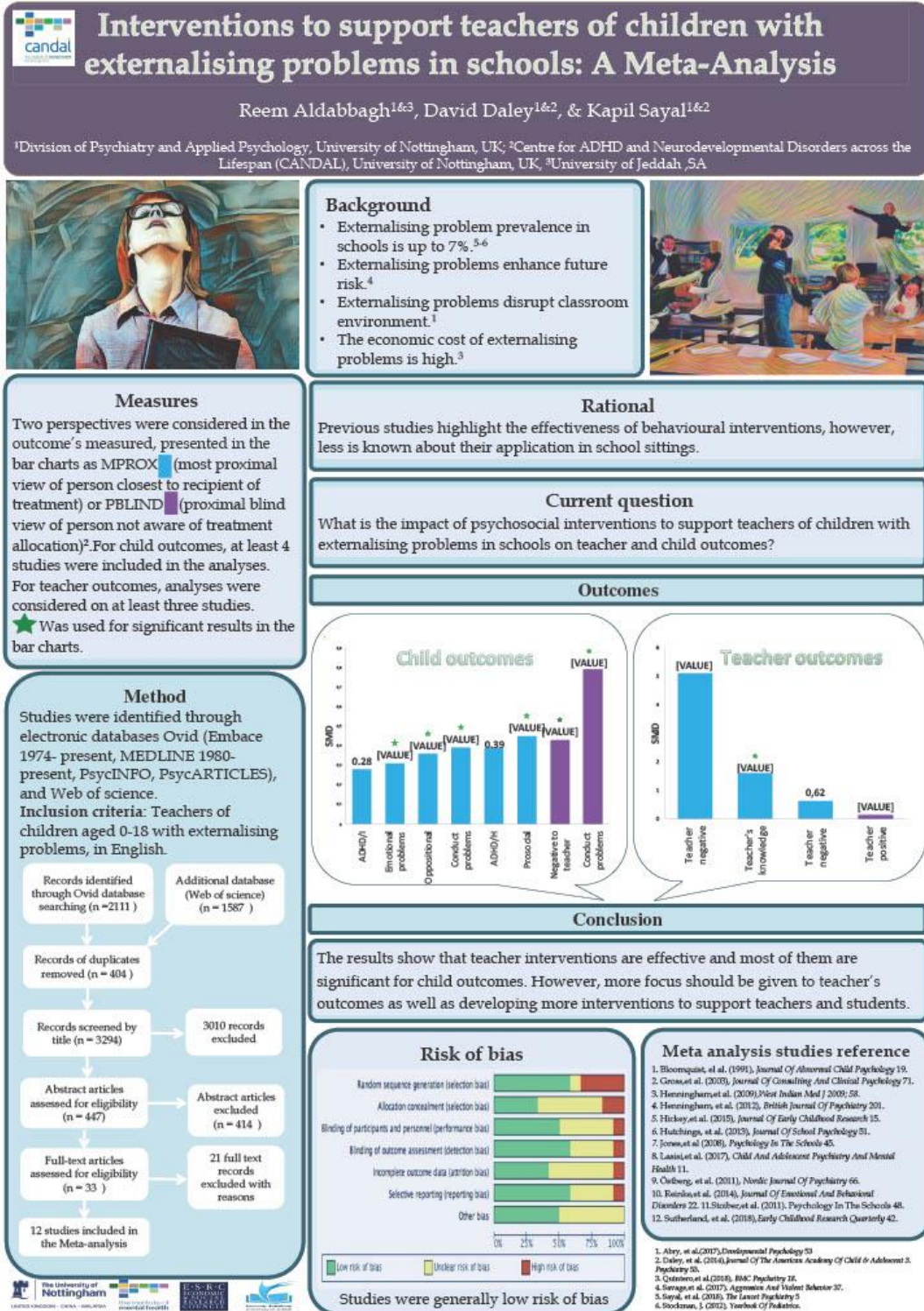
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Appendix 1: Poster Presentation and awards





Exploring the unmet needs of teachers of children at risk of ADHD : A qualitative study



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Aims

- Identify teachers' needs.
- Explore the way teachers respond to children at risk of ADHD.
- Collect suggestion for the type of support needed.

Method

- A qualitative design will help in reaching the study objectives by exploring the unmet needs for teachers of children at risk of ADHD age 4-8.
- Qualitative research is conducted using semi-structured interviews with teachers. Open ended questions were asked.

Data Analysis

Thematic Analysis (TA) using inductive approach was used in the study (1). The focus was on what teachers say explicitly (semantic level).

Rationale for TA

TA help in understanding peoples' experience. It is a useful method for exploring a group of people perspective, and generating unanticipated insights.

Data Collection

Seventeen interviews were conducted for teachers teaching children age 4 to 8 in the Foundation and KS1 schools in the UK.

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Thematic Analysis

1 - Teachers find it difficult to manage children at risk of ADHD:

Lack of attention



"...They are not even able to focus for a really short time.... and so they kind of jump from one thing to another."

"..Throwing things at other children. Using scissors....we are just non-stop trying just to make sure that the class is a safe environment for everybody else.."

Impulsiveness



2 - Children place particle demand on teachers:

Stress



"I'm gonna shut the door and I'll have a little scream"

"I want to pull my hair"

"Its a nightmare"

Workload



3 - ADHD behaviour cause social problems for children and demand special treatment:

Social problems



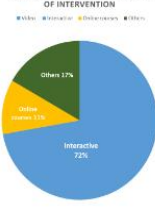
4 - The existing support has limitation:



5 - Teachers need more support and training about ADHD:



TEACHERS SUGGESTION FOR THE TYPE OF INTERVENTION



Conclusion

Teachers find it difficult to manage children at risk of ADHD because of the challenging behaviours they perform. These difficulties are causing an adverse effect on both children and teachers. The existing support has some limitation. More focus should be given to developing teacher's interventions for teachers and teacher assistant. Supporting teachers will help in reducing the adverse effect on both children and teachers.



IMH Research Day Tuesday 22nd May 2018

Best poster presentation

The award goes to

Reem Aldabbagh

The value of the award is £50 to be claimable as expenses for research-related work.
Please contact Kathryn Bryan on Kathryn.bryan@nottshc.nhs.uk to retrieve (by 28 February 2019)

Appendix 2: Covid-19 Statement

COVID19 Impact Statement 2020 For use by PGRs with a funding end date after 1st April 2021

The University of Nottingham aims to support all our PGRs to complete their degrees within their period of funded study, by meeting our [Doctoral Outcomes](#). We recognise, and aim to take into account, personal circumstances that may affect a PGR's ability to achieve this.

This Impact Statement should be used to provide details and evidence of impact for:

- applications for an additional funded period of registered study;
- applications for a funded extension to Thesis Pending;
- the thesis examination.

It will also be used to determine both the case and length of a COVID extension to study **up to a maximum of six months** (twelve for part time PGRs). **Please note that it is expected that most approved extensions will reflect the duration of enforced change in activity during lockdown, and that extensions of longer duration will be the exception rather than the rule.** You should show in this form how you have attempted to lessen the impact of the COVID pandemic on your research progress.

- a) Please keep a completed copy of this form as you may want to refer to it as evidence of impact in your annual review process and/or thesis examination. You will also need to use it copy/paste your responses for submission in the online version of the form which will be the format used to make your extension request.
- b) Please carefully consider your case for any extension with reference to the University's online [Policy](#) on Circumstances Affecting Students' Ability to Study and Complete Assessments (under Exceptional Guidance to Extenuating Circumstances Panels) and section 16 of the PhD Regulations (see [Appendix 2](#), section 1), relating to existing regulations on circumstances that may or may not be usual grounds for an extension, and the Exceptional Regulations for UKRI funded PGR extensions (which can be found on the same site as this form).
- c) We strongly encourage you to discuss the completion of this form with your supervisors. If you prefer, you can alternatively discuss the form with an appropriate member of PGR support staff such as your DTP/CDT Director or Manager, DTP/CDT Welfare Officer, School Postgraduate Student Advisor, School PGR Director or other member of the Welfare team, or the [Researcher Academy Faculty Lead](#) (formerly Associate Dean for the Graduate School).

To ensure that you cover the full impact of the COVID-19 pandemic on you and your research **since March 15th 2020**, please complete all relevant sections of the form. You can be very brief but please include all relevant information even in note or bullet form.

When applying for an extension to either your period of registered study (i.e. when active data collection is to be done) or to Thesis Pending, or both you should show, briefly how/whether your work to date already meets some of the University and QAA Doctoral Outcomes, and clarify which doctoral outcomes are not currently met and how your plan will enable you to meet these ([Appendix 1](#)).

Under the exceptional conditions of the COVID-19 pandemic, in addition to the usual circumstances that may be grounds for an extension, you can and should also consider, and evidence if asked to do so, the additional circumstances listed in Section 1. These include but are not limited to:

- your ability to work effectively now that you are not in your usual working environment;

- any change in access to research settings or facilities, such as archives, field-sites, laboratories, software, or databases;
- any changes in your personal circumstances or environment resulting from remote working, or national restrictions , including those related to:
 - caring responsibilities,
 - disability and/or [being at higher risk from coronavirus](#)
 - impacts on your supervisory team that have affected your research progress
 - your mental health, and whether you have access to mental health support if needed,
 - any financial impacts, either personal or on the research in progress or planned.
 - any other considerations that should be taken into account, whether these do or do not relate to any protected characteristics.

This form should capture the impact of the pandemic on you and your research progress, not solely any impact of the University closure itself.

For further information including addressing future impacts; [privacy and confidentiality](#) of information submitted, and additional notes and guidance please see [Appendix 2](#).

The information collected in this form will be used for the purposes of assessing your case for a funded extension to your doctoral studies, to provide information to your funder; to inform the University of the range of impacts that our PGRs have experienced, and to inform policy decisions on how to support our PGRs in future. The document will also aid discussion and decision making, to ensure consistency in evaluation of the impacts for different people.

All information used for other than the stated purposes will be anonymised, and all personal information through which anyone could be identified removed. The information on this form will not be shared with anyone, including supervisory teams, for other than the stated purposes, without your permission.

Background Information – your details

Family Name:	Aldabbagh	First Name(s)	Reem
ID:	4267941	School:	Medicine
Please identify your relevant funder(s)	AHRC/ BBSRC/ ESRC/ EPSRC/ MRC/ NERC/ STFC/ University of Nottingham/ Charity/ Industry/ international scholarship/self funded	Dates of impact: (the date from which the impact has had an effect).	1 st March 2020
Start date	1 st October 2017	Funding end date	14 September 2021
Length of extension requested: (up to a maximum of twenty six (26) weeks)	(26) weeks)	Programme length (3, 3.5, 4 years) and full time or part time	4 years Full time

The primary areas of impact:

Please tick all that are relevant for the ways in which you have been affected by the COVID pandemic and the resulting effect(s) on you and/or your research progression. You can give more details on these impacts, if you wish, on the next page.

Note: We will ask you to explain whether and how you have been able to manage or reduce any of these impacts in Section 2, on p.5.

The ways in which you have been affected (choose all that apply)

- additional/new caring responsibilities
- specific impact resulting from remote working as a result of a disability*
- being at higher risk of coronavirus;
- personal financial impact;
- new illness, accident or hospitalisation, including any mental health problems
- lack of access to mental health support (if needed);
- death or illness of a partner/close relative*
- illness of a relative for whom you are a carer
- impacts related to any protected characteristics*
- an impact on your supervisory team that has affected your supervision or progress
- military or other service (e.g. NHS) that has not already been accommodated
- parental leave that has not already been accommodated
- redeployment to work in another area (e.g. COVID) where this has not already been accommodated.
- other events not on this list that are specifically related to the COVID pandemic (please describe below)

The ways in which your research activity has been affected (for each that applies, please also indicate whether you have tried to mitigate the effect in this area).

	Was any mitigation possible?
<input type="checkbox"/> Disruption of planned activities	Yes/No
<input type="checkbox"/> Access to facilities/archives/lab/equipment/field sites etc	Yes/No
<input type="checkbox"/> Postponement of critical activities where alternatives are not available	Yes/No
<input type="checkbox"/> Access to other research resources including financial impact	Yes/No
<input type="checkbox"/> Ability to achieve a planned outcome/ milestone/deliverable	Yes/No
<input type="checkbox"/> Access a research partner, including research-related placements	Yes/No
<input type="checkbox"/> Inability to devote your usual time to research activity	Yes/No
<input type="checkbox"/> *Lack of usual supervisory support for thesis progression/writing	Yes/No
<input type="checkbox"/> *Lack of usual supervisory support to help manage risk and mitigate plans	Yes/No
<input type="checkbox"/> Other (please describe below)	Yes/No

My final study was planned to start in March 2020, due to COVID 19 pandemic & school closure the study had to stop.

*We are collecting this information in order to fully understand how you have been affected. Any information that you give here will only be used as information to inform us and will not be shared with anyone other than the teams considering the cases for extension and collating information for submission to UKRI.

1. DESCRIBING THE IMPACT **(Please complete this section to provide us with more detailed information)**

For example, you could write a short clear description of the nature of the impacts or problems that you face/have faced, make making this description as brief, and specific as possible. You could also give more detail on the nature of the impacts on your research progress.

We understand that personal and research impacts will be related, so if it helps you could structure the content in line with the impacts you identified in the tick boxes above.

Section 1, additional guidance

The impact on you:

Due to COVID 19 and the school closure, my 4 children had to stay home, and I had to home-school them, my children's age ranges between 6,8,11 & 14. We are trying to manage time between me and my husband as he is working remotely as well. So, I am proceeding with my work but not as efficient as before. They require attention and effort and lots of breaks between tasks.

The impact on your research:

The final study was planned to start in March 2020 in UK schools. However, we have had to postpone data collection due to the COVID 19 pandemic. We did not anticipate that schools in the UK will re-open normally for the final study to be completed before the summer holidays. We have therefore rescheduled the final study to start at the end of October 2020 to give teachers an opportunity to get to know their new students before entering the study. This is an unprecedented decision taking during COVID 19 pandemic.

2. ACTIONS TAKEN TO MINIMISE THE IMPACT

a) How have you tried to mitigate the risk to your project?

Please **briefly** explain how you are trying to minimise the impact of the situation on your research activities and progress. **With reference to the time between the COVID pandemic, national lockdown and the end of your funded period, if you have not tried to alter your plans to lessen the impact of this on your research progress, it's particularly important to explain here why you have taken this decision.**

For example,

- have you discussed how to do this with your supervisors?
- have you considered different ways to get the research done, such as changing your research plans to alter the order in which you do different elements?
- have you altered your research design, for example to conduct research online, or using other digital resources?
what constraints or barriers did you have to try to remove, modify or overcome?
- **If you have not tried to alter your plans at all, why not?**

Try to show how/whether your work to date already meets some of the University and QAA [Doctoral Outcomes](#). clarify which doctoral outcomes are not currently met and how your plan will enable you to meet these.

up to 200 words

[Section 2](#) additional guidance

We attempted to implement a new plan for my research, increasing its flexibility by amending the protocol to include schools in Saudi Arabia, as my sponsor had planned to repatriate students from Saudi Arabia, but this proved to be an optional plan. However, this plan was revised because the number of Covid 19 cases in Saudi Arabia was rapidly increasing, and schools continued online for the Autumn term. As a pragmatic study 3 was changed from a mixed method study to two separate studies one qualitative and the other one quantitative.

b) List the aspects of your research plan that you have managed to achieve or progress during the period of impact.

I had updated the search for my first-year study and I am in the prosses of preparing it for publication.

3. NEXT STEPS

Please **list** what you have planned to do, in order to continue to lessen the impact on your research **once you are able to** resume the specific activities listed in Section 1

For example, what plans do you have to make sure that elements of your research that you have been unable to undertake due to the University closure restart quickly, or to efficiently complete the work you started during the closure?

up to 200 words

[Section 3](#) additional guidance

The plan is to resume my final study in October. As I mentioned before, I added Saudi schools to the protocol to give the research more flexibility, and I've gained approval from Jeddah University to conduct the study between the UK and Saudi Arabia. However, the plan was revised, and the study will be conducted only in the UK as schools continue online in Saudi Arabia.

The study will be separated into two separate studies, one qualitative and the other quantitative.

4. EVIDENCE

List any evidence that you have to demonstrate the impact you have detailed in section 1.

Please do not provide the evidence with this form, we will request it from you if we need to see it.

Please also provide here:

- a brief bullet list of the doctoral work completed prior to COVID-19 impact
- a revised research plan **that shows how the requested length of extension is justified by the work that remains to be done to enable you to meet the [Doctoral Outcomes](#)**;
- only if available, a previous work plan for comparison

up to 200 words

[Section 4](#) additional guidance

Brief Summary of Goals Accomplished During the previous years

First year,

- 1- systematic review and Meta-analysis for interventions for teachers of children with challenging behaviours.
- 2- Initial literature review.
- 3- Plan for second study.

Second year,

- 1- Updating meta-analysis.
- 2- Conducting a qualitative research to explore the unmet needs for teachers of children with challenging behaviour.
- 3- Plan for final study

Third year,

- 1- Finding an existing intervention and modify it.
- 2- Getting the approval for a mix-method study to evaluate the feasibility of a digital intervention in supporting teachers of children at risk of ADHD symptoms followed by qualitative research to collect teachers' opinion about the intervention.
- 3- Study was ready to start in March but faced a delay due to school closure.

Brief Summary of Goals to be Accomplished During the next Academic Year

Goal #1 Study 3

<u>Step</u>	<u>Description</u>	<u>Timeline</u>	<u>Notes</u>
1	Recruit teachers in the UK (after reamend the protocol)	End of September 2020	If schools are ready
2	Commence study3(Data collection quantitative part)	End of October until January	
4	Conducting the interviews (Qualitative part)	January &February	
5	Analysis	March until July	
6	Entering the writing up phase	August until March	

5. CONFIDENTIAL INFORMATION

Please use this section to provide any confidential information that you would like to be considered. Information given here will only be shared with the team assessing your case and returning the information to UKRI for their consideration of your application.

I confirm that I have completed this form after/in discussion with:

(indicate all those that apply, discussion with only one person is required)

- Primary supervisor/other supervisor
 SPSA
 School PGR Director
 DTP/CDT Director
 DTP/CDT Manager
 DTP/CDT Welfare Officer
 other member of the Welfare Team
 Researcher Academy Faculty Lead (RAFL, aka Associate Dean of the Graduate School)

[RAFLs](#) are: Prof A Grabowska (MHS), Dr L Bradnock (Arts), Prof R Graham (Science) and Dr N Porter (Eng).

I confirm that the information provided in this form is true and request an extension for the reasons and purposes outlined above.

University of Nottingham Criteria for award of PhD and other qualifications at Doctoral Level

- (i) the creation and interpretation of new knowledge, through original research or other advanced scholarship, of a quality to satisfy peer review, extend the forefront of the discipline, and merit publication;
- (ii) a systematic acquisition and understanding of a substantial body of knowledge which is at the forefront of an academic discipline or area of professional practice;
- (iii) the general ability to conceptualise, design and implement a project for the generation of new knowledge, applications or understanding at the forefront of the discipline, and to adjust the project design in the light of unforeseen problems;
- (iv) a detailed understanding of applicable techniques for research and advanced academic enquiry.

Typically, holders of the qualification will be able to:

- (a) make informed judgements on complex issues in specialist fields, often in the absence of complete data, and be able to communicate their ideas and conclusions clearly and effectively to specialist and non-specialist audiences;
 - (b) continue to undertake pure and/or applied research and development at an advanced level, contributing substantially to the development of new techniques, ideas, or approaches;
- and will have:
- (c) the qualities and transferable skills necessary for employment requiring the exercise of personal responsibility and largely autonomous initiative in complex and unpredictable situations, in professional or equivalent environments.

Additional Guidance notes.

What to include:

Section 1, Describing the impact. Please limit the information on this form to impacts that have occurred, and only extend this forwards to future impacts that can be predicted to result from current impacts. If future plans might be disrupted you should show how you plan to adjust the project or use other means to mitigate the risk that this presents. This form will continue to be available on the [R&I sharepoint](#) or through the Graduate School and you can use it if needed to record longer-term or future impacts of COVID-19 on your work over the coming months.

Please do not feel that you have to write a large amount in any of the sections of this form. Your statement of impact can be brief and to the point, please see the sample form also available to view alongside this form.

Please only include research activities that you had planned to undertake during the Lockdown , and the periods immediately before and after this, if relevant. For example, if you had planned a period of research activity at another organisation before or after lockdown that has had to be cancelled, or postponed and cannot be rescheduled within your registered period of study?

Section 16 of the [Postgraduate Regulations](#) describes the usual acceptable and unacceptable circumstances for extensions

16. Acceptable and Unacceptable Circumstances (for extension to Thesis Pending):

The following circumstances may result in an extension being granted:

- Exceptional personal circumstances (eg illness, hospitalisation, accident) if significantly impacting on the writing-up process (or resubmission/minor corrections process relating to paragraph 37 below)
- Maternity
- Paternity
- Death of a close relative, or illness of a close relative where the student is the carer
- Illness or death of a partner
- Prolonged jury service
- Expeditions for sport of national significance (providing the extension is acceptable to the student's funding body)
- Requirement for a student to undertake military service.

The following are examples of circumstances which would not normally warrant an extension:

- Taking up employment during the thesis pending period (or resubmission/minor corrections process relating to paragraph 37 below)
- voluntary service overseas.

Section 2, Action taken. Please list the people with whom you have discussed your research plans and what advice and support you have had in adjusting your activities to mitigate any risk to the progress of your research. You are not obliged to consult or discuss the completion of this form with your supervisors, but we encourage you to do so, before finalising the form. Include if and how your plans have changed as a result of either these discussions or your own planning.

It may be that you feel that you have experienced COVID-related impacts on your research but you have decided not to alter your research plans in any way. If this is the case, we would like to understand the reasons why you have decided that this is the best course of action for you.

Please also detail the things that you have managed to achieve or move forwards under the current conditions, even if you feel that you haven't managed to achieve as much as you planned. Please show how your achievements relate to your previous and future research plans.

Section 3, next steps. It's important to plan both how to deal with a current or emergent situation that disrupts your research, and also how to get back into 'normal' working once you are able to do so. These plans should include how you will get everything back on track, getting started and up and running as quickly as possible. What can/could you be doing now to make sure there are no added delays in resuming 'normal' activity?

If there is anything that is still presenting you with a problem, and that is likely to continue to be a problem once things change, please record it here. Give information on why this might be an ongoing concern and give brief information on discussions you have had to try and solve the problem.

Section 4 Other (please specify below), documents and evidence: We advise you to support your case with evidence wherever possible, but we recognise that there may be circumstances in which evidence is not available to you. Under such circumstances please explain the case in a way that includes the reason why you cannot provide supporting evidence.

Your future/revised plans do not need to be complicated, nor in Gantt chart form unless this is a planning method that you already use. A simple table of milestones, deadlines, and outputs is sufficient.

Privacy and confidentiality: We encourage everyone to discuss the information contained in the form, and its completion with a member of the PGR support staff in the University, particularly with your supervisors. We do however recognise that there may be aspects of this form that you might wish to keep confidential, and so you could alternatively discuss things with your SPSA, your School PGR Director(s), your DTP/CDT Director, Manager or Welfare Officer, or if none of these other supports available to you is appropriate, the Researcher Academy Faculty Lead (Arts - Dr L Bradnock, Science - Prof R Graham, MHS - Prof A Grabowska, Engineering - Dr N Porter, Social Science - TBC).

If the circumstances you describe have an impact on your final thesis assessment, it will probably be necessary to share key information with the

examiners/internal assessor. If there is anything that you wish to keep confidential please only include it in section 5 of the form. This will enable sharing of the rest of the information in a way that will let the assessors/examiners understand the impact on you and your research without sharing this confidential information.

Documentation for extension requests, including information on this form will be kept confidential to the staff considering cases for extensions.

For use in thesis assessment: We suggest that you save a copy of this form, with any confidential material redacted, and include it with your submitted thesis, as a record of how you have managed and mitigated the impact of the COVID pandemic on your achievements during this time.

The Researcher Academy Faculty Leads are the Faculty representatives with responsibility for our PGRs. They have oversight of PGR support and activities at Faculty level, and they also work closely with the Graduate School/Researcher Academy. They can advise and support you in completing this form, if there is no-one else that you feel comfortable with, in sharing this information. They should not however be the first person that you approach, as it would be best to discuss this with someone that you know and who knows you, if possible.

The Researcher Academy Faculty Leads are: Prof A Grabowska (MHS), Dr L Bradnock (Arts), Prof R Graham (Science) and Dr N Porter (Eng). There is unfortunately no official RAFL in Social Sciences at the moment, but if you are in Social Sciences please talk to your School PGR Director if needed.

Appendix 3: Interview schedule (Study 2)

Interview Schedule

Background Information

I am planning to interview _____

The interview will take place in _____ at _____. Years of experience _____.

Interview Schedule Opening

Hi. (Smile and handshake.) Thank for your involvement in my research. As the participant sheet explains, I am Reem Aldabbagh a PhD student within the Division of Psychiatry & Applied Psychology, School of Medicine, University of Nottingham. I am also a lecturer in special education/ behaviour support at the University of Jeddah, Ive worked as a teacher for children age 4-8 , and after my master's degree I worked with children with ADHD and Autism 1:1.

I'm doing this interview to help me explore more about teachers of children at risk of ADHD which is focus of my PhD. Your time and effort will add to my study. Do you have any questions before I start?

1. How do teachers respond to (children at risk of ADHD) in the classroom? What is the most distracting behaviour they

perform? (sub question)

*Where do you consider those children more challenging in class or outdoor (play ground)? (sub question)

*What is the impact of those children on you as a

1- on you as a teacher.

2- on children.

2. In your opinion What are the needs and the support teachers require regarding children at risk of ADHD?

3. What type of support do teachers get to help in managing their classrooms?

*Can you give me an example; do you use internet to know more about managing those children (extended question if needed)

4. If we want to develop an intervention to support teachers what would be your suggestions for the type of intervention needed?

“any preference type, online, digital, face to face, books) (extended question if needed)

1. what is the acceptable amount of time you can spend on this intervention?

2. do you want to add anything?

Closing.

Thanks your for your time.

I have learned a lot.

Handshake, good bye.

Appendix 4: Study advertisement (Study 2)



University of
Nottingham
UK CHINA MALAYSIA

Research participants needed

Researchers from the University of Nottingham, School of Medicine are looking for teachers of children aged 4-8 years old to support their research.

1-Seeking foundation phase and KS1 teachers who have experience of teaching children at risk of Attention Deficits Hyperactivity Disorder ADHD.

2-Children at risk of ADHD demonstrate very low levels of attention, and very high level of impulsivity and hyperactivity.

3-To be eligible for this study you need to have taught a child that you considered to be at risk of ADHD.



Help us to know more about The needs of teachers of children at risk of ADHD, through a 20-30 min interview.

We can offer a £10 shopping voucher as a thank you for taking part

It's easy to participate:

Email reem.aldabbagh@nottingham.ac.uk
or scan with your phone camera



Scan me

Appendix 5: participant information (Study2)



University of
Nottingham
UK | CHINA | MALAYSIA

School of Medicine

University of Nottingham
Medical School
Nottingham
NG7 2UH

PARTICIPANT INFORMATION

STUDENT RESEARCH PROJECT ETHICS REVIEW

Division of Psychiatry & Applied Psychology

Project Title: Exploring the needs of teachers of children with Attention Deficit Hyperactivity Disorder (ADHD) symptoms (A Qualitative Study)
Researcher/Student: *Reem Aldabbagh, reem.aldabbagh@nottingham.ac.uk*

Supervisors/Chief Investigators: *Prof. David Daley,*
david.daley@nottingham.ac.uk

Prof. Kapil Sayal ,
kapil.sayal@nottingham.ac.uk

Ethics Reference Number: *[DPAP-2018-0127-2]*

We would like to invite you to take part in a research study about *the needs of teachers of children at risk of ADHD*. Before you begin, we would like you to understand why the research is being done and what it involves for you.

What is the purpose of this study?

To explore the difficulties and the challenges faced by teachers of children who may be at risk of ADHD, and the types of support they might require in order to manage these children more effectively within the classroom. The ultimate aim is to gather information to inform the development of a brief intervention for teachers. Children at risk of ADHD display very high levels of inattention, impulsivity and /or hyperactive behaviours and find concentration difficult.

Why have I been invited?

You have been invited because you responded to our study adverts which was circulated by your school to all teachers in foundation and KS1, seeking teachers help to inform us about what the needs of teachers might be in managing children at risk of ADHD.

Do I have to take part?

It is up to you to decide whether or not to take part. If you do decide to take part in our study, you will be given this information sheet to keep and be asked to sign a consent. You may change your mind about being involved at any time, or decline to answer a particular question. You are free to withdraw at any point before or during the study without giving a reason.

What will I be asked to do?

You will be asked to take part in an interview that will be audio recorded, about your experience of teaching children with ADHD symptoms.

Will the research be of any personal benefit to me?

We cannot promise the study will help you but the information we get from this study may help teachers of children at risk of ADHD in the future. It also will help in informing the development of a brief intervention. We will be able to offer you a £10 shopping voucher as a thank you for your participation.

Are there any possible disadvantages or risks in taking part?

There are no known risk to taking part in this study

What will happen to the information I provide?

All provided information is kept confidential to the three members of the research team (their names are mentioned at the top of the previous page). The research team only have access to the information you provided, and it will not be shared with anyone outside of this team. All your information and data are anonymous, personal details will be removed when the recordings are transcribed so that you are not personally named or identifiable from your information. We would like to

be able to quote what you say in our report or a publication. We will make sure that your anonymity is protected. But if you do not wish us to do so, please tell us

All your information is kept in a locked cabinet at the University of Nottingham, and on a password-protected database on a secure server at the University of Nottingham.

The study will be written as part of the researcher's PhD thesis within the Division of Psychiatry and Applied Psychology, School of Medicine, the University of Nottingham, UK. The study findings may be published a peer-reviewed journal in the future, and if so all participants' data will be anonymised in this publication. The findings might be shared with other authors for the sake of future research.

If you wish to have the results of this study, please tick the appropriate box on the consent form, provide an e-mail address that you would like the results sent to, and we will e-mail a summary once the study is completed.

We will follow ethical and legal practice and all information will be handled in confidence.

Under UK Data Protection laws the University is the Data Controller (legally responsible for the data security) and the Chief Investigator of this study (named above) is the Data Custodian (manages access to the data). This means we are responsible for looking after your information and using it properly. Your rights to access, change or move your information are limited as we need to manage your information in specific ways to comply with certain laws and for the research to be reliable and accurate. To safeguard your rights we will use the minimum personally – identifiable information possible.

You can find out more about how we use your information and to read our privacy notice at:

<https://www.nottingham.ac.uk/utilities/privacy.aspx>.

The data collected for the study will be looked at and stored by authorised persons from the University of Nottingham who are organising the research. They may also be looked at by authorised people from regulatory organisations to check that the study is being carried out correctly. All will have a duty of confidentiality to you as a research participant and we will do our best to meet this duty.

At the end of the project, all raw data will be kept securely by the University under the terms of its data protection policy after which it will be disposed of securely. The data will not be kept elsewhere

If you have any questions or concerns, please don't hesitate to ask. We can be contacted before and after your participation at the email addresses above.

What if there is a problem?

If you have any queries or complaints, please contact the student's supervisor/chief investigator in the first instance. If this does not resolve your query, please write to the Administrator to the Division of Psychiatry & Applied Psychology's Research Ethics Sub-Committee adrian.pantry1@nottingham.ac.uk who will pass your query to the Chair of the Committee.

Appendix 6: Participant consent sheet (study 2)

University of Nottingham
Medical School
Nottingham
NG7 2UH



**University of
Nottingham**
UK | CHINA | MALAYSIA

PARTICIPANT CONSENT

STUDENT RESEARCH PROJECT ETHICS REVIEW

Division of Psychiatry & Applied Psychology

Project Title : *Exploring the needs of teacher's of children with Attention Deficit Hyperactivity Disorder (A Qualitative Study)*

Researcher: *Reem Aldabbagh , reem.aldabbagh@nottingham.ac.uk*

Supervisors: Professor David Daley, david.daley@nottingham.ac.uk

Professor Kapil Sayal ,

kapil.sayal@nottingham.ac.uk Ethics Reference Number:

[DPAP-2018-0127-2]

- Have you read and understood the Participant Information?
YES/NO
- Do you agree to *take part in an interview that will be audio recorded about the challenges and the needs of teachers of children at risk of ADHD?* YES/NO
- Do you know how to contact the researcher if you have questions about this study? YES/NO
- Do you understand that you are free to withdraw from the study without giving a reason? YES/NO
- Do you understand that once you have been interviewed it may not be technically possible to withdraw your data unless requested within *14 days?* YES/NO

- Do you give permission for your data from this study to be shared with other researchers in the future provided that your anonymity is protected? YES/NO
- Do you understand that non-identifiable data from this study including quotations might be used in academic research reports or publications? YES/NO
- I confirm that I am 18 years old or over YES/NO
- I would like to receive a summary of the study results YES/NO

Signature of Participant

Date

.....

Name (in capitals)

Please send a copy of the study results to this e-mail address

Appendix 7: Ethical Approval (Study2)

DPAP Committee



University of
Nottingham

UK | CHINA | MALAYSIA

10/10/2018

Supervisor: David Daley

Applicant : Reem Aldabbagh

Project: Project Id Exploring the needs of teachers of children with Attention Deficit Hyperactivity Disorder(A Qualitative Study)

A favourable opinion is given to the above named study on the understanding that the applicants conduct their research as described in the above numbered application. Applicants need to adhere to all conditions under which the ethical approval has been granted and use only materials and documentation that have been approved. If any amendments to the study are required, an amendment should be submitted to the committee for approval. An end of study form will be required once the study is complete.

A handwritten signature in black ink that reads "David Daley".

Professor David Daley
Co-Chair of DPAP Ethics Subcommittee

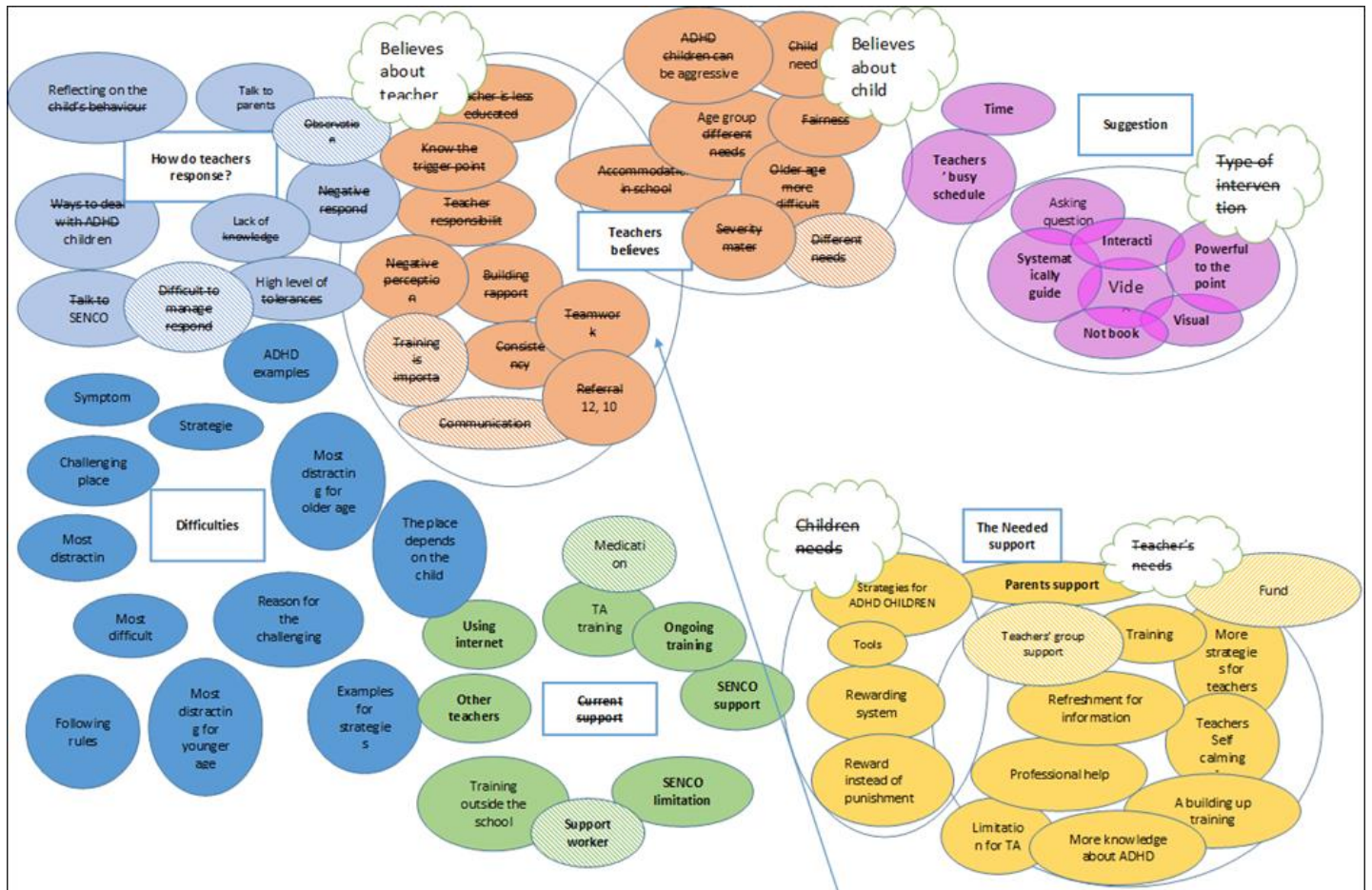
A handwritten signature in black ink that reads "Amanda Griffiths".

Professor Amanda Griffiths
Co-Chair of DPAP Ethics Subcommittee

Appendix 8: Using Excel in TA

<p>issors and things like this. So it can cause a are just non-stop trying just to make sure that nment for everybody else. The learning is etimes it fall as a responsibility on the person pecially if they don't have enough experience niques.</p>	<p>ADHD children can be aggressive</p>
<p>hit someone else or do something, harm other think is the impact of those children on other</p>	
<p>s really have an impact on other children, ry and avoid that student and they think that ear them, they will get hurt or they will get hit.</p>	<p>ADHD children can be aggressive</p>
<p>age group are they. So the younger ones, and then the next day they are sitting or playing ppend to them again, and then they cry about lain about it. Where other children would just can have an impact on both students in a way.</p>	<p>Age group different needs</p>
<p>in a way. The child that has the problem, the ID and then the other children as well on the ither to do with their safety or listening to the get distracted, then they get told off. Then they not us. It was this person distracting us." So it des really. Both the students, as a class as a imself or herself.</p>	<p>Social challenges</p>
<p>in a way. The child that has the problem, the ID and then the other children as well on the ither to do with their safety or listening to the get distracted, then they get told off. Then they not us. It was this person distracting us." So it des really. Both the students, as a class as a imself or herself.</p>	<p>Distracted and stressed</p>
<p>nion, what are the unmet needs teachers managing those children?</p>	
<p>needs that sometimes are not met is training nes recognizing what is the problem, what is it other issues the child has? What is their nds about really how much are they aware of it. s given to them. And the techniques are offered o deal with those children.</p>	<p>More knowledge about ADHD</p>
<p>re not provided, there is a lot of pressure on the s classroom, providing the class with the aging those children at the same time. So it can hoever is dealing with it, to be honest.</p>	<p>Difficult to manage respond</p>
<p>support do teachers usually get currently?</p>	
<p>re SENCO Department if they are available, at as well. So they will either come and attend hat student, or take them outside the class e is the problem and how much the support is hat would be depending on how much the support</p>	<p>SENCO support and limitations</p>

Appendix 9: Code Mapping 1



Appendix 10: COREQ Checklist (Study2)

COREQ (COnsolidated criteria for REporting Qualitative research) Checklist

Topic	Item No.	Guide Questions/Description	Reported on Page No.
Domain 1: Research team and reflexivity			
<i>Personal characteristics</i>			
Interviewer/facilitator	1	Which author/s conducted the interview or focus group?	137
Credentials	2	What were the researcher's credentials? E.g. PhD, MD	135
Occupation	3	What was their occupation at the time of the study?	135
Gender	4	Was the researcher male or female?	135
Experience and training	5	What experience or training did the researcher have?	135
<i>Relationship with participants</i>			
Relationship established	6	Was a relationship established prior to study commencement?	137
Participant knowledge of the interviewer	7	What did the participants know about the researcher? e.g. personal goals, reasons for doing the research	135
Interviewer characteristics	8	What characteristics were reported about the interviewer/facilitator? e.g. Bias, assumptions, reasons and interests in the research topic	140
Domain 2: Study design			
<i>Theoretical framework</i>			
Methodological orientation and Theory	9	What methodological orientation was stated to underpin the study? e.g. grounded theory, discourse analysis, ethnography, phenomenology, content analysis	141
<i>Participant selection</i>			
Sampling	10	How were participants selected? e.g. purposive, convenience, consecutive, snowball	136
Method of approach	11	How were participants approached? e.g. face-to-face, telephone, mail, email	136
Sample size	12	How many participants were in the study?	147
Non-participation	13	How many people refused to participate or dropped out? Reasons?	147

<i>Setting</i>			
Setting of data collection	14	Where was the data collected? e.g. home, clinic, workplace	147
Presence of non-participants	1 5	Was anyone else present besides the participants and researchers?	148
Description of sample	1 6	What are the important characteristics of the sample? e.g. demographic data, date	N/A
<i>Data collection</i>			
Interview guide	1 7	Were questions, prompts, guides provided by the authors? Was it pilot tested?	141
Repeat interviews	18	Were repeat inter views carried out? If yes, how many?	No
Audio/visual recording	19	Did the research use audio or visual recording to collect the data?	137
Field notes	20	Were field notes made during and/or after the inter view or focus group?	140
Duration	21	What was the duration of the inter views or focus group?	140
Data saturation	22	Was data saturation discussed?	147
Transcripts returned	23	Were transcripts returned to participants for comment and/or	145

Topic	Item No.	Guide Questions/Description	Reported on Page No.
		correction?	
Domain 3: analysis and findings			
<i>Data analysis</i>			
Number of data coders	24	How many data coders coded the data?	145
Description of the coding tree	25	Did authors provide a description of the coding tree?	145
Derivation of themes	26	Were themes identified in advance or derived from the data?	207
Software	27	What software, if applicable, was used to manage the data?	145
Participant checking	28	Did participants provide feedback on the findings?	No
<i>Reporting</i>			
Quotations presented	29	Were participant quotations presented to illustrate the themes/findings? Was each quotation identified? e.g. participant number	147
Data and findings consistent	30	Was there consistency between the data presented and the findings?	147
Clarity of major themes	31	Were major themes clearly presented in the findings?	149
Clarity of minor themes	32	Is there a description of diverse cases or discussion of minor themes?	162

Developed from: Tong A, Sainsbury P, Craig J.

Consolidated criteria for reporting qualitative research (COREQ): a 32-item checklist for interviews and focus groups. *International Journal for Quality in Health Care*. 2007. Volume 19, Number 6: pp. 349 – 357

Once you have completed this checklist, please save a copy and upload it as part of your submission. DO NOT include this checklist as part of the main manuscript document. It must be uploaded as a separate file.

Appendix 11: Behaviours' description in the application

Hyperactivity

This area contains strategies to help individuals who exhibit some of the following behaviors: fidgeting with hands or feet; squirming in seat; easily distracted; blurts out answers to questions before they have been completed; talks excessively; shifts from one activity to another without completing the previous one.

Aggression

Aggression involves the initiation of hostile or invasive acts towards others. Low level aggression consists of such acts as rules violation, being disruptive, refusing to comply, and cursing. Strategies in this area help reduce aggressive behavior.

Alternatives to aggression

Contains strategies that can be used to teach children socially constructive alternatives to acting out behavior.

Anger

Anger is a strong feeling of displeasure or hostility. Strategies in this area help individuals to manage anger.

Bad language

Bad language includes profanity, cursing, and obscenity. This area contains strategies to help the individual who uses bad language in any of its forms.

Distractibility

Strategies to assist parents and teachers in reducing distracting stimuli in both the home and school environment.

Following-directions

Directions given in unfamiliar settings or involving two or more ideas can be

confusing. Strategies in these areas focus on improving receptive language by simplifying and breaking down language into its basic component parts making it easier for the child to follow through on requests.

Impulsivity

This area contains strategies to help the individual who acts in a sudden, forceful, compelling, and unpremeditated manner without regard for consequences. Strategies address how to help the impulsive child and/or adolescent to delay gratifying desires and learn to plan ahead.

Lying

This area contains strategies to help the child or adolescent who is engaging in lying or not being truthful.

Selective attention

Selective attention refers to the ability to maintain a response while screening out extraneous noise, such as listening to the teacher when others are talking.

Stealing

This area contains strategies to manage the individual who is stealing. Strategies are presented both to prevent stealing as well as what to do once it has occurred.

Tantrums

Tantrums can be defined as outbursts of temper, including screaming, breaking things, rolling on the floor, and occasionally kicking or hitting an adult. Strategies are suggested to help reduce the child's negative responses to frustration.

Appendix 12: Developer Letter

Behavior Toolbox Software
7-7053 West Saanich Road
Brentwood Bay, BC
Canada

September 26, 2022

Dear Ms. Aldabbagh:

Re: Support of PhD dissertation project

I am so pleased that you were able to make use of the Behavior Tool Box software as part of your project. I wish to emphasize that I would be more than appreciative of any feedback you can provide my company as to the app's utility and any improvements you might suggest. Our company goal is to make our software truly international in scope and your involvement certainly helps in this regard.

My continued wish for your success as you work towards the completion of your degree.

Yours truly,



David V. Erickson PhD (Counselling Psychology)

Appendix 13: Content of ADHD Behavior Toolbox Applications



A book for Ag's teachers about selective attention, hyperactivity, following-directions, impulsivity, anger, tantrums, aggression, altern...

NOTES

1. Inform parents as early on in the school year if their child has persistent problems attending in the classroom. Arrange a meeting with them and find out if they are noticing similar issues at home. Avoid making any assumptions that these difficulties are primarily behavioral or due to a lack of maturity. Establishing early partnerships are essential.
2. Students with persistent attention problems need to sit away from distractions such as: pencil sharpeners, ventilation systems, etc. They may benefit from having their desk as close to the teacher's as possible.
3. Place a child with frequent attending problems in the middle of a group of quiet students with good work habits.
4. Provide instructions in the order they are to happen, e.g., "Take your shoes off then wash your hands."
5. Be an interesting and enthusiastic speaker. Vary the pitch and intonation of your voice while using body language to reinforce important points.
6. Direct or prompt the individual to attend to you by verbally requesting that they listen, or tapping them gently on the arm or by using a secret signal to cue them to focus.
7. A 10-minute walk prior to sitting down to any kind of extended learning task will help a child become more alert and ready to work.
8. After asking the child to do something, have the child repeat the request in their own words to ensure that they know what to do. Allow adequate time for completion of the task.
9. Help to focus a child's attention by saying their name at the beginning of your request for them to do something. (e.g. Sean,

STRATEGIES – SELECTIVE ATTENTION
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remember to wait your turn.)

10. Let the child know that you realize he may have trouble paying attention. Have an agreement that you will give them a secret sign when it is a problem. (e.g. pointing to your ear or nose, thumbs-up etc.)
11. Ensure that activities and language levels required to do a task successfully are a match with the child's developmental abilities. The child's attending skills will be much better when they understand what is required.
12. Redirect or prompt behavior that is unfocused. (e.g., say "Remember you're drawing the picture of the horse." Gently guide the child back to the task. Lightly touching the child may inhibit restless movement if they are squirming in circle or in their desk.
13. Use gestural cues. For example, point to your own face if the child needs to attend to you, or point to the picture in the book if it is the book the child needs to look at.
14. Ask the child to repeat requests but give a framework. For instance, say "I want you to listen for 2 important things, then I'm going to ask you to tell me what those things are." This encourages good listening skills and ensures that the child understands and remembers what has been said.
15. Use electronic recording devices that have earphones. These help to develop the child's ability to listen and understand, while shutting out conflicting sounds.
16. Discourage toys in the desk as these may be distracting.
17. When teaching lessons, be sure that all desktops are clear, and all hands are in sight.
18. Minimize distractions in areas by using dividers and special lighting to help focus attention. Maximize the attractiveness of tasks through the use of hands-on materials which appeal to the children's appreciation of color, texture, smell, sound and novelty.

1. Children with ADHD often need more structure and more clear instruction as to what kinds of behavior an adult is looking for. The adult needs to help the child figure out what the acceptable behaviors are, teach those responses and make sure they receive prompt and positive feedback when they do them. It's important not to look at the child as having malicious intentions.
2. Notice the positive things the child does. You can usually find several desirable behaviors to comment on and encourage. Even if you comment on very small things, they can make a big difference.
3. It has been estimated that as many as 50% to 70% of young children with hyperactive and impulsive behavior are experiencing problems in understanding and expressing ideas through language. Consultation with a speech and language pathologist should be considered if there are suspected problems in these areas.
4. Try not to focus on the child's deficits. Rather, recognize and encourage the child's strengths, even if the talents do not fit your personal hopes or expectations. Artistic, athletic, or creative ability of any kind should be encouraged and developed.
5. Keep goals realistic. Reinforce the child's current skill level and then work on gradual improvement.
6. Provide regular outlets for the release of energy. Give active children time to play and engage in physical exercise. Plan daily activities such as running, a sporting activity, or long walks.
7. Keep unstructured time to a minimum. Thoroughly structure, and divide activities into small units, presenting them one at a time. These activities should be also graded in difficulty in order to provide initial success for the child.
8. Alternate sitting and listening tasks with breaks or activities that provide opportunities for the child to move about.
9. Make sure that disciplinary actions are not taken when the

child's apparent misbehavior or lack of willingness is due to legitimate confusion caused by unclear or mixed messages about expectations.

10. Use a progress chart to show and record improvement. Simply showing the child a chart showing improvement can be highly rewarding. Have them help you record their own progress such as how long they spend time playing a board or electronic game with another family member.
11. Avoid fatigue. Overtired children have more difficulties concentrating and can become "hyperactive".
12. Redirect or prompt behavior that is unfocused. (e.g., say "Remember you're drawing the picture of the horse." Gently guide the child back to the task. Lightly touching the child may inhibit restless movement if they are squirming in circle or in their desk.
13. Keep increasing the amount of time you expect the child to stick with an activity or to pay attention.
14. Children can be permitted to walk on a treadmill in a designated exercise room for 10 minutes if they're feeling on the hyper side.
15. Be as consistent as possible. This helps the hyperactive child feel more secure and helps them to predict what the negative and positive consequences of their behavior will be.
16. Direct or prompt a child to attend to you by asking that they listen, tapping them gently on the arm, waving your arms to get their attention, turning the lights on and off in the room or by using a secret signal to cue them to focus.
17. Keep activities short, change frequently, and try to end on a positive note. This will keep the child engaged and interested. They are more likely to want to return to these activities at a later date if they have experienced success.
18. Praise the child for not interrupting, for waiting patiently, for neat and accurate work, for remaining on task, and

for task completion.

19. Be consistent in establishing and maintaining rules. They should be simple and few.

e.g. We take care of each other. We respect each others property.
We listen to each other.

20. Provide for physical movement. If the child has difficulty sitting, have the child distribute and collect materials, erase the blackboard, and run errands. Do not expect an "active" child to sit perfectly still. Tolerate fidgeting which is not disruptive to others or their own concentration.

21. Have a well-organized and predictable classroom structure. Post the daily schedule and classroom rules. If a child must leave the room for additional help on a regular basis, ensure that they are not missing "critical" class time during their absence.

22. Discourage toys in the desk as these may be distracting.

23. Attach desks and chairs to each other or to the floor.

24. Give immediate feedback to the child to maximize progress. Discuss the child's progress with them. Fill out an assessment sheet daily or weekly.

25. Encourage parents and teachers to provide for physical movement. If the child has difficulty sitting, have them distribute and collect materials in class, erase the blackboard, and run errands. Help them develop realistic expectations in that they should not expect an "active" child to sit perfectly still. There is a need to tolerate fidgeting which is not disruptive to others or their own concentration.

26. Move the hyperactive child's desk away from other children to an area closer to the teacher. This reduces the child's access to classmates' approval of disruptive behavior and allows the teacher to more closely monitor behavior.

27. Establish rules about moving about the class freely, or leaving one's seat. Review them with all the children, and post them where the children can see them.

1. Use simple requests and directions. Avoid too much talking. Use only the number of words that are needed.
2. Check regularly with the child in the class to see if they understand what has been said. This should be done discreetly, or the child may become self-conscious and feel singled out.
3. Write clear instructions on the chalkboard or whiteboard for easy reference.
4. Get the child's attention and establish eye contact if possible when giving initial requests. These are keys to getting a child to follow directions
5. Ask for periodic feedback from the child to ensure the child is listening to the spoken message. Have them paraphrase what they think was said.
6. If the child has difficulty following a series of instructions, have the child make brief notes or draw visual cues to remind them of the sequence. (e.g. first social questions ?, then math #, then finish star map ***)
7. Talk slowly and frequently restate oral information. This will aid in comprehension. Find creative ways to get your message across to the child. For instance, use humor, gestures or demonstrations to help clarify what you mean.
8. Review homework assignments at the end of each class. Have the child write specific notes for each assignment in a homework reminder or journal which goes home daily. The parent can then go over the notes later to check for the child's understanding of what they are expected to do.

9. Review new concepts and vocabulary at the beginning of a lesson. Also highlight them at the end of the lesson. Writing them on the board is useful. This will give the child a better understanding of how to follow through on a task if he is confidently grounded in the appropriate concepts.
10. Avoid using questions to get children to do things. Try not to ask, "Do you want to do this?" if it is something the child has to do. Instead say, "I need you to do this." However, give the child an element of choice in other aspects of the activity. For instance, say, "Would you rather do it at your desk or on the table?". For the child with language comprehension problems, point to two pictures and ask them to choose which one they prefer.
11. Use electronic recording devices that have earphones. These help to develop the child's ability to listen and understand, while shutting out conflicting sounds.
12. Before making a request minimize distractions by placing the child in an area that is as free as possible from excessive auditory and visual stimuli.
13. Praise the child for all instances of following directions. This teaches the child which behaviors you like as a means of encouraging them to perform them more often. Focusing on negative behavior only gives the child information about what not to do.
14. When explaining a task, provide concrete examples. This will minimize difficulties dealing with symbolic language. Make examples real.
15. Use visual maps, demonstrations and simple verbal explanations to help the child get a picture of what is being said or read.

16. Use pauses appropriately when giving instructions to maximize "chunking" in memory. For example, in helping them remember a phone number read out the numbers in groups of two or three.
17. Eliminate extraneous material from the child's work area. This will help maintain focus and increase the child's comprehension.
18. Ask the child to STOP, LOOK, and LISTEN to you when you are speaking to them.
19. Tell a child that their listening efforts are appreciated in various situations.
20. Teach the child to self-check. For instance, have the child explain in his own words the concepts or ideas he has understood from the reading.

1. Children with ADHD often need more structure and more clear instruction as to what kinds of behavior an adult is looking for. The adult needs to help the child figure out what the acceptable behaviors are, teach those responses and make sure they receive prompt and positive feedback when they do them. It's important not to look at the child as having malicious intentions.
2. Notice the positive things the child does. You can usually find several desirable behaviors to comment on and encourage. Even if you comment on very small things, they can make a big difference.
3. Praise the child for not interrupting, for waiting patiently, for neat and accurate work, for remaining on task, and for task completion.
4. Alternate sitting and listening tasks with breaks or activities that provide opportunities for the child to move about.
5. Keep unstructured time to a minimum. Thoroughly structure, and divide activities into small units, presenting them one at a time. These activities should be also graded in difficulty in order to provide initial success for the child.
6. Provide regular outlets for the release of energy. Give active children time to play and engage in physical exercise. Plan daily activities such as running, a sporting activity, or long walks.
7. Set up regular daily routines. They'll help give the child the organization they lack. If the child can follow them automatically, their attention is freed for the task at hand.
8. If the child cannot sit for the entire activity, have the child join the group for just some part of it. For instance, the child could participate in the first or last five minutes of the group activity. The amount of time that he is expected to attend can be gradually increased overtime.
9. Teach children how to reward and compliment themselves for waiting or for thinking of a better approach to a situation.

10. Make sure that disciplinary actions are not taken when the child's apparent misbehavior or lack of willingness is due to legitimate confusion caused by unclear or mixed messages about expectations.
11. Avoid fatigue. Tired children lose their self-control easily and become more impulsive.
12. Teach the child to keep track of the amount of work they complete. This focuses the child's attention on task completion.
13. Electronic devices, equipped with headphones, can help a child focus on a particular activity.
14. Keep goals realistic. Reinforce the child's current skill level and then work on gradual improvement.
15. A child who continually plays with something may be a low arousal child. Try allowing the child to play with something appropriate such as an eraser in the pocket.
16. Consider teaching the child a set of self-directed statements to help them slow down and to guide them-self through a step by step problem solving process.
17. Teach the child to talk through each step of a task. This can help the child structure the task and reduce impulsivity and frustrations.
18. Praise or reward children when their out loud self-talk and actual self-control behavior match.
19. Show a very impulsive child a concrete cue. For instance, have the child make a C with the thumb and index finger on the left hand, which stands for control. Under stress, the child can look at this C, relax, and not impulsively lash out or speak out.

20. Teach children to reward and compliment themselves for waiting or for thinking of a better approach to a situation.
21. Reward any instance of calm and reflective behavior demonstrated by the impulsive child. For example "Kate, I saw you really thinking it through before you wrote down your answer".
22. Through play, encourage the child to act out a role that involves patience and consideration. Play often teaches a child how to behave more appropriately.
23. Point out cause and effect to the impulsive child. Say "If you hit children, then they will be upset."
24. Rehearse a strategy for the child in the event he experiences a stressful situation. For example, say, "There will be a lot of noise at the swimming pool so stay close."
25. Reminders to "slow" or "calm down" will help reduce immature behavior and impulsivity during periods of high emotion.
26. It has been estimated that as many as 50% to 70% of young children with hyperactive and impulsive behavior are experiencing problems in understanding and expressing ideas through language. Consultation with a speech and language pathologist should be considered if there are suspected problems in these areas.
27. Place tape around the outside perimeter of the floor around the child's desk and inform them that during class discussion they are not to move beyond the tape. Ensure that you give them positive feedback for the control they are displaying when they are able to remain at their desk.
28. Surprise spot checks can be carried out for on task student behavior several times throughout the school day or during a specific period of activity. Students should be informed that the spot checks

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will be occurring but should not be aware of the exact times or how far apart they are scheduled. Children who are on task when the spot check is taken earn points which they can cash in at recess time for special privileges (e.g. special outdoor equipment extra computer time).

1. Some signs of anger problems are not always readily apparent. They may include sleep problems, fights at school or home, physical attacks on others or animals, and disobedience from an otherwise well-behaved child. Help them put their feelings into words.
2. Pay attention to other signs of anger may include blaming others, using foul language, other children refusing to play with them because they are a bad sport, and open refusal to do necessary work, They may also throw or break things when discouraged or frustrated.
3. Anticipate problems. Have a plan if issues come up. It's even better to have the child involved at this stage and have them thinking of how they can manage stressful situations differently. Tell them how you will respond and how you hope they will respond.
4. To learn to manage anger four key concepts need to be understood
1. Anger cues (physical signs that us we are getting angry such as rapid breathing, tense muscles, suddenly feeling hot or cold)
2. Anger triggers (Those things that set off our anger)
3. Anger reducers (Ways we can cool off when we are angry)
4. Communication skills (Ways we can express anger non-aggressively). These apply to both children and adults.
5. Focus on building qualities that counteract excessive anger. These include developing a sense of autonomy, respect, identity, and self-esteem. Create an environment that is power sharing and focused on clear communication.
6. Talk to the child about their anger when they are in a more positive mood. Develop a plan. Mutually discuss ways that they can express anger differently. Examples include talking about their anger, listening to music, going to a quiet place, or where appropriate, exiting a situation that is a cause of the anger.
7. How significant others respond to the child's anger is key. This is so even when the child is very young. Practice as calm a response as possible.

8. In a classroom setting, introduce the topic of anger along with a discussion of emotions in general. Teach that it is normal and has many variations.
9. Ensure that your expectations are age appropriate (i.e. expecting a four-year-old to sit perfectly quiet for 20 minutes or an 13 yr old to regularly go to bed at 8:00 may be unrealistic).
10. Model responsible anger management.
Adults who are most effective in helping children manage anger by acknowledging, accepting, and taking responsibility for their own angry feelings and by expressing anger in direct and non-aggressive ways.
11. Use social stories to teach coping skills. Resources can be found at <https://www.pinterest.com/pin/435019645233490361/>
12. Even if you already know the source of a child's anger, it's important to ask. Then, listen to the response from your child and treat it seriously.
13. You can teach a child how to cope with a frustrating situation by recommending alternative actions. For instance, you could say, "I know you're mad because John wants to play on the swing for a while. But it's his turn. Let's see what you can do until he's done. I know! You can ride your tricycle or play with the dog".
14. Attempt to use a neutral tone of voice when expressing anger. It encourages children to listen and not be as easily turned away.
15. Never ignore a child whose behavior is dangerous to them-self, others or is physically destructive. Try talking calmly to them and holding them securely until the rage has passed. Move the child to a comfortable, private place if they are reinforced by the attention of others who may be present.

16. Regularly praise a child when you see them dealing with their irritation/anger in appropriate ways. For example, "I know it was hard for you when I was on the telephone for so long, thank you for waiting for me".
17. Watch for times when the child is "talking themselves through" the anger and encourage this behavior. It is often helpful to give them a script or set of words then can recite themselves to use when they are angry. It could be as simple as " I can relax if I try".
18. Don't diminish the reason for a child's anger or minimize it. Avoid saying "That's nothing to get mad about". As an example you might want to say "I can see why you'd get mad about that. It's hard to wait for our turn when we want to play on the swings".
19. Time away is a version of the popular concept of "time out" used in dealing with anger in children. Isolating an angry child may only make things worse, yet circumstances often warrant the child's taking a break in order to cool off. Time away with the teacher means going away with them in order to talk about their anger.
20. Provide physical outlets for anger such as running, climbing stairs, dancing, walking.
21. Reactions to illness, frustration, tiredness, medication, or stress can mirror the responses of anger. Yet these reactions can easily be addressed through relieving the hunger, tiredness, frustration, treating the illness or changing the medication. If indeed the child is hungry, your response will be different.

1. Remain calm when assisting children to resolve conflicts. Try to avoid communicating anger, irritation, or rejection. Speak softly so they must listen carefully.
2. Have the child engage in physical exercise to modify or reduce his anger. Suggest that they do something which will be enjoyable versus an activity which will only increase his frustration. (e.g., a young child can throw a ball high up into the air, or an older child might benefit from working out on a treadmill or exercise bike).
3. Provide regular outlets for the release of energy. Give active children time to play and engage in physical exercise. Plan daily activities such as running, a sporting activity, or long walks.
4. Encourage the child to talk about both positive and negative feelings. Respond tentatively by saying something like "it seems that that you felt really angry when John chose not to play with you." Give the child a chance to further clarify his feelings.
5. Teach the child how to describe behaviors that provoke them as well as their personal reaction. Teach the child to say phrases such as "I was using the computer, and you pushed me away from it, so I got mad."
6. Model by example. The child will often imitate the way in which you handle frustrations. (e.g., Remove yourself from a situation if you know that you are too upset to be constructive but then return and state your concerns objectively and clearly once you feel calmer.)
7. Limit controls over the child to the most necessary ones. Avoid being too demanding by setting too many unnecessary or trivial rules.
8. Never ignore a child whose behavior is dangerous to them-self, others or is physically destructive. Try talking calmly to them and holding them securely until the rage has passed.

Move the child to a comfortable, private place if they are reinforced by the attention of others who may be present.

9. Encourage the child to express minor frustrations and irritations in a socially acceptable manner. For example, have the child verbally express their anger. You can teach this by asking "Jason, are you mad?" and then encourage them to put their feeling into words, "I feel mad."
10. Encourage appropriate expression of negative feelings. Model and teach children to use words to express their feelings. (e.g., I feel sad when ..., I feel mad when..., I feel hurt when..., I feel left out when..., etc.)
11. Coach the child to talk them-self out of their anger. Teach the child some calming self-talk strategies.(e.g., counting to ten slowly before reacting, reminding them-self to use words to express their feelings, remembering that everyone sees things differently, etc.)
12. Limit the number of choices to two.
13. Ignore negative behavior as long as it is minor, non-disruptive, and no one can be hurt. Instead, catch them being good and enthusiastically reinforce their appropriate action. Never ignore noncompliance.
14. Don't try to teach during a tantrum - it is almost never successful.
15. Remove the child to a safe time-away area if the child is likely to harm someone or something during a tantrum physically. After doing this ignore the temper outburst.
16. Impose a five to ten-minute penalty in a time-away area in the event of a disruptive tantrum. If the tantrum continues after this period, impose additional time.

17. Avoid throwing a tantrum yourself. Losing your cool will only encourage the child to keep the heat on. Say to yourself, "Why do I need to act crazy? I know that when I said no, I said it for a reason."

18. Do not belittle the child. Just because the child had a temper tantrum does not mean he is a bad person. Avoid saying, "Bad boy! You should be ashamed of yourself!" This will only decrease his self-esteem which will add fuel to further tantrums.

19. Do not remind the child of the tantrum later that day. This only gives more attention to the behavior and increases the chances that the child will have another outburst, merely to be the center of your conversation.

20. Do not make the child pay for the tantrum. Having nothing to do with the child after the outburst is over will only cause the child to have more tantrums to try to get your attention. Do not make the child feel unloved and unwanted just because his behavior was undesirable.

21. Avoid unnecessary talking when giving instructions. USE SIMPLE CLEAR CUT DIRECTIVES. Focus on telling children what they CAN DO.

22. Ignore tantrum behavior that can be tolerated. Avoid eye contact, move away, and maintain a neutral facial expression. Refrain from any verbal response.

23. After a child has had a tantrum, discuss alternative problem-solving strategies. Have them verbally agree to try a specific plan next time a similar concern arises. (e.g., walking away, asking for adult help, compromising, etc.)

24. When you see a child attempting to apply new problem-solving strategies, reinforce their behavior and try to support a successful outcome. This may require stepping in and coaching the involved parties until they are all familiar enough with the process so that they can do it independently.

1. Let the child know they can deal with the inappropriate

behavior of others by leaving the room or getting involved in another activity. Point out that if you remove the "audience" it may discourage this behavior from occurring again.

2. A child needs a STRONG, LOVING, RELATIONSHIP with a parent or other adult to feel safe and secure and to develop a sense of trust. Without a continuing relationship with a caring adult, a child is at risk of becoming difficult to manage. Children are less likely to develop behavior problems when their parents are actively involved in their lives at any age. Encourage parents to spend regular one-one time with their child. Not only is this a great relationship builder but it allows the parent is better informed as to their child's activities.

3. Encourage parents to spend regular one-one time with their child. Not only is this a great relationship builder but it allows the parent to be better informed as to their child's activities.

4. At this age children are somewhat less aggressive physically, but they begin expressing their aggression more frequently by methods such as teasing and cursing. Although they may not be as physically violent, the offensive behaviors at this age can be more calculating and cruel, with children picking on each other and making fun of weaknesses and insecurities. However, due to their increasing intellectual abilities, it is easier for parents and teachers to reason with them. For example, children in their beginning years of school are ready to think about aggressive behavior regarding how it feels to be the other person - "How would you like it if someone said that about you"? Encouraging the development of empathy and taking another person's point of view is means of helping children develop self-control over their aggressive impulses.

5. Let a child experience the natural consequences of their aggressive behavior if the effects are not a danger to their physical or emotional well-being. (e.g., If the child's playmate decides to stop playing because they didn't appreciate the aggressive behavior, don't arrange for another child to play instead). It is essential for children to experience the results of their behavior. Rescuing them from the natural consequence of emotional discomfort is depriving them of an opportunity to learn about the effect their behavior can have on themselves and

others.

6. It is important to remember that children have minds of their own. Increasing independence may lead them to behave in ways that disappoint, anger or frustrate their parent or caregiver. Patience and a willingness to view the situation through the child's eyes, before reacting, can help you deal with your emotions. **AVOID RESPONDING** with hostile words or actions. Use a **NEUTRAL** tone of voice that is clear about expectations and consequences.

7. Very young or immature children need adult involvement in their activities to prevent or reduce aggressive reactions. Close supervision is important. Show an interest in what the children are doing to head off trouble. Research studies indicate that unsupervised children often have behavior problems.

8. Encourage children of school age and over to participate in **SUPERVISED** after-school activities such as sports teams, tutoring programs, or organized recreation. Involve them in community programs run by adults whose values you respect.

9. When you are unable to supervise them closely, limit the number of children with whom the child is allowed to play.

10. Many young children can only play cooperatively for short periods of time. Note the average length of time a child can play before becoming tired and resorting to aggression to resolve problems. Lessen the length of their playtimes by 15 to 30 minutes. Playtimes can be lengthened again as they mature and learn new coping skills.

11. Parent training is an essential part of managing aggressive behavior. If the parent is unable to participate in a formal parent training program consider providing one meeting. The professional can provide support and behavioral strategies. Parents, the school, and working in cooperation with a mental health professional, can be very effective at reducing aggressive behavior.

12. Model positive problem-solving skills. Children learn much of their social behavior by observing and imitating others,

particularly children their age. Introduce them to an organized, peer group such as cubs where they will see problem-solving behavior demonstrated.

13. Provide regular outlets for the release of energy. Give active children time to play and engage in physical exercise. Plan daily activities such as running, a sporting activity, or long walks.

14. Model appropriate language for the child to use to express feelings, resolve conflict, and indicate frustration. Verbally cue the child when the child is using inappropriate means of communication. For children who can read, provide a vocabulary list of feeling words.

15. Show the child how to handle conflict. Children need specific suggestions and demonstrations from adults to learn that there are more efficient and acceptable ways to handle disagreements than physical attack and retaliation. They may choose to leave the situation, ignore inappropriate behavior which is not of danger to anyone, get help if necessary, calmly state their needs to the other children, apologize, work out a compromise that is fair to all parties (i.e., sharing, trading, taking turns, etc.) Have children role-play conflict situations.

16. Occasionally rephrase what they have told you and suggest what their feelings may have been at that point in the situation. Resist telling them how they should have handled the situation.

17. Have the child engage in physical exercise to modify or reduce his anger. Suggest that they do something which will be enjoyable versus an activity which will only increase his frustration. (e.g., a young child can throw a ball high up into the air, or an older child might benefit from working out on a treadmill or exercise bike).

18. Model calm, controlled behavior for the child, mainly when you are upset or angry. This shows the child how you should handle yourself.

19. Encourage the child to talk about both positive and negative feelings. Respond tentatively by saying something like "it seems that that you felt really angry when John chose not to play with you." Give the child a chance to further clarify his feelings.
20. Teach children how to solve problems with words, not actions. Children often fight it out because they lack the language and social skills to talk things through. When a child learns to read, post a list of feeling words that they can refer to.
21. Have the child rehearse appropriate behavior or language before entering a situation. Have them think about things they can do or say if another child attempts to provoke them. This could include counting to ten, staring at the child without saying anything, or walking away. It might also involve asking them to "please stop."
22. If the aggressive child has good writing abilities, suggest that they express their feelings in a story.
23. Actively teach empathy to the child. When you read about or see a situation in which someone has been hurt, try to talk about how that person feels.
24. Have the child rehearse appropriate behavior or language before entering a situation. Have them think about things they can do or say if another child attempts to provoke them. Approaches could include counting to ten, staring at the child without saying anything, or walking away. It might also involve asking them to "please stop."
25. Give praise whenever the child shows concern for the difficulty of others.
26. Reinforce behavior that is incompatible with aggressive behavior, such as sharing materials with other children, being polite, and cooperating with adult requests.
27. Try to KEEP INTERACTIONS with the child CONSTRUCTIVE. Interact with the child frequently using a

positive tone of voice. Compliment them on their abilities in areas of strength.

28. Be firm, making it clear what is acceptable and what is not. Rules for appropriate behavior need to be very clear, with a zero-tolerance for aggressive acts towards others.

29. Check if you are sending mixed messages to the child about the child's aggressive behavior. If you say, "Don't hit" but are obviously proud of their fighting abilities, the child will become confused.

30. If time-away is not appropriate, take away privileges or require them to make restitution to the injured party (e.g., the child may not be allowed to play in a specific area at recess, or they may have to redo the child's homework they scribbled on).

31. Try to determine the circumstances which triggered the child's aggressive behavior. Ask yourself what might have just happened that set the child off, including your behavior, another person's behavior, or something else in the situation.

32. Limit access to pencil, scissors and other materials if a child is continually misusing them. (e.g., allow the child to have scissors only for specific supervised activities) Reward more responsible behavior by gradually allowing them to have these items for more extended periods of time, and with fewer restrictions.

33. Avoid getting into power struggles. Offer appropriate choices to the child whenever possible. This provides the child with some control and increases the chances that they will comply (e.g., Insist that they are seated for an activity but allow them to choose between locations).

34. Teach the child how to describe behaviors that provoke them as well as their personal reaction. Teach the child to say phrases such as "I was using the computer, and you pushed me away from it, so I got mad."

35. Try to determine whether or not some unmet need may be leading to the aggressive behavior. Consider the amount of

encouragement the child receives, any learning problems, and the quality of the child's relationships with friends.

36. Ignore negative behavior as long as it is minor, non-disruptive, and no one can be hurt. Instead, catch them being good and enthusiastically reinforce their appropriate action. Never ignore noncompliance.
37. Avoid physical punishment to reduce aggressive behavior. Using force to stop aggression wrongly shows that it is a legitimate problem-solving technique.
38. When a child is aggressive, stop the behavior and give the child something else to do. Suggest and help start a new activity or guide the child to a place where aggressive feelings can be expressed without harming anyone or anything.
39. When the child is acting aggressively, stop the behavior, deliver a brief reprimand which describes the unacceptable behavior and tell them alternative behaviors which are acceptable. (e.g. "Tom when you kick Sally it hurts her. Either sit on one end of the couch with your feet on the floor or move to the spare chair").
40. Move physically closer to the child as a means of reducing aggressiveness.
41. Use other children as positive models for gentle, cooperative action. Praise appropriate behavior. However, don't belittle one child in praising the other. (e.g. "Carla, thanks for helping Dave. Why can't John be more like you?") Focus only on the positive behavior. (e.g., "Super Carla! Dave needed your help")
42. Be consistent in your use of time-away. Use time-away every time the child is aggressive. The child needs to learn the message: When I play cooperatively, I get lots of positive attention and get to stay and play. Whenever I hit, I can't play, and I get no attention.
43. If the child hits again, start the whole time-away procedure again.

44. After misbehavior and once the child is calm, rehearse with them how the situation could have been handled or how they can handle it in the future.
45. With older children or if a time-away is not possible, take away privileges or require them to make restitution to the injured party. (e.g., the child may not be allowed to play in playtime .)
46. Document aggressive acts by the child so that you have a record when meeting with parents or other school or social service officials.

1. Instruct the child on how to ignore someone who is annoying them. Tell them not to look at the person he wants to avoid. Tell them not to listen to what the other person is saying. Remind them not to say anything back to the other person.
2. Let the child know they can deal with the inappropriate behavior of others by leaving the room or getting involved in another activity. Point out that if you remove the "audience" it may discourage this behavior from occurring again.
3. Teach children how to solve problems with words, not actions. Children often fight it out because they lack the language and social skills to talk things through. When a child learns to read, post a list of feeling words that they can refer to.
4. Teach the child how to describe behaviors that provoke them as well as their personal reaction. Teach the child to say phrases such as "I was using the computer, and you pushed me away from it, so I got mad."
5. Have the child stop and think. Point out that this gives a person time to make appropriate choices.
6. Model positive problem-solving skills. Children learn much of their social behavior by observing and imitating others, particularly children their age. Introduce them to an organized, peer group such as cubs where they will see problem-solving behavior demonstrated.
7. Encourage the child to talk about both positive and negative feelings. Respond tentatively by saying something like "it seems that that you felt really angry when John chose not to play with you." Give the child a chance to further clarify his feelings.
8. Give praise whenever the child shows concern for the difficulty of others.

9. Provide regular outlets for the release of energy. Give active children time to play and engage in physical exercise. Plan daily activities such as running, a sporting activity, or long walks.

10. Have the child engage in physical exercise to modify or reduce his anger. Suggest that they do something which will be enjoyable versus an activity which will only increase his frustration. (e.g., a young child can throw a ball high up into the air, or an older child might benefit from working out on a treadmill or exercise bike).

1. Children may just be experimenting with new words. They may think it's a cool new word to try. When adults say swear words, they tend to emphasize them, which makes them all the more appealing to youngsters. Adults need to be aware of the words they use, especially in front of their child.
2. There are several reasons why children swear. These may include not having the right words to express themselves, spending time with people who swear, to get attention, to establish independence, to look big in front of their peers, or to copy what they see on TV or in the movies. You are one step closer to coming up with the right strategy when you can determine the motivation behind the swearing.
3. Sometimes children use bad language to get attention. Make sure you pay attention and comment on their use of proper communication. Check to make sure that you are spending an adequate amount of time doing individual activities with your child.
4. Allow the child opportunities to express hurt and anger to you directly. Request that they use a reasonable tone of voice. The child is less likely to use curse words to communicate negative feelings.
5. Openly discuss bad words with the child. Talk freely about every one of the commonly used inappropriate words. Write the words down and then explain them. This approach may help prevent the use of foul language by taking away from their shock value.' Use can also say "that is a word for private body parts. We don't use it like that in our school.'
6. Do not appear shocked or disturbed when the child uses bad language. Play dumb. Reply by saying, "What is that word you used? I don't understand. What does it mean?" The child is likely to abandon a tactic which puts them in this position.
7. Express disapproval. For instance, say "I can understand that you are angry, but you may not use bad language."
8. If the child continues to use bad language, after you have asked him to stop, use a consequence. Going

to a time-away area for five or ten minutes is one option.

9. It frequently happens that younger children will use words without knowing what they mean. Ask the child if he knows what the words mean, then give the meaning and ask the child if that is what he wanted to communicate.
10. If the child swears out of anger, fear or frustration, suggest substitutions for these words. Teach the child to say, "I am mad" when angry, "I am scared" when fearful, and "I need help" when frustrated. Teach these phrases and remind the child of what to say when he is feeling this way.
11. When children swear or use foul language, let them know how it makes you feel. Say something like "When you talk that way, I feel really uncomfortable. I would appreciate you using another word(s) to tell me how you feel". You could even encourage them to make up their own silly expressions to use instead of swearing words.
12. Explain the rules about bad language to everyone in the class. Make the rewards and penalties for swearing apply to everyone.

1. There are a number of reasons children lie. These can include seeking attention, avoiding consequences, or not knowing the difference between fantasy and reality. The reason will determine your approach. You may have to use a trial and error approach to determine the reason.
2. When you are unsure as to whether a child is lying or telling the truth, attempt to be neutral in your response. Try something like "Mary, what you say is interesting. I'll just have to think about it."
3. If your child is lying to get something, help explore other ways to get the desired object. Consider a small allowance might for the completion of specific projects.
4. Avoid being critical when your child makes a mistake or error. Children will lie to preserve their self-esteem. Make frequent use of praise and appreciation so the child will feel secure enough to admit mistakes and misdeeds.
5. When you know with certainty that a child is not telling the truth, gently correct them. Let them know that what they are saying is not true and how you know. Follow this by having the child make a more accurate statement. "John, I know you didn't do your homework, you need to tell me what you were doing instead" Do not engage in argument.
6. Be honest with the child. Say something like "That doesn't sound like the truth to me. Often when we don't tell the truth it's because we are feeling afraid or trapped. Why don't we just think on this for a time, and we can talk about it, later on, today, if you would like to tell me how you are feeling about what is going on for you".
7. Avoid asking questions. Instead, tell the child what he did that was wrong.

8. Do not force the child to lie or confess wrongdoings. We are all tempted to lie when asked to incriminate ourselves. Gather facts from other sources as well and base your decision on all of the information.
9. When reading to the child, point out stories which pretend and those which are about things that happened.
10. Be truthful yourself. Do not try to avoid unpleasant situations by telling the child the doctor's needle will not hurt, or to disguise personal weaknesses by breaking promises or making excuses.
11. If the child is lying to be loyal and protect other children, gather the facts from other sources.
12. If the child lies as an act of general hostility, consider seeking professional counselling for the child and the family.
13. If the child is lying to belittle or exploit others, discuss fairness and good sportsmanship.
14. If the child is lying because they fear disapproval for failing a difficult task, lower your expectations. Do not expect so much so soon from the child.
15. If the child is lying to avoid punishment, guilt, or embarrassment, be less severe if the child has been receiving harsh discipline in the past. Set a reasonable penalty for lying, and make honesty more rewarding.
16. If the child is lying to get praise, attention, or prestige, give the child more recognition and appreciation. This way the child does not have to lie to feel good.
17. In the case of a cover-up lie, punish the child both for the act of lying and for the misdeed that prompted the lie. Two punishments may be appropriate. This may involve the loss of two

different sets of privileges.

18. Discuss the value of truthfulness. Explain that if they are truthful about a troublesome situation, you will do all you can to help come up with a solution to their problem. Tell the child that if they continue to lie to you, you cannot be much help because you cannot depend on them for the truth. Remind and reassure the child that they do not have to be afraid.

19. Teach the child that dishonest behavior leads to a lack of trust by others.

20. Show the child that your approval and love are not dependent on them achieving a high level in school.

21. If a child seems to be having difficulty separating reality and fantasy, clarify whether what they are saying is either fiction or non-fiction. If they insist that what they are reporting is "non-fiction" and that her uncle really is 10 feet tall, say in "That's interesting, but I bet it's fiction." Then move on to another topic.

22. When a child is exaggerating, respond neutrally and keep your interaction brief. For example, if a child says they saw a real pirate ship sailing in the sky, you might say "You've been enjoying your new book you got from the library, what else have you been reading?"

23. Focus on the child's strengths and what they already do well so they will have less of a need to exaggerate out of a sense of insecurity. For example, if the child is artistic, have them draw a picture for your office or make a poster for a special event.

24. During class time conduct a lesson(s) on the importance of trust. Explain that lying reduces credibility (Use the fabled little boy who cried wolf). Also, explain that trust is created over time and one lie can destroy the trust.

25. Let a student know that any time he tells you something that is not true, he will owe time-away of recess. Time will depend on the age of the child.

26. If a student appears to have difficulty telling the truth, briefly document the incidences where lying was evident. Also separately record situations which you could not prove but were highly suspicious. These may be helpful when you discuss the problem with the child's parent. Perhaps there is a pattern to the child's lying which will become more evident after discussion.

27. If you anticipate significant problems with a parent-teacher conference invite another staff member (such as a school counselor or principal) to join you in the meeting. Be sure to let the parent know that that person will also be in attendance. Let them know that they are welcome to bring another adult with them as well. Once the parent is involved, arrange for weekly updates of information to be exchanged between the home and school environments.

28. If you have a meeting with the parent and child over lying, have the parent announce the conference to the child. Cooperatively conduct the meeting, inviting input from parent and child. End the session with words of encouragement.

1. Place a high value on personal honesty and respect for the property of others. The more clear you are about these values and live up to them in your daily life, the less likely the child will have a stealing problem.
2. Show the child what you mean by stealing. Teach the child the difference between borrowing (having permission to use something that does not belong to you for a limited period) and stealing (taking something without permission or without paying for it). Discuss the potential consequences of each of these activities. For example, if you borrow something with permission and return it in good shape then you will probably be allowed to borrow again. But if you steal something you lose someone's trust, and possibly your borrowing privileges with them. A clear explanation helps ensure the child knows what you mean when you say, "You must not steal."
3. Teach the child how to borrow and return property belonging to others.
4. Respect the child's right to personal property. Never borrow the child's property or savings without the child's permission.
5. In coping with a child who steals, try to control your emotional upset and not be overly shocked, angry, or despairing. Do not take stealing as a personal failure or insult to you.
6. Do not ask the child why he stole something. Most children will have difficulty coming up with a valid answer. As a teacher, stick with the facts and move on to a solution.
7. If the child stole something for the thrill of it, to win the approval of peers, or to prove how tough he is, give or suggest other sources of excitement, friendships, and prestige.
8. Immediately and consistently set penalties for stealing incidents.
9. Don't remind the child about a stealing incident. Bringing up the past will only reteach the child what to do wrong, not right.
10. Encourage empathetic responses from the child. Ask, "How

would you feel if someone took something you owned and really liked?"

11. Do not give a sermon. Confront the child about stealing in an honest and straightforward way. Point out the unfairness of the act, explain people's right to private property, and examine the feelings others have toward people who steal.
12. Firmly express your disapproval without excessive confrontation. Avoid exaggerating the incident and making the child feel like a criminal. Do not label the child a little thief.
13. Verbally confront the child about the seriousness of stealing. Explain why the act is inappropriate and make it clear that the behavior will not be tolerated. Label the act as stealing so that the child understands the true nature of the misdeed and cannot minimize it.
14. Show the child what you mean by stealing. Teach the child the difference between borrowing (having permission to use something that does not belong to you for a limited period) and stealing (taking something without permission or without paying for it).
15. Ask the parent to explain the correct process of buying things in a store. Make the child aware of the correct and incorrect behavior. For example, say "You may ask me for a chocolate bar. If I say yes, you may choose a bar and put it with the other groceries until we pay for it. You may not eat the chocolate bar or take it out of its wrapping until after it is paid for."
16. Ask parents to remove temptation. Do not leave loose change, wallets, and unlocked coin collections around.
17. Encourage a child to ask you when they want things by teaching them how to ask. Make a rule such as, "You must always ask me if you can have something before you help yourself."

1. Make sure that parents arrange for the child to be seen by a pediatrician for a medical review. They can advise as to whether medication would be appropriate. If medication is advised, ensure that follow-up with the referring physician occurs regularly to determine adherence, side-effects, and overall effectiveness.
2. Work closely with your school team. Ensure that the school has the relevant medical and psychological data on your child. You are then in a much better position to develop a coordinated approach. Your school psychologist can be helpful.
3. Avoid unnecessary talking when giving instructions. Use simple, specific, and direct requests. Focus on telling the child what they can do. (e.g. "Play by the table " vs. "Don't play on the computer").
4. To help students stay engaged in classroom activities, call on them frequently during group discussions.
5. Teach children how to attend. Emphasize the importance of keeping their eyes on the speaker, and their body quiet, as they listen and think along. Be a model of these behaviors yourself.
6. Students with persistent attention problems need to sit away from distractions such as: toys, pencil sharpeners, ventilation systems, etc. They may benefit from having their desk as close to the teacher's as possible.
7. Have "quiet corners" in the class which children can choose to move to in order to complete work or concentrate better.
8. Provide regular outlets for the release of energy. Give active children time to play and engage in physical exercise. Plan daily activities such as running, or sporting activity.
9. Provide instructions in the order they are to happen, e.g., "Take your coat off then wash your hands."
10. Ensure that the child's desk contains only the essentials. Train

the child to place books, pencils, and erasers in the same spot after each lesson.

11. Combine verbal teaching with a visual demonstration. Use pictures, diagrams, outlines, and models when possible.
12. Seat a child with frequent attending problems in the middle of a grouping of quiet students with good work habits.
13. Allow students sufficient time to fully process information prior to asking them to respond.
14. When presenting new information try to incorporate materials which are attractive and or novel. Consider the use of area lighting to focus attention. As well you can vary your tone of voice or assume the voice of an interesting character (e.g. Mr. Nature Nut) to hold their interest.
15. Maintain eye contact during a verbal request.
16. Use a progress chart to show and record improvement. Simply showing the child a chart showing improvement can be highly rewarding. Have them help you record their own progress such as how long they spend time at playing a board or electronic game with another family member.
17. If you see the child's attention is wandering, ensure the child's desktop is clear of distracting items.
18. Redirect or prompt behavior that is unfocused. (e.g., say "Remember you're drawing the picture of the horse." Gently guide the child back to the task. Lightly touching the child may inhibit restless movement if they are squirming in circle or in their desk.
19. Inform parents as early on in the school year if their child has persistent problems attending in the classroom. Arrange a meeting with them and find out if they are noticing similar issues at home. Avoid making any assumptions that these difficulties are primarily behavioral or due to a lack of maturity.

Establishing early partnerships are essential.

20. Ensure that activities and language levels required to do a task successfully are a match with the child's developmental abilities. The child's attending skills will be much better when they understand what is required.
21. Alternate sitting and listening tasks with breaks or activities that provide opportunities for the child to move about.
22. Minimize distractions in areas by using dividers and special lighting to help focus attention. Maximize the attractiveness of tasks through the use of hands-on materials which appeal to the children's appreciation of color, texture, smell, sound and novelty.
23. Teach the child to keep track of the amount of work they complete. This focuses the child's attention on task completion.
24. Use carpeting and drapes to reduce noise levels.
25. Electronic devices, equipped with headphones, can help a child focus on a particular activity.
26. Install rubber tips on chair and table legs. Use an area carpet if wall-to-wall carpet is not possible. If desktops are hinged, install felt at contact surfaces. Also consider the use of room dividers.
27. Keep unstructured time to a minimum. Divide activities into small units and present one at a time. These activities should be graded in difficulty in order to provide assurance of success.
28. Reduce distractions by seating the child in the front side row. This reduces the number of close contacts.
29. Children concentrate better in classrooms or other areas that are painted in muted colors with almost no posters, artwork or decorations on the walls.

30. Let the child know that you realize he may have trouble paying attention. Have an agreement that you will give them a secret sign when it is a problem. (e.g. pointing to your ear or nose, thumbs-up etc.)
31. Reduce auditory distractions by having a low number of students in the classroom.
32. Provide electronic devices with earphones to help focus attention to reduce distracting noise.
33. Avoid fatigue. Overtired children cannot concentrate and may become overactive.
34. Make sure that disciplinary actions are not taken when the child's apparent misbehavior or lack of willingness is due to legitimate confusion caused by unclear or mixed messages about expectations.
35. Break down complex tasks into smaller simpler units. Provide encouragement and feedback to the adolescent as they complete each unit.
36. Consistently show your encouragement for good attending behavior by being specific with praise. For instance, say, 'I like the way you were looking at the class when you spoke to them.' or 'Your comments showed me that you were really listening.'
37. Carefully consider the organization of the seating. This could involve putting the child at the front, close to the chalkboard as well as avoiding placing the child near high traffic areas such as close to the door.
38. Use gestural cues. For example, point to your own face if the child needs to attend to you, or point to the picture in the book if it is the book the child needs to look at.
39. Minimize distractions by using dividers and special lighting to help focus attention. Maximize the attractiveness of tasks through the use of hands-on materials which appeal to the children's appreciation

of color, texture, smell, sound and novelty.

40. Activities into the daily routine which allow children to release physical energy. Gym time and recess are major opportunities for children to be physically active. However, a classroom game of Simon Says or even a few minutes of yoga or Tai Chi can also be beneficial and recharge students' abilities to concentrate.

41. Provide the child with a practice trial to help them prepare to pay attention and reduce distractibility.

42. Write clear instructions on the chalkboard or whiteboard for easy reference.

43. Avoid teaching at a frustration level. Teach at a level that allows for frequent success but is still challenging for the adolescent.

44. Redirect wandering attention in a supportive way. Use physical closeness, touch, and visual cues such as gestures and pointing to important features.

45. When teaching lessons, be sure that all desktops are clear and all hands are in sight.

46. If the child cannot sit for the entire activity, have the child join the group for just some part of it. For instance, the child could participate in the first or last five minutes of the group activity. The amount of time that he is expected to attend can be gradually increased overtime.

47. Try to end an activity at the highest point of the child's interest. Then come back to it later.

48. Some children cannot work in situations where there is more than one activity going on at the same time. Modify the environment accordingly. In the classroom, consideration might be given to wearing earplugs/headphones or working in the library/hallway to screen out distracting information.

49. Keep activities short, change frequently, and try to

end on a positive note. This will keep the child engaged and interested. They are more likely to want to return to these activities at a later date if they have experienced success.

50. Use electronic recording devices that have earphones. These help to develop the child's ability to listen and understand, while shutting out conflicting sounds.

51. Praise the child for not interrupting, for waiting patiently, for neat and accurate work, for remaining on task, and for task completion.

52. Check regularly with the child in the class to see if they understand what has been said. This should be done discreetly, or the child may become self-conscious and feel singled out.

53. Keep increasing the amount of time you expect the child to stick with an activity or to pay attention.

54. Keep goals realistic. Reinforce the child's current skill level and then work on gradual improvement.

55. Avoid fatigue. Overtired children have more difficulties concentrating and can become "hyperactive".

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Appendix 14: TIDieR



The TIDieR (Template for Intervention Description and Replication) Checklist*:

Information to include when describing an intervention and the location of the information

Item number	Item	Where located **	
		Primary paper (page or appendix number)	Other † (details)
1.	BRIEF NAME Provide the name or a phrase that describes the intervention.	<u>190</u>	_____
	WHY		
2.	Describe any rationale, theory, or goal of the elements essential to the intervention.	<u>190</u>	_____
	WHAT		
3.	Materials: Describe any physical or informational materials used in the intervention, including those provided to participants or used in intervention delivery or in training of intervention providers. Provide information on where the materials can be accessed (e.g. online appendix, URL).	<u>190</u>	_____
4.	Procedures: Describe each of the procedures, activities, and/or processes used in the intervention, including any enabling or support activities.	<u>190</u>	_____
	WHO PROVIDED		
5.	For each category of intervention provider (e.g. psychologist, nursing assistant), describe their expertise, background and any specific training given.	<u>Appendix 12</u>	_____
	HOW		
6.	Describe the modes of delivery (e.g. face-to-face or by some other mechanism, such as internet or telephone) of the intervention and whether it was provided individually or in a group.	<u>190</u>	_____
	WHERE		
7.	Describe the type(s) of location(s) where the intervention occurred, including any necessary infrastructure or relevant features.	<u>190</u>	_____

	WHEN and HOW MUCH		
8.	Describe the number of times the intervention was delivered and over what period of time including the number of sessions, their schedule, and their duration, intensity or dose.	201_____	_____
	TAILORING		
9.	If the intervention was planned to be personalised, titrated or adapted, then describe what, why, when, and how.	N/A_____	_____
	MODIFICATIONS		
10.*	If the intervention was modified during the course of the study, describe the changes (what, why, when, and how).	193_____	_____
	HOW WELL		
11.	Planned: If intervention adherence or fidelity was assessed, describe how and by whom, and if any strategies were used to maintain or improve fidelity, describe them.	202_____	_____
12.*	Actual: If intervention adherence or fidelity was assessed, describe the extent to which the intervention was delivered as planned.	207_____	_____

** **Authors** - use N/A if an item is not applicable for the intervention being described. **Reviewers** – use ‘?’ if information about the element is not reported/not sufficiently reported.

† If the information is not provided in the primary paper, give details of where this information is available. This may include locations such as a published protocol or other published papers (provide citation details) or a website (provide the URL).

‡ If completing the TIDieR checklist for a protocol, these items are not relevant to the protocol and cannot be described until the study is complete.

* We strongly recommend using this checklist in conjunction with the TIDieR guide (see *BMJ* 2014;348:g1687) which contains an explanation and elaboration for each item.

* The focus of TIDieR is on reporting details of the intervention elements (and where relevant, comparison elements) of a study. Other elements and methodological features of studies are covered by other reporting statements and checklists and have not been duplicated as part of the TIDieR checklist. When a **randomised trial** is being reported, the TIDieR checklist should be used in conjunction with the CONSORT statement (see www.consort-statement.org) as an extension of **Item 5 of the CONSORT 2010 Statement**. When a **clinical trial protocol** is being reported, the TIDieR checklist should be used in conjunction with the SPIRIT statement as an extension of **Item 11 of the SPIRIT 2013 Statement** (see www.spirit-statement.org). For alternate study designs, TIDieR can be used in conjunction with the appropriate checklist for that study design (see www.equator-network.org).

Appendix 15: Interview Schedule (Study3)

Interview Schedule Opening

Hi. Thank you for agreeing to take part in the study

My name is Reem Aldabbagh, a PhD student within the Division of Psychiatry & Applied Psychology, School of Medicine, University of Nottingham. I am also a lecturer in special education/ behaviour support at the University of Jeddah. I used to work as teachers for children age 4-8.

As the participant sheet explains, I'm doing this interview to help me explore your views and thoughts about the App that you've been using for few weeks. Your time and effort will add to the study.

Firstly I would like to ask you a few questions about yourself. Demographics

- 1- What is your highest educational qualification?
- 2- Have you received any training in behavioural management?
- 3- What is your age range?
 - 20 - 29
 - 30 - 39
 - 40-49
 - 50-59
 - 60+
- 4- What is your gender:
 - Male
 - Female
 - Prefer not to say

Do you have any questions before we start? Are you happy if I start recording now?

Now I am going to ask you a few questions about your professional experience What

is your current role?

- Age group taught _____
- What type of school (infant, junior, faith school)
- How long have you been in that role?

About how many years of professional experience have you had overall?

What previous training have you had in supporting children with ADHD in the classroom

How much experience of working with children with symptoms of attention disorder and hyperactivity? Prompt age group

- Any children that stand out as having had particular difficulties

The start of the semi-structure interview

I am going to start by asking about the experience of downloading and using the app before we move on to your experience of applying the application in practice

When did you download the app? Was that onto your phone? How did you find the process of installing the app?

How did you find navigating the app?

What about the process for keeping notes?

What aspects of the app's design did you like?

What aspects of the app's design could have been improved?

- How?

Can you tell me a bit about how often you accessed the app and in what circumstances?

- If applicable
- What were the barriers to access?

Now can we move on to how you feel about using the app in practice?

How did you feel about the app's approach to supporting children with symptoms of ADHD?

How does it fit with your own practice?

How does it fit with your training in classroom support for ADHD (if applicable) What did you think about the content of the app?

- Was anything missing
- Was anything there that was not needed or not appropriate

How would you use the app to support children with symptoms of ADHD?

- Do you have children in mind

Where you able to apply some of the strategies with children in the classroom?

- Can you give an example

Are there any features that you feel would be particularly useful?

Anything that would be difficult to use? How can you see yourself using the app in the future?

Can you see this app becoming part of routine practice in your school?

- Why?

Any other comments about the app.

1 Closing

Thank you for your time. You've been very helpful Goodbye.

Appendix 16: Link to Participant information Sheet & Consent Form (Study3)

Evaluating the feasibility of a digital intervention to support teachers managing children in the classroom.

Page 1: Welcome to our study

Thank you for taking the time to participate in this study. We aim to provide teachers with an App with a range of classroom strategies for challenging behaviours in students. After engaging with the App you will be invited to a phone or online interview about your views.

For more information download the Participant information sheet.

PARTICIPANT INFORMATION

STUDENT RESEARCH PROJECT ETHICS REVIEW
Division of Psychiatry & Applied Psychology

Project Title: *Evaluating the feasibility of a digital intervention in supporting teachers of children who are difficult to manage*

Researcher/Student: *Reem Aldabbagh*

reem.aldabbagh@nottingham.ac.uk;

Supervisors/Chief Investigators: Prof. David Daley,
david.daley@nottingham.ac.uk

Prof. Cris Glazebrook

cris.glazebrook@nottingham.ac

[.uk](mailto:) Prof. Kapil Sayal,

kapil.sayal@nottingham.ac.uk

Ethics Reference Number: [DPAP - 2020 - 0429 – 2]

We would like to invite you to take part in a research study to evaluate the feasibility of using a digital intervention in an App in supporting children who are difficult to manage in the classroom. In particular, we would like to explore your view of whether you think the App is helpful to teachers. Before you begin, we would like you to understand why the research is being conducted and what it involves for you.

What is the purpose of this study?

This study is being conducted as part of a PhD. It aims to evaluate the ADHD Behavior Toolbox application that was developed to help support teachers of children with ADHD symptoms.

Why have I been invited?

You have been invited to take part because you responded to our study advert that was circulated by gatekeepers, or you were introduced to our study by another participant who had already taken part.

Do I have to take part?

It is up to you to decide whether or not to take part. If you do decide to take part in our study, you will be provided with this information sheet to read and be asked to give consent online. You may change your mind about being involved at any time before the interview without giving a reason. However, once you have been interviewed it may not be technically possible to withdraw your data unless requested within 14 days.

What will I be asked to do?

Your participation will involve reading the strategies in the App, trying them out in your classroom for up to three weeks and then taking part in an online or telephone interview that will last about 30 minutes.

Once you have given your consent to take part.

1. You will be asked to click on the link to download the App and receive some instructions on how to use it.
2. We encourage you to read through all the behaviours strategies on the App and think if they would work with your students.
3. If possible try to use some of the strategies with your students in the classroom.
4. After three weeks we will contact you again to arrange a time for the interview that will be audio recorded. The interview will explore your views of using the App.
5. In return for the investment of your time in our study, we will be able to offer you a £30 voucher in appreciation of your time and support for the study.

Will the research be of any personal benefit to me?

You will get free access to the ADHD Behavior Toolbox application, but we cannot promise that the app will help you in managing your classroom. We hope that the findings from this study will be used to help in improving the App so that it may be of more help to teachers in the future.

Are there any possible disadvantages or risks in taking part?

There is no known risk of taking part in this study.

What will happen to the information I provide?

All provided information is kept confidential to the four members of the research team (their names are mentioned at the top of the previous page). The research team only have access to the

information you provided, and it will not be shared with anyone outside of this team. All your information and data will be kept anonymous. Please note that should you want to withdraw your data from the study, it may not be possible to do so two weeks after taking part.

All your information is kept in a locked cabinet at the University of Nottingham, and on a password-protected database on a secure server at the University of Nottingham.

The study will be written as part of the researcher's PhD thesis within the Division of Psychiatry and Applied Psychology, School of Medicine, the University of Nottingham, UK. The study findings may be published a peer-reviewed journal in the future, and if so, all participants' data will be anonymised in this publication. The findings might be shared with other authors for the sake of future research.

If you wish to have the results of this study, please tick the appropriate box on the consent form, provide an e-mail address that you would like the results sent to, and we will e-mail a summary once the study is completed.

We will follow ethical and legal practice and all information will be handled in confidence.

Under UK Data Protection laws the University is the Data Controller (legally responsible for the data security), and the Chief Investigator of this study (named above) is the Data Custodian (manages access to the data). This means we are responsible for looking after your information and using it properly. Your rights to access, change or move your information are limited as we need to manage your information in specific ways to comply with certain laws and for the research to be reliable and accurate. To safeguard your rights we will use the minimum personally-identifiable information possible.

You can find out more about how we use your information and read our privacy notice at:

<https://www.nottingham.ac.uk/utilities/privacy.aspx>.

The data collected for the study will be looked at and stored by authorised persons from the University of Nottingham who are organising the research. They may also be looked at by authorised people from regulatory organisations to check that the study is being carried out correctly. All will have a duty of confidentiality to you as a research participant, and we will do our best to meet this duty.

At the end of the project, all raw data will be kept securely by the

University under the terms of its data protection policy after which it will be disposed of securely. The data will not be kept elsewhere

If you have any questions or concerns, please don't hesitate to ask. We can be contacted before and after your participation at the email addresses above.

What if there is a problem?

If you have any queries or complaints, please contact the student's supervisor/chief investigator in the first instance. If this does not resolve your query, please write to the Administrator to the Division of Psychiatry & Applied Psychology's Research Ethics Sub-Committee adrian.pantry1@nottingham.ac.uk who will pass your query to the Chair of the Committee.

We believe there are no known risks associated with this research study; however, as with any online activity the risk of a breach is always possible. We will do everything possible to ensure your answers in this study will remain anonymous.”

After reading the participant information sheet, please click Next to consent for the study.

Many thanks

Page 2: Consent Form

Please answer the following questions

	<input type="checkbox"/>	Required	
		Yes	No
1- Have you read and understood the Participant Information?	<input type="checkbox"/>	<input type="checkbox"/>	
2- Do you agree to take part in an interview that will be audio recorded about your views for the application, we intend to evaluate?	<input type="checkbox"/>	<input type="checkbox"/>	
3- Do you know how to contact the researcher if you have questions about this study?	<input type="checkbox"/>	<input type="checkbox"/>	
4- Do you understand that you are free to withdraw from the study without giving a reason?	<input type="checkbox"/>	<input type="checkbox"/>	
5- Do you understand that once you have been interviewed it may not be technically possible to withdraw your data unless requested within 14 days?	<input type="checkbox"/>	<input type="checkbox"/>	
6- Do you permit your data from this study to be shared with other researchers in the future provided that your anonymity is protected?	<input type="checkbox"/>	<input type="checkbox"/>	
7-Do you understand that non-identifiable data from this study might be used in academic research reports or publications?	<input type="checkbox"/>	<input type="checkbox"/>	
8- Do you confirm that you are 18 years old or over?	<input type="checkbox"/>	<input type="checkbox"/>	
9- Would you like us to email you the study result when it is available?	<input type="checkbox"/>	<input type="checkbox"/>	
10- Are you happy to engage with the App and participate in an interview exploring your views of the App.			

Please provide your e-mail address and phone number so that we can contact you to arrange a suitable time to conduct the interview, and provide you with your voucher. Email:

Please enter a valid email address.

Phone or mobile number:

Please enter a valid phone number.

By clicking "I agree" below, you are indicating that you agree to participate in the research study.

I agree

I do not agree

Page 3: You can access the App from the following link, then watch the manual video

Please use this link to download the ADHD Behavior Toolbox from the Apple store

<https://testflight.apple.com/v1/app/1492150326?build=62010874>

The Application user guide is available through this link

http://static.onlinesurveys.ac.uk/media/account/171/survey/648903/question/application_user_guide_19-10-2.pdf

Watch this video, it will help you in downloading and in using the App.

<https://www.youtube.com/watch?v=V0qrEaYTUas>

Please text the word **downloaded to 07465674708 if you had successfully downloaded the app. If you are facing any technical problems with downloading the app, please text the previous phone number.**

We hope you enjoy working with the Behavior Toolbox and that you find it useful.

We will e-mail you in 3 weeks to plan for the interview.

Appendix 17: ethical approval (Study3-4)

DPAP Committee :16/04/2020 Supervisor: David Daley

Applicant : Reem Aldabbagh



**University of
Nottingham**
UK | CHINA | MALAYSIA

Project ID 0429 - Evaluating the feasibility of a digital intervention for teachers of children who are difficult to manage

Dear Reem,

A favourable opinion is given to the above named study on the understanding that the applicants conduct their research as described in the above numbered application. Applicants need to adhere to all conditions under which the ethical approval has been granted and use only materials and documentation that have been approved.


If you need to make any any changes (for example to the date or place of data collection, or measures used), an Amendment Form should be submitted. This can be done by the Supervisor in 'Create Sub Form' in the Actions Menu on the left hand side of the page on the on-line system: Select 'Amendment Form'



Yours

Professor David Daley

Co-Chair DPAP Ethics Subcommittee



Professor Amanda Griffiths

Co-Chair DPAP Ethics Subcommittee

Appendix 18: COREQ Checklist (Study 3)

OREQ (Consolidated criteria for REporting Qualitative research) Checklist

A checklist of items that should be included in reports of qualitative research. You must report the page number in your manuscript where you consider each of the items listed in this checklist. If you have not included this information, either revise your manuscript accordingly before submitting or note N/A.

Topic	Item No.	Guide Questions/Description	Reported on Page No.
Domain 1: Research team and reflexivity			
<i>Personal characteristics</i>			
Interviewer/facilitator	1	Which author/s conducted the interview or focus group?	205
Credentials	2	What were the researcher's credentials? E.g. PhD, MD	205
Occupation	3	What was their occupation at the time of the study?	205
Gender	4	Was the researcher male or female?	205
Experience and training	5	What experience or training did the researcher have?	205
<i>Relationship with participants</i>			
Relationship established	6	Was a relationship established prior to study commencement?	205
Participant knowledge of the interviewer	7	What did the participants know about the researcher? e.g. personal goals, reasons for doing the research	
Interviewer characteristics	8	What characteristics were reported about the interviewer/facilitator? e.g. Bias, assumptions, reasons and interests in the research topic	2052205
Domain 2: Study design			
<i>Theoretical framework</i>			
Methodological orientation and Theory	9	What methodological orientation was stated to underpin the study? e.g. grounded theory, discourse analysis, ethnography, phenomenology, content analysis	207
<i>Participant selection</i>			
Sampling	10	How were participants selected? e.g. purposive, convenience, consecutive, snowball	203
Method of approach	11	How were participants approached? e.g. face-to-face, telephone, mail, email	205
Sample size	12	How many participants were in the study?	210
Non-participation	13	How many people refused to participate or dropped out? Reasons?	210
<i>Setting</i>			
Setting of data collection	14	Where was the data collected? e.g. home, clinic, workplace	205

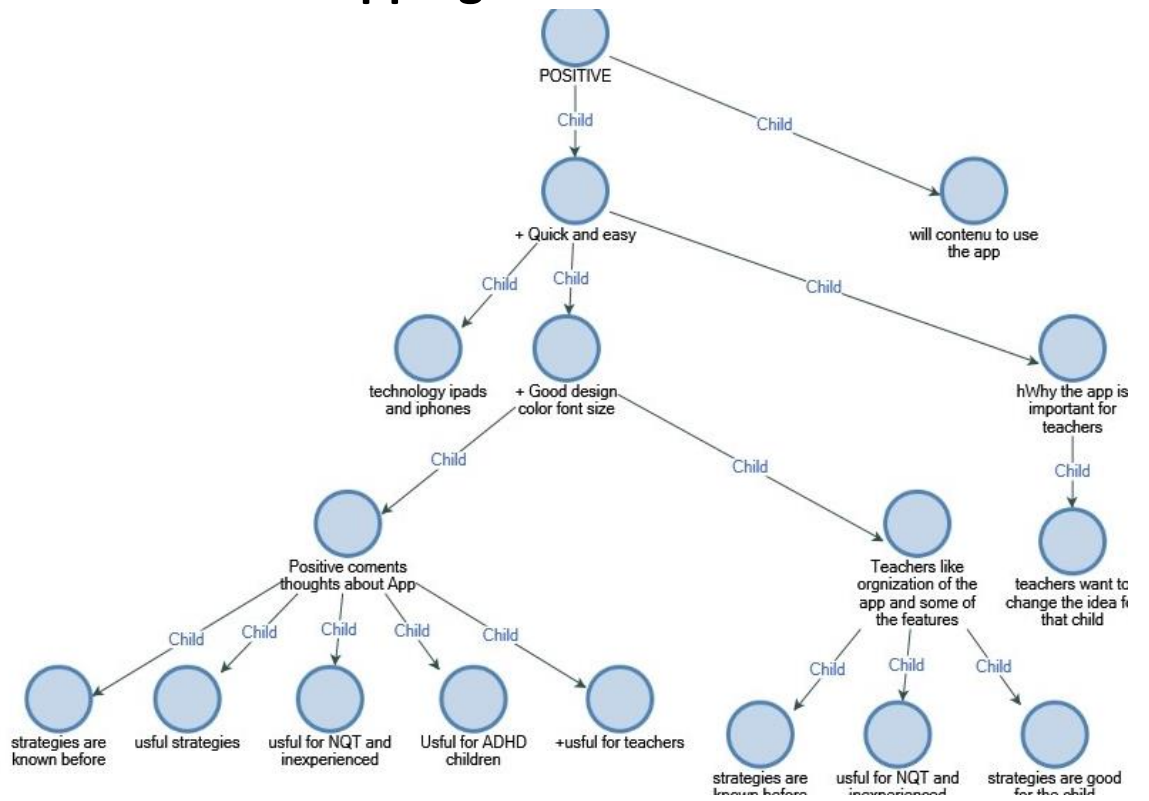
Presence of non-participants	15	Was anyone else present besides the participants and researchers?	205
Description of sample	16	What are the important characteristics of the sample? e.g. demographic data, date	211
Data collection			
Interview guide	17	Were questions, prompts, guides provided by the authors? Was it pilot tested?	202
Repeat interviews	18	Were repeat inter views carried out? If yes, how many?	No
Audio/visual recording	19	Did the research use audio or visual recording to collect the data?	205
Field notes	20	Were field notes made during and/or after the inter view or focus group?	211
Duration	21	What was the duration of the inter views or focus group?	210
Data saturation	22	Was data saturation discussed?	210
Transcripts returned	23	Were transcripts returned to participants for comment and/or	

Topic	Item No.	Guide Questions/Description	Reported on Page No.
		correction?	
Domain 3: analysis and findings			
Data analysis			
Number of data coders	24	How many data coders coded the data?	210
Description of the coding tree	25	Did authors provide a description of the coding tree?	210
Derivation of themes	26	Were themes identified in advance or derived from the data?	210
Software	27	What software, if applicable, was used to manage the data?	210
Participant checking	28	Did participants provide feedback on the findings?	No
Reporting			
Quotations presented	29	Were participant quotations presented to illustrate the themes/findings? Was each quotation identified? e.g. participant number	210
Data and findings consistent	30	Was there consistency between the data presented and the findings?	210
Clarity of major themes	31	Were major themes clearly presented in the findings?	210
Clarity of minor themes	32	Is there a description of diverse cases or discussion of minor themes?	210

Developed from: Tong A, Sainsbury P, Craig J. Consolidated criteria for reporting qualitative research (COREQ): a 32-item checklist for interviews and focus groups. *International Journal for Quality in Health Care*. 2007. Volume 19, Number 6: pp. 349 – 357

Once you have completed this checklist, please save a copy and upload it as part of your submission. DO NOT include this checklist as part of the main manuscript document.

Appendix 19: Code Mapping 2



Appendix 20: Opt-out form (Study 3)



University of
Nottingham
UK | CHINA | MALAYSIA

Opt-Out form

STUDENT RESEARCH PROJECT ETHICS REVIEW

Division of Psychiatry & Applied Psychology

Project Title: Evaluating the feasibility of a digital intervention to support teachers managing children in the classroom.

Researcher/Student: Reem Aldabbagh, reem.aldabbagh@nottingham.ac.uk

Supervisors/Chief Investigators: Prof. Cris Glazebrook cris.glazebrook@nottingham.ac.uk

Prof. David Daley, david.daley@nottingham.ac.uk

Prof. Kapil Sayal kapil.sayal@nottingham.ac.uk

Ethics Reference Number: [DPAP - 2020 - 0429 – 2]

My name is Reem Aldabbagh A PhD student in the Division of Psychiatry and Applied Psychology at the University of Nottingham. I am conducting research to evaluate an iPhone application that was designed to help teachers in managing children’s behaviour in the classroom. Your child’s school is supporting our research study. In the study teachers will choose just one child from their class to try out the strategies from the application. You are not required to participate in the study it is only for teachers and we will also not be asking anything of any children. However, if you would not like your child to be the one that the teacher selects, then please complete this form and return it to the class teacher or school office.

Please exclude my child from this study, tick the box
Name of Child

Name of Parent or Guardian

Appendix 21: Link to Consent and information sheet (Study Protocol)

Baseline survey / Evaluating the feasibility of a digital intervention in supporting teachers of children with ADHD symptoms in the classroom

Welcome to our study

Thank you for taking the time to complete this survey. We truly value the information you will provide. You will find all the information about the project on the following page, please read them then sign the consent form. Reading the participant information sheet and consenting should take approximately 10-15 minutes.

Please click Next to go to the
next page. Many thanks

PARTICIPANT INFORMATION

STUDENT RESEARCH PROJECT ETHICS REVIEW

Division of Psychiatry & Applied Psychology

Project Title: *Evaluating the feasibility of a digital intervention in supporting teachers of children who are difficult to manage*

Researcher/Student: Reem Aldabbagh reem.aldabbagh@nottingham.ac.uk

Supervisors/Chief Investigators: Prof. Cris Glazebrook cris.glazebrook@nottingham.ac.uk

Prof. David Daley, david.daley@nottingham.ac.uk

Prof. Kapil Sayal, kapil.sayal@nottingham.ac.uk

Ethics Reference Number: [DPAP - 2020 - 0429 - 2]

We would like to invite you to take part in a research study to evaluate the feasibility and effectiveness of using a digital intervention in managing children who are difficult to manage. In particular we would like to explore whether the intervention helps in managing children with behavior difficulties and improve teachers' wellbeing. Before you begin, we would like you to understand why the research is being conducted and what it involves for you.

What is the purpose of this study?

This study is being conducted as part of a PhD. It aims to evaluate the ADHD Behavior Toolbox phone application an app developed to help support teachers of children at risk of ADHD.

Why have I been invited?

You have been invited because you were emailed the study advertisement directly by being referred from another participant as a teacher who is teaching children age 4-8 and

lives in the UK, and an iPhone or iPad user (Apple), then you responded to our study advert. The email that was sent was seeking teachers help to evaluate the feasibility and the effectiveness of using a digital intervention in managing children who are difficult to manage and in increase teachers' wellbeing.

Do I have to take part?

It is up to you to decide whether or not to take part. If you do decide to take part in our study, you will be provided with this information sheet to read and be asked to sign a consent online. You may change your mind about being involved at any time. You are free to withdraw at any point before or during the study without giving a reason.

Your participation in the study would last eight weeks in total. First, you will be asked to complete some questionnaires, this should take no more than 20 minutes. Then you will be provided with the ADHD Toolbox application (app) and asked to use it. This will take about 10 minutes a week for six weeks. All responses are anonymous, and involves several steps, as outlined below.

1. First, you will read this participant information sheet through the link. Then you will be sent to a page to ask if you are an apple user and select a child in your class who is difficult to manage and rate their behaviour, if eligibility is confirmed you will need to consent electronically.

2. Then another link will be sent to you and you will be asked a few questions about yourself (age, gender, job title, years of experience). You will also create a password which is the date and the month of your birthday and the first letter of your name so that we can link your responses from the baseline questionnaire to the follow-up questionnaire. After that you will start filing the questionnaires.

3. At the end of the survey, you will be given a code to download the Toolbox App.

4. You will use the behavior Toolbox application focusing on 12 behaviors, and you will tailor a sequence focusing at least one behaviour based on the child's needs. Please apply the strategies to the targeted child in your classroom. The intervention phase will last for eight weeks. During the eight weeks, the researcher will send text

reminders and check if you need to ask any questions.

5. The follow-up questionnaire will be emailed to you after eight weeks; please follow the link to the online survey which repeats the same measures again with one more about the application usability of the ADHD Behavior Toolbox.

Will the research be of any personal benefit to me?

You will get free access to the ADHD Behavior Toolbox application, but we cannot promise that the Toolbox will help you in managing your classroom and improve your self-efficacy. We hope that the findings from this study will be used to help in improving the application.

Are there any possible disadvantages or risks in taking part?

There is no known risk of taking part in this study.

What will happen to the information I provide?

All provided information is kept confidential to the four members of the research team (their names are mentioned at the top of the previous page). The research team only have access to the information you provided, and it will not be shared with anyone outside of this team. All your information and data are anonymous.

All your information is kept in a locked cabinet at the University of Nottingham, and on a password-protected database on a secure server at the University of Nottingham.

The study will be written as part of the researcher's PhD thesis within the Division of Psychiatry and Applied Psychology, School of Medicine, the University of Nottingham, UK. The study findings may be published a peer-reviewed journal in the future, and if so, all participants' data will be anonymised in this publication. The findings might be shared with other authors for the sake of future research.

If you wish to have the results of this study, please tick the appropriate box on the consent form, provide an e-mail address that you would like the results sent to, and we

will e-mail a summary once the study is completed.

We will follow ethical and legal practice and all information will be handled in confidence.

Under UK Data Protection laws the University is the Data Controller (legally responsible for the data security), and the Chief Investigator of this study (named above) is the Data Custodian (manages access to the data). This means we are responsible for looking after your information and using it properly. Your rights to access, change or move your information are limited as we need to manage your information in specific ways to comply with certain laws and for the research to be reliable and accurate. To safeguard your rights we will use the minimum personally-identifiable information possible.

You can find out more about how we use your information and read our privacy notice at:

<https://www.nottingham.ac.uk/utilities/privacy.aspx>.

The data collected for the study will be looked at and stored by authorised persons from the University of Nottingham who are organising the research. They may also be looked at by authorised people from regulatory organisations to check that the study is being carried out correctly. All will have a duty of confidentiality to you as a research participant, and we will do our best to meet this duty.

At the end of the project, all raw data will be kept securely by the University under the terms of its data protection policy after which it will be disposed of securely. The data will not be kept elsewhere

If you have any questions or concerns, please don't hesitate to ask. We can be contacted before and after your participation at the email addresses above.

What if there is a problem?

If you have any queries or complaints, please contact the student's supervisor/chief investigator in the first instance. If this does not resolve your query, please write to the Administrator to the Division of Psychiatry & Applied Psychology's Research Ethics Sub-Committee adrian.pantry1@nottingham.ac.uk who will pass your query to the Chair of the Committee.

Confirming your eligibility for the study

Think of one of your students in the classroom who you think is difficult to manage. Does this child have difficulty with

	Yes	No
Following instructions		
Controlling impulses		
Sitting still		
Concentration		
Compliance		

Do you have an iPhone or an iPad? (Apple device)

Yes No

Thank you for your answers

If the child you picked has difficulty in at least one of the areas that were mentioned before, and you are Apple user, you are illegible for the study

Please press next to sign the consent form:

Consent Page

PARTICIPANT CONSENT

STUDENT RESEARCH PROJECT ETHICS REVIEW

Division of Psychiatry & Applied Psychology

Project Title: Evaluating the feasibility of digital intervention in supporting teachers of children at risk of Attention Deficit Hyperactivity Disorder (ADHD) (A Quantitative Study)

Researcher/Student: Reem Aldabbagh, reem.aldabbagh@nottingham.ac.uk

Supervisors/Chief Investigators:

Prof. Cris Glazebrook cris.glazebrook@nottingham.ac.uk

Prof. David Daley, david.daley@nottingham.ac.uk

Prof. Kapil Sayal, kapil.sayal@nottingham.ac.uk

Ethics Reference Number: [DPAP - 2020 - 0429 - 2]

Please answer the following questions


	Required [?]	
	Yes	No
1-Have you read and understood the Participant Information?		
2-Do you know how to contact the researcher if you have questions about this study?		
3-Do you understand that you are free to withdraw from the study without giving a reason?		

4-Do you understand that for anonymous questionnaire studies, once you have completed the study and submitted your answers, the data cannot be withdrawn?		
5-Do you permit your data from this study to be shared with other researchers in the future provided that your anonymity is protected?		
6-Do you understand that non-identifiable data from this study might be used in academic research reports or publications?		
7-Do you allow the researcher to send text messages to your mobile phone?		
8-Do you confirm that you are 18 years old or over?		

Please write your email and mobile number

 *Required*

--	--

By clicking "I agree" below, you are indicating that you agree to participate in the research study.  *Required*

<input type="radio"/> I agree	<input type="radio"/> I do not agree
-------------------------------	--------------------------------------

Thank you, soon you will receive an email and text message from the research team

Appendix 22: Link to Baseline Survey (Study Protocol)

Baseline survey / Evaluating the feasibility of a digital intervention in supporting teachers of children with ADHD symptoms in the classroom

Welcome to our study

Thank you for taking the time to complete this survey. We truly value the information you will provide. This survey should take approximately 15-20 minutes.

Please click Next to go to the next

page. Many thanks

Demographic questions

What is your age range? Required

Please select exactly 1 answer(s).

- 20 - 26 years old
- 27 - 33 years old
- 33-39 years old
- 40-46 years old
- 47+ years old

How would you describe your gender? *Required*

- Female
- Male
- Other
- Prefer not to say

What is your current job title *Required*

Please select exactly 1 answer(s).

- Teacher
- Teaching assistance

For how long have you been teaching *Required*

Please enter a number.

Please create a password using the date and the month of your birthday and the first letter of your name so that we can link the responses from the baseline questionnaire to the follow-up questionnaire. (you will be asked to use it later in the follow-up

questionnaire)  *Required*

Let's start the surveys

Now please rate the child you picked as being difficult to manage and has an impact on you and the classroom.

First Survey (T-SDQ/ this will not be deleted later)

Please give your answers on the basis of the child's behaviour over the last six months or this school year.

[More info](#)

	Not True	Somewhat true	Certainly True
Restless, overactive, cannot stay still for long			
Constantly fidgeting or squirming			
Easily distracted, concentration wanders			
Thinks things out before acting			
Sees tasks through to the end			
Often has temper tantrums or hot tempers			
Generally obedient, usually does what adults request			
Often fights with other children			
Often lies or cheats			
Steals from home, school or elsewhere			

Second Survey (DASS21 (Stress) this will be deleted later)

Please read each statement and circle the answer that indicates how much the statement applied to you **over the past week**. There are no right or wrong answers. Do not spend too much time on any statement.

	<i>Required</i>			
	Did not apply to me at all	Applied to me to some degree	Applied to me to a considerable degree	Applied to me very much or most of the time.
I found it hard to wind down				
I tended to over-react to situations				
I felt that I was using a lot of nervous energy				
I found myself getting agitated				
I found it difficult to relax				
I was intolerant of anything that kept me from getting on with what I was doing				
I felt that I was rather touchy				

Third Survey (Teachers' Self-efficacy/ this will be deleted later)

Please read each statement and choose one of the options

	ⓧ Required			
	Not true	Barely true	Moderately true	Exactly true
I am convinced that I am able to successfully teach all relevant subject content to even the most difficult students.				
I know that I can maintain a positive relationship with parents even when tensions arise.				
When I try really hard, I am able to reach even the most difficult students.				
I am convinced that, as time goes by, I will continue to become more and more capable of helping to address my students' needs.				
Even if I get disrupted while teaching, I am confident that I can maintain my composure and continue to teach well.				
I am confident in my ability to be responsive to my students' needs even if I am having a bad day.				
If I try hard enough, I know that I can exert a positive influence on both the personal and academic development of my students.				
I am convinced that I can develop creative ways to cope with system constraints (such as budget cuts and other administrative problems) and continue to teach well.				

I know that I can motivate my students to participate in innovative projects.				
---	--	--	--	--

I know that I can carry out innovative projects even when I am opposed by sceptical colleagues.				
---	--	--	--	--

The end of the survey

Thank you very much for your time, please use this code ##### to download the ADHD Behavior Toolbox from the Apple store.

You will be sent a link eight weeks later, please use the application and apply the strategies on the targeted child.

Appendix 23: Link to Follow-up survey (Study Protocol)

Follow up Survey /Evaluating the feasibility of a digital intervention in supporting teachers of children who are difficult to manage.


Welcome to our study

Thank you for participating in our study over the past eight weeks. We will ask you to complete the follow-up online surveys and to provide your feedback about the application. This should take approximately 10 minutes to complete depending on the time you will spend on the feedback.

Please click Next to go to the next

page. Many thanks

Before completing the surveys

We would first ask you about the password you created previously in the baseline survey eight weeks ago (the date and the month of your birthday and the first letter of your name) to connect your answers from the baseline survey eight weeks ago to this survey and see if there have been any changes in your answers. Please type in the password you created previously  *Required*

Questionnaire 1

Please give your answers to your targeted child's behaviour after applying the ToolBox application strategies.

[More info](#)

	Not True	Somewhat true	Certainly True
Restless, overactive, cannot stay still for long			
Constantly fidgeting or squirming			
Easily distracted, concentration wanders			
Thinks things out before acting			
Sees tasks through to the end (good attention span)			
Often has temper tantrums or hot tempers			
Generally obedient, usually does what adults request			
Often fights with other children or bullies them			
Often lies or cheats			
Steals from home, school or elsewhere			

Which behaviour (behaviours) did you focus on during the past 8 weeks [Required](#)

Your answer should be no more than 200 characters long.

Questionnaire 2

Please read each statement and circle the answer that indicates how much the statement applied to you after applying the ToolBox application strategies. There are no right or wrong answers. Do not spend too much time on any statement.

	<i>Required</i>			
	Did not apply to me at all	Applied to me to some degree	Applied to me to a considerable degree	Applied to me very much or most of the time.
I found it hard to wind down				
I tended to over-react to situations				
I felt that I was using a lot of nervous energy				
I found myself getting agitated				
I found it difficult to relax				
I was intolerant of anything that kept me from getting on with what I was doing				
I felt that I was rather touchy				

Questionnaire 3

Please read each statement and choose one of the options

	ⓧ <i>Required</i>			
	Not true	Barely true	Moderately true	Exactly true
I am convinced that I am able to successfully teach all relevant subject content to even the most difficult students.				
I know that I can maintain a positive relationship with parents even when tensions arise.				
When I try really hard, I am able to reach even the most difficult students.				
I am convinced that, as time goes by, I will continue to become more and more capable of helping to address my students' needs.				
Even if I get disrupted while teaching, I am confident that I can maintain my composure and continue to teach well.				
I am confident in my ability to be responsive to my students' needs even if I am having a bad day.				
If I try hard enough, I know that I can exert a positive influence on both the personal and academic development of my students.				
I am convinced that I can develop creative ways to cope with system constraints (such as budget cuts and other administrative problems) and continue to teach well.				

I know that I can motivate my students to participate in innovative projects.				
I know that I can carry out innovative projects even when I am opposed by sceptical colleagues.				

Questionnaire 4 (MAUQ will be deleted later)

	Strongly disagree	Disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Agree	Strongly agree
The app was easy to use.							
It was easy for me to learn to use the app.							
The navigation was consistent when moving between screens.							
The interface of the app allowed me to use all the functions (such as entering information, responding to reminders, viewing information) offered by the app.							

Whenever I made a mistake using the app, I could recover easily and quickly.							
I like the interface of the app.							
The information in the app was well organized, so I could easily find the information I needed.							
The app adequately acknowledged and provided information to let me know the progress of my action.							
I feel comfortable using this app in social settings.							

The amount of time involved in using this app has been fitting for me.							
I would use this app again.							
Overall, I am satisfied with this app.							
The app would be useful for my practice.							
The app improved my access to delivering classroom strategies.							
The app helped me manage my students effectively.							
This app has all the functions and capabilities I expected it to have.							

<p>I could use the app even when the Internet connection was poor or not available.</p>							
<p>This app provides an acceptable way to deliver services, such as accessing educational materials, tracking my own activities, and performing self-assessment.</p>							

End of the study

Thank you very much for your time. We hope that this study was beneficial to you.

If you want to participate in the phone interview and get 20 pounds gift voucher, please email Reem.aldabbagh@nottingham.ac.uk
