An Exploratory Study into the Development and Effectiveness
of an Interaction and Communication for Engagement (ICE) Framework for Children
Showing Attention Difficulties in Learning

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Table of Contents

Abstract 5

Acknowledgements 7

List of Tables 8

List of Figures: 10

Chapter 1: Introduction 12

1.1 Statement of Personal Interest 12

1.2 Relevance to Educational Psychology and Schools 13

1.3 Original Contribution 14

1.4 Layout of This Research 15

Chapter Two: Narrative Literature Review 16

2.1 Attention Difficulties and Rationale for Psychological Intervention 16

2.2 Rationale for Focusing on Academic Classroom Learning 20

2.3 Defining Engagement 22

2.4 Interaction and Communication Influencing Engagement 24

2.4.1 Interpersonal Qualities of Interaction and Communication 25

2.4.2 Instructional Interaction and Communication 30

2.4.3 Non-Verbal Interaction and Communication 35

2.5 Conclusion 36

2.5.1 Receptiveness 36

2.5.2 Rapport 36

2.5.3 Reciprocity 37

2.5.4 Influential language 37

2.5.5 Non-Verbal Influence 38

Chapter Three: Systematic Literature Review 38

3.1 Systematic Literature Review Research Questions 38

3.2 Systematic Literature Review Process 39

3.2.1 Selection Criteria: Excluded and Included Studies 41

3.2.2 Searching for Studies 44

2.3.3 Critical Appraisal 49

3.2.4 Critical Appraisal Summary 55

3.2.5 Initial Emerging Concepts: Indexing and Charting Codes 55

3.2.6 Emerging Concepts Between Studies: Grouping into Themes 59

3.2.7 Research Questions 60

Chapter 4: Methodology 61

4.1 Philosophical Assumptions 62

4.1.1 Ontology 62

4.1.2 Epistemology 62

4.2 Alternative Methodology 64

4.3 Single Case Experimental Designs 66

4.4 This Study's Overall Design 67

4.4.1 Participant Recruitment ... 68
4.4.2 Measures ... 70
4.4.3 Teacher-Rated Engagement Scales ... 71
4.4.4 Child Self-Rated Scale ... 74
4.4.5 Semi-Structured Interviews Post-SCED ... 75
4.5 Procedure ... 76
4.5.1 Setup and Baseline Phase ... 77
4.5.2 Intervention Implementation Structure ... 78
4.5.3 Experimental ... 79
4.5.4 Piloting the Intervention ... 88
4.5.5 Case Summaries ... 90
4.6 Reliability and Validity ... 103
4.7 Ethical Considerations ... 107
4.8 Reflexivity ... 109
Chapter 5: Results ... 110
5.1 Analysing Single Case Experimental Data ... 110
5.2 Single Case Experimental Data Analysis in This Study ... 112
5.2.1 Cautions ... 114
5.3 Individual SCED Results and Visual Analyses ... 115
5.3.1 Bailey (Pilot) ... 117
5.3.2 Callum ... 124
5.3.3 Oscar ... 135
5.3.4 Gregor ... 144
5.3.5 Christopher ... 150
5.3.6 Giovanni ... 156
5.3.7 Simon ... 162
5.4 Possible Salient Findings Across Cases ... 167
5.4.1 Changes to Mean Scores ... 167
5.4.2 Effects on Variability ... 169
5.4.3 Immediacy of Effects ... 169
5.5 Feasibility Feedback ... 170
5.6 Thematic Analysis of Feedback Comments at Follow-Up ... 171
5.7 Results Summary ... 174
Chapter 6: Discussion ... 175
6.1 Introduction ... 175
6.2 Individual Case Findings ... 175
6.2.1 Bailey ... 176
6.2.2 Callum ... 177
6.2.3 Oscar ... 180
6.2.4 Gregor ... 181
6.2.5 Christopher ... 183
6.2.6 Giovanni ... 184
6.2.7 Simon ... 187
6.3 Summary of SCED Findings ... 188
6.4 Thematic Analysis Findings ... 190

6.5 Intervention Effectiveness Overall 192
6.5.1 Intervention Feasibility 193
6.5.2 Integrity of the ICE Framework and Action Plan 194
6.5.3 Importance of Observation and Consultation 195
6.6 Research Strengths and Limitations 196
6.7 Implications for Future Research 200
6.8 Implications for Future Practice 201
6.9 Unique Contribution and Conclusion 202
References 204
Appendices 215
Appendix 1: Gough's (2007) Weight of Evidence for Systematic Literature Review Studies 215
Appendix 2: PRISMA Flowchart for Systematic Literature Review Studies; Moher et al. (2009) 222
Appendix 3: Search Terms Used for Systematic Literature Review 223
Appendix 4: Initial School and Parent Recruitment Letters, Consent Forms and Briefing Information 224
Appendix 5: Questions and Considerations Guiding Screening of Child Participants for Suitability 232
Appendix 6: SCED Teacher Rating Measure 233
Appendix 7: SCED Child Self-Rating Measure 238
Appendix: 8 Semi-Structured Interview Questions 239
Appendix 9: Example ICE Action Plan (Oscar) 240
Appendix 10: Observation and Consultation Materials 247
Appendix 11: Ethical Approval Letter and GDPR Privacy Notice 251
Appendix 12: Thematic Analysis Process and Photographs 255
Appendix 13: Updated ICE Framework & Blank Action Plan 264

Abstract

Teachers can feel children with attention difficulties present a particular challenge to teach (Kos et al. 2006). Children with these difficulties can struggle to maintain engagement in academic classroom activities, rather than sensory or imaginative (e.g. Imeraj et al. 2013) but may be effectively engaged using interaction and communication principles (e.g. Stevens et al. 2000). A comprehensive intervention approach refining interaction and communication, enhancing academic learning engagement of children showing attention difficulties could be low cost and high impact, and contribute to early intervention.

This research aims to establish effective interaction and communication principles and approaches for engaging children with attention difficulties in academic classroom learning, using supporting background theory. An 'Interaction and Communication' ('ICE') Framework and intervention approach is developed and applied in single case experimental designs (SCEDs) aiming to measure its effectiveness on improving children's engagement.

This study involved 7 pupil participants in 5 schools in a rural area of the UK, who were reported to show attention difficulties and their 7 link teachers. Engagement was measured using teacher and child self-ratings, adapted from the Carpenter et al. (2015) engagement indicators.

Following SCED data visual analysis and descriptive statistics, results were largely inconclusive but showed possible indications the intervention might help mitigate low engagement in some cases, especially if refined further and applied for longer. Teachers' comments at review were thematically analysed following intervention, to qualitatively understand possible effectiveness, utility and practicability. Thematic analysis results indicated teachers valued the intervention principles, with need for more systematic application.

Applying ICE Framework principles in Educational Psychologists' work with and for children showing attention difficulties, is concluded to be useful and worth further

investigation. Future observational research with more focus on engagement in specific tasks, is concluded to be beneficial.

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My sweet, wonderful daughter has been a source of personal interest and inspiration throughout my learning. I am constantly in awe of her developments, particularly her resilience, her imagination, and the key role interaction and communication plays in shaping our strong bond.

List of Tables

- 3.1: Study Inclusion Criteria
- 3.2 Studies Included in the Systematic Literature Review
- 3.3: Emerging Concept Codes
- 3.4: Themes and Comprising Codes
- 3.5: Research Questions & Hypotheses
- 4.1: Alternative Methodologies and Rationales for Not Employing
- 4.2: SCED Design Procedure Stages
- 4.3: Redefining Themes Through Triangulation
- 4.4: Tabulated Interaction and Communication for Engagement (ICE) Framework
- 4.5: Threats to Reliability and Internal Validity, and This Study's Mitigations
- 5.1: Visual Characteristics Analysed in This Study
- 5.2: Score Means and Ranges for Each Case, Comparing Baseline and Intervention
- 5.3: Visual Analysis of Bailey's Self-Rated Engagement
- 5.4: Visual Analysis of Bailey's Teacher-Rated Engagement Frequency
- 5.5: Visual Analysis of Bailey's Teacher-Rated Engagement Impact
- 5.6: Visual Analysis of Callum's Self-Rated Engagement
- 5.7: Visual Analysis of Callum's Teacher-Rated Engagement Frequency (Mrs Crawford)
- 5.8: Visual Analysis of Callum's Teacher-Rated Engagement Impact (Mrs Crawford)
- 5.9: Visual Analysis of Callum's Teacher-Rated Engagement Frequency (Mrs Harrington)
- 5.10: Visual Analysis of Callum's Teacher-Rated Engagement Impact (Mrs Harrington)
- 5.11: Visual Analysis of Oscar's Self-Rated Engagement
- 5.12: Visual Analysis of Oscar's Teacher-Rated Engagement Frequency (Mrs Crawford)
- 5.13: Visual Analysis of Oscar's Teacher-Rated Engagement Impact (Mrs Crawford)

- 5.14: Visual Analysis of Oscar's Teacher-Rated Engagement Frequency (Mrs Harrington)
- 5.15: Visual Analysis of Oscar's Teacher-Rated Engagement Impact (Mrs Harrington)
- 5.16: Visual Analysis of Gregor's Self-Rated Engagement
- 5.17: Visual Analysis of Gregor's Teacher-Rated Engagement Frequency
- 5.18: Visual Analysis of Gregor's Teacher-Rated Engagement Impact
- 5.19: Visual Analysis of Christopher's Self-Rated Engagement
- 5.20: Visual Analysis of Christopher's Teacher-Rated Engagement Frequency
- 5.21: Visual Analysis of Christopher's Teacher-Rated Engagement Impact
- 5.22: Visual Analysis of Giovanni's Self-Rated Engagement
- 5.23: Visual Analysis of Giovanni's Teacher-Rated Engagement
- 5.24: Visual Analysis of Giovanni's Teacher-Rated Engagement Impact
- 5.25: Visual Analysis of Simon's Self-Rated Engagement
- 5.26: Visual Analysis of Simon's Teacher-Rated Engagement Frequency
- 5.27: Visual Analysis of Simon's Teacher-Rated Engagement Impact
- 5.28: Measures Decreasing in Mean Level by One or More Score Unit
- 5.29: Measures Increasing in Mean Level by One or More Score Unit
- 5.30: Teacher Responses to Implementation Questions
- 5.31a: An Illustration of How Codes Comprised Themes
- 5.31: Themes of Teacher Views of Intervention Usefulness, Effectiveness Practicality
- 5.32 Answers to Research Questions A and B with Summary of Findings
- 5.33: Answer to Research Question C with Summary of Findings

List of Figures:

- 2.1: Child-Adult Relationship as Key Mediator of Task Engagement for Children with Attention Difficulties (Adapted from Geddes, 2006).
- 4.1: Frequency of ICE Framework Elements Underpinning Bailey's Action Plan
- 4.2: Frequency of ICE Framework Elements Underpinning Callum's Action Plan
- 4.3 Frequency of ICE Framework Elements Underpinning Oscar's Action Plan
- 4.4: Frequency of ICE Framework Elements Underpinning Gregor's Action Plan
- 4.5: Frequency of ICE Framework Elements Underpinning Christopher's Action Plan
- 4.6: Frequency of ICE Framework Elements Underpinning Giovanni's Action Plan
- 4.7: Frequency of ICE Framework Elements Underpinning Simon's Action Plan
- 5.1: Scatter Graph of Bailey's Engagement Self-Rated Engagement Scores
- 5.2: Scatter Graph of Bailey's Teacher-Rated Engagement Frequency Scores
- 5.3: Scatter Graph of Bailey's Teacher-Rated Engagement Impact Scores
- 5.4: Scatter Graph of Callum's Self-Rated Engagement Scores
- 5.5: Scatter Graph of Callum's Teacher-Rated Engagement Frequency Scores (Mrs Crawford)
- 5.6: Scatter Graph of Callum's Teacher-Rated Engagement Impact Scores (Mrs Crawford)
- 5.7: Scatter Graph of Callum's Teacher-Rated Engagement Frequency Scores (Mrs Harrington)
- 5.8: Scatter Graph of Callum's Teacher-Rated Engagement Impact Scores (Mrs Harrington)
- 5.9: Scatter Graph of Oscar's Self-Rated Engagement Scores
- 5.10: Scatter Graph of Oscar's Teacher-Rated Engagement Frequency Scores (Mrs Crawford)
- 5.11: Scatter Graph of Oscar's Teacher-Rated Engagement Impact Scores (Mrs Crawford)
- 5.12: Scatter Graph of Oscar's Teacher-Rated Engagement Impact Scores (Mrs Harrington)
- 5.13: Scatter Graph of Gregor's Self-Rated Engagement Scores

- 5.14: Scatter Graph of Gregor's Teacher-Rated Engagement Frequency Scores
- 5.15: Scatter Graph of Gregor's Teacher-Rated Engagement Impact Scores
- 5.16: Scatter Graph of Christopher's Self-Rated Engagement Scores
- 5.17: Scatter Graph of Christopher's Teacher-Rated Engagement Frequency Scores
- 5.18: Scatter Graph of Giovanni's Self-Rated Engagement Scores
- 5.19: Scatter Graph of Giovanni's Teacher-Rated Engagement Frequency Scores
- 5.20: Scatter Graph of Giovanni's Teacher-Rated Engagement Impact
- 5.21: Scatter Graph of Simon's Self-Rated Engagement Scores
- 5.22: Scatter Graph of Simon's Teacher-Rated Engagement Frequency Scores
- 5.23: Scatter Graph of Simon's Teacher-Rated Engagement Impact Scores

Chapter 1: Introduction

1.1 Statement of Personal Interest

I became interested in attention difficulties during previous work in secondary schools, in roles relating to inclusion, working directly with young people. I set up some intervention work with children who had ADHD diagnoses, when I was 'Inclusion Unit Manager' in a mainstream secondary school, to help engage children showing these difficulties, in their learning. I used a variety of approaches including mindful practices, meta-cognitive training approaches and attending children's lessons to advocate for their needs, helping teachers build strategies for engaging them.

Studying and working as a Trainee Educational Psychologist (TEP) has given me the privilege of furthering my evidence-based psychological understanding of many cognitive and affective impacts on children's learning. I have had a range of experiences seeing attention difficulties from a holistic point of view in Educational Psychology casework, using collaborative consultation to understand the child, with contributions from the adults who know them best.

Finally, a personal experience which emphasised the pivotal, engaging nature of interaction and communication, was reading stories with my then 3-year-old daughter. The engagement she eventually showed during our bedtime 'story time' was always particularly fascinating, despite the over-stimulated, disorganised excitement leading up to it. During this excitement, meeting her interest before leading to mine, changing my vocal tone, then beginning to read, seemed to cause a reliable change in her behaviours, from twirling, wriggling and giggling, to dedicatedly choosing a book, avidly listening, and gazing intently at the pages, as she swiftly settled comfortably in my lap. I was in awe of her responsive engagement in relation to my interaction and communication. I amazed at the quality of her attention as she anticipated the story, filling in the gaps directed by my questioning tones, in sharp contrast to the impulsive and overwhelmed activity just moments ago.

1.2 Relevance to Educational Psychology and Schools

Classrooms are challenging environments for children showing attention difficulties, and teachers often feel more effort, time and planning is needed to successfully teach them (Kos et al., 2006). Children can experience attention difficulties for a variety of environmental and cognitive reasons. Children with these difficulties can show disorganised, fleeting task-engagement, and disorganised thinking (Hughes, 2009), leading to intense disruption of their own and others' learning engagement, with long-term negative impacts (Saunders & Chambers, 1996). It can be difficult for school staff to efficiently influence their attention without continuous prompts or reprimands. There is room for improvement in the learning engagement and the way this can be influenced in school, for children with these difficulties. Efficient and easily accessible approaches would be useful for many teaching staff, and children with attention difficulties.

Improving interaction quality not quantity, can be highly effective for the learning engagement of children with Special Educational Needs and Disabilities (SEND) in general (McBrien & Weightman, 1980). Influencing the attention of children with attention difficulties can be a challenge yet improving everyday interaction quality seems beneficial. Therefore, a framework for refining and tailoring interaction and communication with children who show these difficulties, could be highly useful for school staff and educational psychologists (EPs), in a structured, evidence-based way.

An interaction and communication-based intervention framework for children with attention difficulties could be effective, implemented in general 'quality first' teaching. The SEND Code of Practice (SEND CoP; DfE, 2014) recommends a 'graduated approach' to interventions, starting at a 'universal' level with high quality teaching for all. A child's response to intervention guides the next actions with increasing focus (SEND CoP). It says schools should have clear universal processes for managing disruptive behaviour of children with Attention Deficit Hyperactivity Disorder (ADHD) or Attention Deficit Disorder (ADD) diagnoses. This supports the need for a universal, proactive approach to influencing the attention of children showing attention difficulties

and therefore their learning engagement, which an interaction and communication framework could help to achieve.

Interaction and communication principles are potentially tools at every teacher's disposal with high utility and low cost. Impact on engagement could be high if interaction and communication principles can be stimulating, engaging, and supportive of information processing. A comprehensive framework of effectively engaging interaction and communication approaches and principles could be practical and useful as an early intervention approach if applied preventatively by EPs for individual children as part of quality first teaching, through consultation with classroom teachers, to build bespoke strategies.

1.3 Original Contribution

There is a dearth of classroom-based research evidence on the most effective interaction and communication approaches and principles for engaging children with attention difficulties in academic learning (where they may struggle most with their attention). Where this research exists, it is on a small scale, focusing on applying one specific approach or paradigm. An original contribution of this research is development of a comprehensive (non-exhaustive) framework of principles and approaches that can be used dynamically to build bespoke and targeted strategies for individual children's needs. The development of this framework is described in Chapter 4.

A unique aspect of this research is investigation and exploration of how a multitude of specific interaction and communication approaches and principles, based on sound theory, might underpin strategies to be used by teaching staff to engage children with attention difficulties in classroom learning.

Gulliford (2015) outlines the rigour in evidence-based practice approaches in research, originating from medicine, yet the limitations to a positivist search for causal explanations. Nevo & Slonim-Nevo, (2011) argue the case for 'evidence-informed practice', allowing for practice to be directly informed by theory and practitioners' intuitive contributions, as well as rigorous research evidence. Letting practice form the

evidence is sometimes more useful where evidence bases are behind effective practices (Gullford, 2015). Exploring the feasibility and effects of interventions in the 'real world' on real problems, aims to further the understanding of possible effects through practical application with individuals. This may contribute towards an understanding of feasibility, a further understanding of limitations, or even an initial evidence base, with high social validity.

This research aims to synthesise an understanding of effective principles and approaches from the literature, into a comprehensive framework, for helping school staff plan strategies to engage children with attention difficulties in academic learning. This research aims to test application of the framework as a potential intervention approach for EPs to use in schools, for children identified as having attention difficulties, and needing some early intervention support to engage them in academic learning.

1.4 Layout of This Research

The narrative literature review supporting the 'ICE Framework' and intervention approach is set out in Chapter Two, followed by the systematic literature review in Chapter Three, which focuses on key studies meeting defined selection criteria. This aims to find examples of interaction and communication which are effective for engaging children with attention difficulties in academic classroom learning. The resulting themes from the framework synthesis are presented.

Chapter Four sets out philosophical foundations of the research, methodological considerations, SCED design, thematic analysis approach, and case details. To define the intervention, the ICE Framework development is described which follows on from the Systematic Literature Review and framework synthesis in Chapter Three. Ethical considerations and researcher reflexivity are then outlined.

Chapter Five describes the SCED data visual analysis, outlining findings case-by-case with results displayed in line graphs, and visual analysis findings tabulated and briefly described. The thematic analysis findings are also described and tabulated.

Chapter Six discusses the SCED findings on an individual case-by-case level. Contextual aspects of qualitative responses from the thematic analysis are triangulated with SCED findings to understand them further. The salience amongst cases is then discussed, followed by the thematic analysis findings. Implications for future research and EP practice are discussed, and a brief conclusion of the research is offered.

Chapter Two: Narrative Literature Review

This literature review sets out theory and research concerned with positive impacts of communication and interaction on the academic learning engagement of children with attention difficulties. Literature was welcomed from a variety of psychological paradigms. The child's environment was viewed as a key mediator of their attention, avoiding a simply static within-child view of attention difficulties. Most literature uncovered is oriented in social, cognitive and behavioural psychology.

The literature is explored in narrative form initially. Firstly, the researcher's stance on attention difficulties and engagement are discussed, and how they relate to children's academic classroom learning. Then principles of interaction and communication for engagement are investigated in relation to attention.

Following this narrative literature review is a Systematic Literature Review (SLR) in Chapter Three, synthesising a small number of primary studies relating to a research question. It aims to focus the investigation into what specific communication and interaction techniques, strategies and approaches are found to affect the immediate engagement of children with attention difficulties in academic learning.

2.1 Attention Difficulties and Rationale for Psychological Intervention

Attention is positioned in this research as a fluid, dynamic concept overall, and can be viewed and defined in a variety of ways. 'Attention' is implicated in a range of executive functions (Dawson & Guare, 2010) and cognitive processes, including filtering

information, dividing attention, and selecting action (e.g. Styles, 2006). Children can experience attention difficulties for biological, cognitive and environmental reasons, all of which an EP might encounter. To highlight the complexity, a few examples of contributing interacting factors are: Sensory processing (Shimizu et al. 2014), motivation and affect for the teacher (Rogers et al., 2015), cognitive and developmental adaptations to violence or stress (Mead et al., 2010), and any combination of executive functioning difficulties such as working memory, goal-related planning, time management, response inhibition, and emotional control or regulation (e.g. Dawson & Guare, 2010; Rief, 2016; Barkley, 1997).

Some children with persistent and consistent difficulties in line with the Diagnostic and Statistical Manual of Mental Disorders (DSM-V) (APA, 2013), are diagnosed with an inherent difficulty such as Attention Deficit Hyperactivity Disorder (ADHD). Hyperactivity, impulsivity and inattentiveness are all symptomatic of ADHD from a diagnostic point of view in the DSM-V (APA, 2013). However, a focus on diagnosed conditions is felt by the researcher to exclude populations with similar challenges without named conditions. The term 'Attention difficulties' is treated by this research as a superordinate to named conditions, such as 'ADHD.' This research views attention difficulties as consistent, persistent difficulties regulating, sustaining or shifting attention (Deutsch & Mohammed, 2010), across settings; a dynamic view of attention as a functional process. This framework is treated by this research as a superordinate paradigm of 'attention difficulties,' with acknowledgement that the DSM-V conceptualisation (APA, 2013) provides a useful descriptive framework.

There is a need for non-medical[1] support and intervention for children with attention difficulties, especially in schools, where classrooms place great demand on attention. An EP can make a unique psychological contribution for children showing these difficulties. The National Institute for Health and Care Excellence (NICE, 2016) recommends non-medical intervention effectiveness research for ADHD, particularly psychologically focused, due to associations between medication and negative mental health consequences. Reid & Maag (1997) say ADHD is often seen as a disorder that

[1] Medical treatments for attention needs has carried some contention historically.

the individual has little ability to control, concluding that response to intervention is an effective approach for non-medical professionals. Interventions with psychological understandings enable school staff to develop influence and insight around children's attention, therefore their learning engagement.

An holistic view of children's attention difficulties and a focus on the interacting environmental impacts on attention and academic learning engagement is practical and realistic. Evidence-based practice in Educational Psychology has had a strong place in considering wider systemic influences on ADHD behaviour, contributing to the consideration of various contexts in assessment (Gulliford, 2015). Thomas (2002) claims the relationship between children's apparent cognitive deficits and low achievement is highly complex and plastic, and must be viewed holistically. He warns against conceptualising specific learning 'capacities' or assuming they are sub-skills directly responsible for lack of achievement. Similarly, the BPS (1996) ADHD report sets out the challenge of developing measures of 'pure attention' which are not confounded with other cognitive processes, such as motivation and working memory. Perhaps 'pure' clinical measures of attention are arbitrary or even practically infeasible to isolate from other cognitive processes. This research therefore takes a real-world, pragmatic perspective of attention as closely linked to observable engagement in the environment.

Guidance from NICE (2002) and BPS (2000) each acknowledge psychological, social and biological influences on behaviour, supporting holistic assessment and intervention approaches. Investigating children's engagement in this way and consulting with parents and classroom teachers could carry great potential for EPs to help affect real change.

In addition to the ecological, holistic view, strengths-based approaches can be effective. The Australian education guidance (DETE, 1999) supports strengths-based approaches to addressing ADHD behaviours. Similarly Climie & Mastoras (2015) suggest strengths-based approaches to helping children with attention difficulties cope, adapt, and develop resilience. They claim this is particularly important as there

is no ‘quick-fix’ for ADHD. However, an influential review by Swanson et al. (1993) says stimulant medication can be highly effective for temporary symptom management, although with frequent problematic side effects such as sleeping and eating. It feels empowering to harness potential strengths resulting from the child’s attention difficulties, arguably with longer term benefits. Tymms & Merrell (2011) found impulsive behaviours such as blurting out answers can be strengths despite potential disruption, as they overtly signal engagement. Some impulsive behaviours are perhaps more disruptive, although many could be harnessed as strengths using creative, refined, evidence-based techniques. The current research takes a strengths-based, solution-oriented approach, aiming to embrace children’s strengths where possible, considering ‘what works’ for children with attention difficulties; not a deficit focus.

Attention and learning engagement should be viewed dynamically given the complexity of interacting influences, constantly changing and responding to the environment. Attention processes tend to be dynamic non-static influences on cognition and learning (Yeomans, 2008) and are core to cognition in Vygotsky’s sociocultural theory of mind (SCT) (Poehner, 2011). A dynamic approach to influencing or ‘mediating’ learning is grounded in Vygotsky's social constructivist view of learning and the 'zone of proximal development' (Vygotsky, 1978). This is the highest level of learning within the child's capabilities, with the most effective, personalised mediation from a more capable other. The dynamic paradigm moves us away from static within-child descriptions, towards interactionist, fluid understandings of children’s strengths and potential.

Attention regulation, shift and sustenance are key to the child's learning and response to mediation; outlined in the Cognitive Abilities Profile (CAP) (Deutsch & Mohammed, 2010). Haywood & Lidz (2007) outline the interacting layers in attention processes, such as internal and external influences on attention, and processes such as maintaining focus and selecting what to focus on, involving inhibiting and filtering distractions. There appear to be many interacting processes in and influences on attention, some of which could be used to mediate it. This research is concerned with

children's functional needs and difficulties, rather than descriptive or diagnostic approaches.

2.2 Rationale for Focusing on Academic Classroom Learning

Academic, cognitively demanding and desk-based learning can be a challenge for children with attention difficulties, regardless of cognitive or intellectual ability, due to the necessity of effortful attention and executive functioning needed to carry out tasks (e.g. Barkley, 1997; Rief, 2016; & Kahneman, 2012). Barry et al. (2002) found children with attention difficulties often achieve at lower levels than predicted, especially those with more severe ADHD symptoms. They claim children with these difficulties may possess good higher order problem-solving or cognitive skills but are hindered by difficulty with effortful attention focus and therefore struggle to understand tasks, remain on-task, or produce required workloads. Effortful attention is a key mediator of academic learning activity, perhaps helping to explain children with attention difficulties' underachievement in areas of academic achievement.

All children require purposeful, focused attention to engage in academic learning. Pashler et al. (2001), and Styles (2006) distinguish between 'automatic attention' and attention requiring controlled, voluntary processing; relying on working memory. The latter is necessary during cognitively demanding tasks in lessons such as literacy and numeracy. Csikszentmihalyi & Nakamura's (2005) concept of 'flow' describes focused attention in the absence of cognitive effort and executive inhibition, which perhaps depends on direct intrinsic motivation and cannot be manufactured. This adds complexity to conceptualising and influencing task-focused attention and engagement, however, children with attention difficulties could clearly find effortful academically focused attention less challenging if information is transmitted and responses elicited, in the most effective, engaging ways. For example, joining or influencing children's 'automatic attention' first, could help support their 'voluntary attention', such as using the tendency to pay automatic attention to emotive language or imagery.

Academic activities can lack stimulation for children with attention difficulties. Imeraj et al. (2013) found children with ADHD showed shorter on-task time during academic

tasks than imaginative or musical tasks, and Barfield & Driessnack (2018) found children with ADHD had a strong preference for kinaesthetic and emotive activities. They explored children with ADHD's perspectives on their general wellbeing, using semi-structured interviews; 60% of children identified physical education and playtime as their preferred school activities. Content analysis of children's verbal and art-based responses showed strong emphasis on being outdoors and sharing connections with family. Although it is unclear how these findings would compare to a non-ADHD population, these US-based findings emphasise the possible high engagement of children with ADHD with tangible, relationship-based, physical, or emotionally stimulating experiences compared to traditional academic classroom learning.

The challenge to children with attention difficulties can be engaging in tasks with high linguistic, executive functioning, or processing demand, with less immediate or sensory reward (Weiss et al., 2011). It seems tasks with high cognitive demand and little opportunity for novelty, emotive, or multi-sensory approaches are where children with attention difficulties may need more intensive and refined instruction, engagement and stimulation. Literacy and processing spoken language can be central to accessing most other classroom learning, so it is also clear how attention difficulties could affect learning widely.

Investigating the cognitive demand and sophistication of largely symbolic academic tasks helps us to understand the challenge for children with attention difficulties, and their apparent ease of attending to activities with sensory or directly stimulating qualities. Bandura (1986) describes symbolising as a cognitively sophisticated ability moving a person beyond direct sensory experience. Symbolising includes language; comprehension of language can be a challenge for children with ADHD (Bruce et al., 2006). Attention difficulties do not necessarily mean communication needs, however, if children with attention difficulties are struggling with sophisticated processes involved in listening and comprehension, it would follow that particularly engaging interaction and communication would mediate their attention.

2.3 Defining Engagement

Just as there can be many varieties and definitions of attention (Styles, 2006), there can be many of engagement. Axelson & Flick (2010) acknowledge the various meanings of 'engagement' including overall involvement in school. The current research purely focuses on current 'real time' engagement with learning activities, such as on-task behaviour (e.g. Jiang et al., 2018) and participation and responsiveness (Vile Junod et al., 2006).

Focused effort and engagement appear to link closely with attention, but the interaction appears complex. Styles (2006) explores whether attention itself can be viewed as a cause or an outcome, concluding that varied effects of the whole system result in a range of forms of attention, interacting with long-term memory. Practically, it seems engagement is a useful construct for describing the effects of the wider systems responsible for supporting focused attention.

Hughes' (2008) interviews with parents and teachers of children with ADHD highlight the importance of children being 'occupied' and 'stimulated' with mental or physical pursuits, to control their activity and potential disruption. Being occupied resonates with engagement and attention-regulation, as well as wider processes such as motivation. Engagement can be conceptualised as the quality of the child's interaction with the environment, and for children who do not need support with their engagement this can mean being able to self-regulate the focus of their efforts (Carpenter et al., 2015). Learning engagement remains a complex process which can be defined in a number of ways, and could be seen generally as a practical, functional product of sustained and regulated attention.

The Carpenter et al. (2015) engagement model has 7 practical engagement indicators for use with children with complex learning difficulties: curiosity, initiation, investigation, discovery, anticipation, persistence and responsiveness. Engagement is seen as a dynamic, responsive set of behaviours, influenced by adults. The model is authored by a range of multi-disciplinary professionals including an EP and includes ways to promote engagement (although these are not specific to communication and

interaction, nor attention difficulties). Hounslow's (2016) review acknowledges the lack of mutual exclusivity between the 7 engagement indicators yet claims this does not limit practical utility (although he says the complexity might). Engagement appears a complex construct, however these categories make clear what we might expect to see from a child who is 'on-task' in class.

The Carpenter et al. (2015) engagement profile is a versatile model, designed for children who are likely to have a complex interacting profile of needs and difficulties, including attention difficulties. Its use in understanding and addressing attention difficulties as an important part of a bigger picture is well-placed within the interactionist perspective, rather than narrowly focusing on attention as an isolated skill. The profile's utility for a range of needs and difficulties supports its practicability and flexibility. Children with attention difficulties might realistically have wide ranges of strengths and needs and this approach would prevent attention difficulties being viewed in isolation or being treated deterministically.

There are alternative ways to conceptualise engagement. Fredricks et al. (2004) set out three-dimensions of classroom engagement; cognitive, behavioural and affective. These seem too broad to be practical engagement indicators, although they highlight engagement is not always behaviourally observable. Fredricks et al. (2004) acknowledge the overlap and complexity of these dimensions, especially central processes like motivation and self-regulation. Based on these dimensions, Wang et al. (2014) developed the classroom engagement inventory (CEI) and found five factors, using factor analysis: affective engagement, behavioural engagement (compliance), behavioural engagement (effortful class participation), cognitive engagement, and disengagement. There is clearly more to engagement than observable behaviour.

In contrast to 'engagement,' 'on-task' behaviour implies being specifically occupied on the task at hand. Spanjers et al. (2008) investigated correlations between on-task procedural behaviours and 'substantive engagement' (committed and sustained), finding small but significant correlational differences. They conclude time on-task can

indicate procedural engagement more than substantive, and substantive engagement would be more difficult to measure. The Carpenter et al. (2015) indicators could arguably indicate substantive engagement, not just procedural, although sensitive to interpretation. Caution would be needed in concluding whether a child was meaningfully engaged or just procedurally.

It seems engagement is not a discrete construct and remains closely intertwined with affect and cognition and cannot always be observed. Carpenter et al.'s (2015) 7 practical indicators of engagement could help unpack the idea of being substantively occupied and involved in learning activity, in a reasonably structured and in-depth way. It could hold practical insight into a child's classroom learning engagement, rather than whether they are simply following expected procedures.

2.4 Interaction and Communication Influencing Engagement

Children with attention difficulties could be engaged in academic learning through interaction and communication techniques designed to make information accessible. In contrast they can be disengaged when learning requires lengthy passive listening; when information has high cognitive load requiring effortful processing (e.g. Kahneman, 2012), or when target information is not stimulating (Zentall, 1993).

Children with attention difficulties are likely to struggle with lengthy listening tasks; attention and working memory can correlate positively with listening comprehension (Jiang & Farquharson, 2018), and as previously noted, children with attention difficulties can struggle to process language (Bruce et al., 2006).

Children with attention difficulties could therefore be effectively engaged with methods of interaction and communication such as clear affirmative instructions (DuPaul et al., 2011), adults' sensitive awareness of their learning processes (Hughes, 2009), and supplementary non-verbal gestures (Wang et al., 2004). It seems communication and interaction can play a pivotal role in the learning engagement of children showing attention difficulties.

Good interaction and communication techniques are freely available once refined and build on the interpersonal strengths and interests of many children with attention difficulties. From the perspective of Feuerstein's (1991) mediated learning environment (MLE), interaction and communication with adults is a key external influence on children's attention and engagement in learning. Attention can therefore be co-regulated with engaging interaction and communication.

Stevens et al. (2000) indicate teachers' and children's behaviours mutually affect one another. They distinguish between teachers as supporting an interaction with a child, not controlling it, and the importance of teacher receptiveness to the child's motivation and how it affects their engagement. Haywood & Lidz (2007) outline the effectiveness of mediating attention through non-verbal and verbal ways to elicit it, such as gestures, voice, contrast and novelty, and cueing the child for what is important to notice. A DfE research report (Dockrell et al., 2012) emphasises the importance of refining adults' language and interactions with children to enhance teaching effectiveness for children with language and communication needs, which could even include the receptive comprehension of children with attention difficulties. Attention can clearly be co-regulated through effective, engaging interaction and communication. For interaction and communication to be engaging, the adult needs to be attuned and receptive to the child's constantly changing attention and engagement.

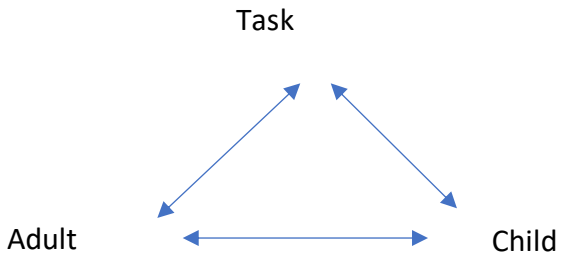
A responsive dynamic approach to mediating a child's attention would need to be contingent upon the child's affect, such as emotional states and stimulation or arousal levels. For example, Breakwell's (1997) assault cycle outlines levels of escalation in response to stressful events. It could be important for mediation to be of a soothing, containing nature during crisis points, in contrast to perhaps a more interactive nature during lower escalation. Interpersonal flexibility and sensitivity seem crucial to co-regulating attention and engagement effectively.

2.4.1 Interpersonal Qualities in Interaction and Communication

Bandura's Social Cognitive Theory (Bandura, 1986) says the environment, cognition and behaviour all mutually interact and influence one another. For classroom learning,

this supports the importance of the child's interaction with the adult or teacher, for task processing and engagement. Geddes (2006) sets out a triadic model of interaction between the child, adult and task, whereby the task can mediate interaction with the adult, and interaction with the adult can mediate child task-engagement (outlined in Figure 1 below). The child-adult relationship can therefore influence the child's task engagement, particularly for children struggling to regulate their attention, activity and/or emotion.

Figure 2.1: Child-Adult Relationship as Key Mediator of Task Engagement for Children with Attention Difficulties (Adapted from Geddes, 2006).



Although this triadic model comes from an attachment and relationship perspective, co-regulation seems directly relevant to children with attention difficulties' task engagement. The strengths of children with attention difficulties may lie in social connections (Barfield & Driessnack, 2018) and emotional 'intelligence,' despite difficulties such as impulsivity negatively impacting their actual behaviour (Climie et al., 2013).

Reciprocal interaction between children and teachers is important for active interaction and communication. In the Netherlands, Stevens et al., (2000) developed an 'attunement strategy' to help teachers lessen children's off-task behaviour. This was characterised by receptiveness to instructional needs, task motivation, and attempting to influence this through active questioning strategies, such as task-focused questions, e.g. 'how much time do you think you need?' and 'what do you already know?'

Children's off-task behaviour decreased significantly with a medium effect size. On-task behaviour increased, although not significantly. Individual instructions to children increased in frequency, as well as teacher questioning and explanation. Evaluative interactions increased in frequency and duration; these changes showed large effect sizes. Teachers with higher initial expectations rated better effects which could have confounded the effectiveness of the strategy itself. However, these results generally support the potential effectiveness of helping teachers refine interactions with children to influence task engagement, motivation and understanding.

Support staff can play a key role in using interaction and communication to open up avenues of task engagement. Blatchford et al., (2013) tested alternative deployment of Teaching Assistants (TAs) in a large-scale study with a diversely representative sample, triangulating qualitative and quantitative data. Part of the focus was on adult-child interactions. 'Productive talking' (e.g. open questions, and emphasising understanding rather than activity completion) was found to be particularly effective for stimulating children's learning involvement. This demonstrates the importance of quality interactions between children and adults, for active learning engagement. This is especially important for children with attention difficulties, given tailored, directly relevant interaction supports effortful attention, comprehension and active processing, as previously outlined.

Working with, not against, children's distractions and movable attention, seems an effective approach to engaging and influencing attention. Children with attention difficulties generally show less cooperation and reciprocity, and more off-topic statements and interruptions in communication (Nilsen & Fecicia, 2011). Gibbs (2018) found a specifically helpful way to help children with ADHD to learn, was teachers answering children's off-topic questions. Although a small instrumental case study with only male children, these findings support the teacher noticing and joining children's existing attention as an effective starting point for engaging them and influencing their attention back to the intended activity.

For interactions between teachers and children to be engaging, Mason (2002) says teachers must be receptive to children's existing attention and give creative, genuine non-habitual responses to it. Cowie et al. (2018) conceptualise two 'noticing' processes: attending to events, then making sense of them to choose a creative response. They highlight the importance of 'noticing' in formative learning, and that the teacher must detect and link the child's own current experiences and understandings, using observation, dialogue and demonstration; pursuing the child's ideas as they emerge.

Along with noticing, sensitivity to detecting children's learning patterns is important, e.g. for building on existing learning engagement. Hughes (2009) identifies sensitivity to learning styles as a key effective engagement theme, found during interviews with children who have ADHD, teachers, and professionals. Sensitivity to the child's typical attention span was particularly important. Teacher receptiveness to how and when the child is accessing and understanding information seems a key part of maintaining engagement. These principles also resonate closely with the concept of mediated learning (e.g. in dynamic assessment; Tzuriel, 2014).

Reciprocal communication techniques can give interactions a highly sensitive, attuned quality. Cooper et al. (2014) tested effects of training for impoverished mothers in South Africa including 'sensitive book-sharing' techniques, for improving young children's attention and language. Techniques included following children's cues, building on their active participation, referring to objects in their visual field, asking them direct questions when it is known that they know the answers, and linking content to their experiences. Although a pilot study, a significant proportion of intervention group children showed improved attention quality and language, compared to controls. Intervention group mothers were concluded to show more sensitivity, supporting the effectiveness of adult sensitivity - noticing and joining children's engagement and attention - for maintaining engagement.

Passive, receptive activities can be more demanding on attention, therefore challenging for children with attention difficulties. Mishra (2015) emphasises the

passivity in reading and listening, and the active intention in speaking and writing. One of the main effective skills shown by mothers trained in the Cooper et al. (2014) intervention, was reciprocity. Eliciting active processes from children via focused 'back-and-forth' interaction during passive activities, requiring them to actively process information, could help maintain and moderate their attention and active task-engagement. Reciprocal interaction and communication seem to directly and effectively mediate children's learning.

General emotional quality and rapport in interaction also appear important mediators of engagement and in supporting attention. In the U.S., Rudasill et al. (2010) used regression analysis to investigate relationships between classroom emotional support and children's attention and activity at age 4, and later achievement in mathematics and reading at ages 9-10. They found attention had most negative impact on achievement where emotional support was low, concluding school psychologists can effectively work with teachers to increase children's attention through positive behaviour support training. Although findings are not necessarily causal, hierarchical regression allowed systematic comparison and control of variables, for greater confidence that low emotional support negatively related to later learning outcomes, to a greater extent for children with attention difficulties.

Rapport is highly qualitative and interpersonal, directly affecting most interaction and communication between people. Beaver (2013) describes Neuro-Linguistic-Programming (NLP)-based understanding of rapport in EP work. He says in-depth understanding of another's worldview, and forming empathic connections is effective for successfully building relationships where challenging behavioural characteristics, such as poor attention skills, can be a barrier. Rapport-building seems an integral part of effective interaction and communication for engaging children with attention difficulties.

A range of emotional, interpersonal and rapport-based factors clearly play a key role in eliciting and sustaining engagement of children showing attention difficulties.

2.4.2 Instructional Interaction and Communication

Children with attention difficulties need a clear path to reaching goals, to maintain engagement. Task awareness, understanding, and appreciation for the consequences or outcomes of actions are essential for this (Mishra, 2015). For children with ADHD, Hughes (2009) advocates for firm instructions and expectations with carefully paced information, leading directly to clear task-understanding. Related to outcome focus, DuPaul et al. (2011) emphasise children with ADHD need to make active choices to process tasks clearly, saying they should be questioned to actively elicit choices, and all choices should lead to the same skill outcome.

Attention and learning engagement can also be influenced from a behaviourist perspective, for directing and shaping behaviour, e.g. through reinforcing consequences. Pfiffner et al. (2006) set out feedback-related strategies for engaging children with ADHD in classwork, such as frequent immediate praise following naturally occurring successful behaviours. Ahmann (2014) says praise can inadvertently be far less interesting and engaging than reprimands for children with ADHD. An anecdotal example could be the emotive, interactive difference between a shocked 'what are you *doing?!'* and a passing comment such as 'good job!' Engaging, emotive feedback with novel verbal qualities could give focus and momentum to desired behaviours.

Actively processing instructions and desired behaviours can also lead onto and enhance the children's engagement with them. Amongst feedback-related strategies, Pfiffner et al. (2006) listed children's repetitions of verbal instructions as effective, and the child giving feedback for helping externally regulate their activity. DuPaul et al. (2011) advocate for affirmative instructions and rules as effective antecedents (e.g. telling children what to do, not what not to do, before wrongdoing). Giving children clear visions of expected behaviours, through making goals easy to imagine, arguably makes goal steps and outcomes clearer and easier to aim for, therefore more likely to occur.

From a constructionist standpoint, interactions and communications can be made individually meaningful for effective engagement. NLP approaches can have strong implications in education for finely tuning and personalising teacher communication to children's understandings and experiences of the world (Day & Tosey, 2011). NLP founders Bandler & Grinder (1976), explain the 'deep structure' of language for making communication precise and meaningful by clarifying exact meanings of general 'surface' meanings at an individual level. Beaver (2013) advocates use of the NLP 'meta model' for restoring relevant detail through questioning, therefore recognising others' thinking and communication patterns. For example, for 'I can't do it' the adult restores detail by asking questions such as 'what exactly can't you do?', 'which bits can you do?' or 'how do you know you can't?' This can help find solutions through insight into another's subjective experience of the world, and their generalisations and distortions for example.

NLP practices can lack peer-review in education. However, Beaver (2011) acknowledges its similarity with other evidence-based constructionist approaches such as Solution Focused Brief Therapy (SFBT; e.g. De Shazer & Berg, 1997) and Personal Construct Psychology (PCP; Kelly, 1955), which helps support its effectiveness. A paper from CfBT Schools Trust (Churches & West-Burnham, 2008) sets out use of NLP techniques for general learning engagement, including:

- Matching and pacing children's arousal and emotional states before leading with desired ones.
- Behaving flexibly; noticing children's perceptions and views of the world through their assumptions and language, and the adult adapting their responses to join the child's experience.
- Using language to influence children's mindsets, e.g. after pacing, using descriptive words such as 'gently,' 'slowly' and 'softly' with matching qualities in speech, when the child is ready to cope with verbal interaction.

There is some evidence for NLP techniques' effectiveness in engaging children in learning. Carey et al. (2009) present a set of action research case studies, of teachers' general classroom NLP techniques, with a range of evidence for gaining engagement

and improving attention. Approaches included mirroring non-verbal body language for building rapport, questioning techniques to establish specific understanding (as outlined above), and descriptive, influential language such as using sensory modalities or imagery. The impacts described include a child with very poor concentration who became more focused in the teacher's lessons, contributing ideas and finishing written tasks, within a few weeks of implementing NLP strategies. The teacher described the student achieving a C grade on a mock GCSE paper, when predicted an E. Although these findings are highly anecdotal with low external validity, they provide interesting qualitative insights into the possible effects of NLP-based approaches.

Carey et al. (2009) conclude some of the strongest evidence for NLP is for effects of influential language patterns such as descriptive language, and using all sensory modalities in teaching, including using visualisations. They also found emphasis on 'anchoring' techniques; provision of stimuli associated positively by the child. This could help 'frame' activities or ideas in encouraging and positive ways, using language known to carry good affirmative meanings for the child.

Personally relevant and multi-sensory information can easily influence attention. Bandura (1986) says symbols and language that are directly relevant for the individual would affect their direct experience, effectively influencing attention, processing and understanding. Marzano et al. (2001) recommend non-linguistically represented information as the most easily engaging for learning, such as kinaesthetic activity, and visual representation; diagrams and forming mental images. Information is often verbal in academic classroom learning and this could be particularly engaging if it is descriptive and imagery-based, for example.

Visualisation and descriptive language could be useful for increasing engagement if children are ‘unsettled’ or distracted. Kudliskis (2013) undertook a small-scale action research study on use of NLP-based visualisation techniques with Key-Stage 3 children with learning and behavioural difficulties, to promote learning engagement. The intervention was a weekly visualised ‘guided walk’ described by the teacher (e.g. through a forest), using sensory and descriptive language, aiming to harness

children's imaginations and alter states of mind. Immediately following, children's 'settling time' decreased substantially. Children reported feeling calmer, less hyperactive, and readier to learn. Although none were reported to have attention difficulties specifically, this supports visualisation and imagery-based language for engaging children who struggle to settle to learn.

Influential language can also help with directing focus, especially where visual and multi-sensory stimuli are distracting. Goodhew & Kidd (2015) outline a database of spatial language relating to areas of the visual field, for influencing where children direct their gaze. This kind of language could perhaps be used subtly to help children avoid looking in the direction of distracting peers or aim their gaze at the task.

Language enables engagement outside of immediate surroundings (Valsiner, 2000). Children with attention difficulties can be particularly fixated or distracted by sensory-based stimuli or emotionally provocative stimuli for example. Engaging language holds great potential for interrupting a child's fixated attention on their immediate environment. Imagery and visualisation are again implicated here, as an engaging way to direct attention.

The sound of speech itself is inherently engaging and nearly impossible to ignore, therefore may effectively elicit attention. Detecting speech (not processing and comprehending it) does not demand voluntary attention, as humans are generally biologically disposed to be stimulated by speech (Mishra, 2015; Cline, 2015). This could be a challenge when children are distracted by peer conversation, or a strength if teacher speech is the most engaging or dominant source.

Children with ADHD are predisposed to attending to novelty due to their difficulty filtering information (Zentall, 1993). Zentall elegantly sets out the potentially distracting or engaging role of stimulation for children with ADHD, depending on what information the stimulation enhances. Children's attention could be effectively elicited using novelty stimulation for enhancing desired targets (e.g. using tone or descriptive, interesting language).

Language can also play a role in de-escalation and settling externalised behaviours expected from many children with attention difficulties. In a qualitative study of teachers' communication techniques for managing ADHD-related behaviours, Geng (2011) found calming tones and words were immediately followed by calm behaviours. Other more basic strategies (e.g. calling the child's name or repeating instructions) resulted in the child ignoring the teacher, walking out of lesson, or talking back to them. This emphasises the importance of carefully chosen calming language and tones.

Qualities and patterns in speech and language can seemingly be pivotal to engagement of children showing attention difficulties, and tangible, affirmative, relatable language can be effectively engaging.

2.4.3 Non-Verbal Interaction and Communication

Moving to non-verbal communication, gestures and gaze also seem a pertinent aspect of communication aiding children's attention and information processing in academic or cognitively demanding activities. Wang et al. (2004) found supporting hand gestures engaged children with attention difficulties in puzzle tasks which had a high cognitive demand (this study is discussed further in the SLR section). This supports a variety of non-verbal communication considerations for engaging children with attention difficulties.

Gaze is also relevant for processing spoken information. Although not explicitly specific to attention difficulties, Phelps et al. (2010) found that children looking away when being spoken to, can indicate processing, rather than disengagement. They claim children can be distracted by the gaze or facial perception of another person (i.e. the questioner or teacher) when processing cognitively demanding information, and gaze-aversion can help limit this.

Phelps et al. (2010) trained 5-year old children to avert their gaze from an adult questioner's face when processing cognitive questions (including arithmetic, verbal recall and spelling). Trained children successfully averted their gaze, in comparison to the non-trained control group, answering questions quicker than controls. There was a significant main effect difference between group and response accuracy, and a significant interaction between group and difficulty, showing larger effects of gaze-aversion on accuracy, for more difficult questions. This illustrates the need for eye-contact or facial communication to be well-timed, not interfering with processing or 'thinking' time. This re-emphasises the need for teachers to be receptive to children's thinking and internal states.

Non-verbal qualities and considerations seem to go some way to adding meaning in communication and making it more accessible.

2.5 Conclusion

Strategies such as those discussed could be influential in engaging children with attention difficulties in academic learning. They have the potential to be minimal in time and effort, and practical for use in quality first teaching; limiting need of repetitive or time-consuming strategies or risk of negative interactions.

The main points from the literature on interaction and communication for engaging children with attention difficulties are concluded below, under the next five headings. Each represents a broad theme of interaction and communication which appears key to engagement, based on the literature and theory discussed so far. These broad themes directly overlap with aspects of one-other and are viewed as interdependent principles.

2.5.1 Receptiveness

Attempts to gain children's attention and establish engagement could be successful when pursuing the child's existing interest and attention as it emerges. Sensitivity to the child's attention styles, span, emotional levels, and task motivation make engaging them in learning, tailored, responsive and dynamic.

2.5.2 Rapport

For building trust and positive regard, it seems important to give frequent, relevant praise and encouragement for desired behaviours, matching the child's desire for and response to it. Related to responsiveness, this kind of feedback needs to be carefully timed to the child's attention, so it does not serve as a distraction, inadvertent discouragement, or go unnoticed.

Linking content to children's individual experiences and worldview seems related to both receptiveness above and building rapport. Empathy and understanding of the child's worldview and the meaning they might take from learning, would arguably help children feel safer, more related to, and more motivated by, their learning.

Also closely related to receptiveness above, is awareness of the child's individual emotional state or activity level. Tailoring responses to these states and levels is a seemingly key element of building rapport; first by matching (or 'pacing'), then leading with the desired emotional state or activity level (e.g. Churches & West-Burnham, 2008).

2.5.3 Reciprocity

Eliciting active back-and-forth participation and making listening, task processing, and praise active processes, seems essential to maintaining engagement in academic learning for children with attention difficulties. Teachers supporting interaction, not controlling it (advocated for by Stevens et al., 2000), is highly relevant here.

Reciprocal communication approaches include task-related questions at the motivational level of the child, the child repeating instructions back, and the child making choices in tasks. Learning and information exchanges seem most reciprocal and engaging when the child can give and receive feedback and contribute in accessible contained ways.

2.5.4 Influential language

Language for framing and anchoring ideas, instructions and activities as positive experiences, to induce positive states of mind, seem effective when finely-tuned to the child's experience of the world. Descriptive visualisations and imagery, calming language, and spatial language, could be used to influence thoughts and states of mind.

Language can also be influential through affirmative instructions before disengagement, and immediate praise in familiar language; key to putting children on a path of 'success'. This also fits with teacher receptiveness, to notice early, subtle signs of disengagement and engagement.

2.5.5 Non-Verbal Influence

Non-verbal gestures could support more complete meanings of adults' spoken language and encouraging aversion of visual distractions (such as gaze) can promote more sustained processing of cognitively demanding information.

A calming quality or tone of speech may also help engage children with attention difficulties, especially if emotionally escalated or agitated; this could be soothing and reassuring. This also links with rapport, pacing, and mirroring the child's non-verbal communication to match and then influence their arousal levels and focus.

Chapter Three: Systematic Literature Review

This Systematic Literature Review (SLR) aims to interrogate and synthesise primary studies relating to research questions. It investigates what communication and interaction techniques, strategies and approaches are found to affect the immediate engagement of children with attention difficulties in academic learning. It appraises the evidence from 5 primary studies, using Gough's (2007) weight of evidence.

A form of Framework Synthesis (Carroll et al. 2013) is used to combine salient emergent concepts and features of what is found to be effective, to identify key themes, using thematic analysis (Robson & McCartan, 2016). Later in the research (Chapter Four), findings from the thematic analysis are organised into an 'Interaction and Communication for Engagement (ICE) framework', for use in consultation with teaching staff.

3.1 Systematic Literature Review Research Questions

a) Which interactions and communications between school-age children who show attention difficulties, and their teaching adults, appear to promote their engagement in cognitively demanding learning activities?
b) What will the most salient emergent concepts look like when understood collectively using a thematic analysis*?

*(Which contributes to research intervention formulation: a practical framework of effective principles. This will be achieved by triangulating themes with the narrative literature. See Methodology chapter).

3.2 Systematic Literature Review Methodology

The background literature and theory already introduced forms a basis for defining how attention and engagement are viewed, and for investigating what works and how it can be understood theoretically.

Despite SLR research question ‘a’ being a 'what is effective' endeavour, the focus here is not simply on quantifying how effective a known, defined intervention is. Rather, the purpose is to explore and synthesise the effective characteristics within an overall category; 'interaction and communication', as an intervention approach. The systematic review aims to appraise and critique the most relevant studies, then synthesise the emergent concepts to answer research question ‘a’ and group these into common themes to answer research question ‘b’.

This review of the literature to answer SLR research question ‘a’ takes a Framework Synthesis approach; a pragmatic method (Carroll et al., 2013), bringing order to heterogenous ideas or findings, within a common theme (Brunton et al., 2015). The common theme is interaction and communication which engages children with attention difficulties in academic learning. The synthesis is qualitative, aiming to organise and collectively understand aspects of communication and interaction in each study, which seem effective. There is focus on both qualitative and quantitative data and findings, with particular attention paid to the qualities defining effective approaches.

Searches of the literature were undertaken to find out ‘what is effective’ (searches described in the section below). As a result of these searches, five primary studies met criteria specific to SLR research question 'a' and formed the content of the review. To ensure replicability, strict inclusion and exclusion criteria apply (See section below).

SLR research question ‘a’ is concerned with what is effective, and SLR research question 'b' attempts to find out what the common themes are of the most effective principles and techniques that have been extracted in the 5 primary studies. Thematic analysis was used to code relevant artefacts in the research, and group them into salient themes.

The end purpose is to form a practical framework which is a key part of the research intervention; the Interaction and Communication for Engagement (ICE) Framework. To achieve this, themes found in the SLR will be supported and triangulated further with the broad themes in the rich wider narrative literature (a process outlined in the Methodology chapter of this research).

A thematic coding analysis approach (Robson & McCartan, 2016) was used to identify themes in this SLR to answer research question ‘b’. This process is outlined below:

- Artefacts resulting from research question 'a', in the 5 primary studies, were charted via initial emerging concept codes.
- Emerging concept codes were grouped into initial wider themes along commonly occurring dimensions.
- Then, for forming the ICE Framework in Chapter Four, the below steps were taken:
    - Themes triangulated with wider narrative literature previously discussed, to map how they link and can be understood in relation to it.
    - Resulting redefined themes formed a framework of strategies and techniques found to be the most relevant and effective.

A risk with taking a Framework Synthesis approach is varying methods for assessing evidence quality (Brunton et al., 2015). To guard against this, studies and their evidence were weighted using Gough’s (2007) weight of evidence (WOE), to assess their trustworthiness and rigour (see appendix 1 for full WOE). WOE was assessed by deciding whether studies meet individual criteria, which are grouped into three sub-categories, and combined overall. Percentages are calculated as to how many of the

criteria each study met. 75% and over was considered ‘high’, over 50% was ‘medium’ and below 50% was ‘low’. This aimed to quantify the weighting.

Another risk with Framework Synthesis is confirmatory bias; that what is found to work, will be defined by what is searched for or assumed to work to begin with. The lack of specificity over what kinds of 'communication and interaction' are searched for, will help to guard against this.

3.2.1 Selection Criteria: Excluded and Included Studies

The studies were included and excluded based on the essential criteria, in Table 3.1 below. This was based on the Cochrane inclusion criteria for interventions (Higgins & Green, 2008). However, this was used only as a guide; correlational studies with no specifically manipulated independent variable were acceptable if they related to immediate engagement.

Although Randomised Controlled Trials (RCTs) are at the top of the hierarchy of evidence for answering questions such as 'what works', the best available evidence must be utilised (Petticrew & Roberts, 2006). The positivist nature of RCTs would not necessarily fit the current purposes of exploring and synthesising the effective characteristics within ‘interaction and communication’ (as opposed to an already defined approach).

Table 3.1: Study Inclusion Criteria

Participants	**Interventions, Independent Variables and Dependent Variables**	**Study Design and Methodology**
• School aged children (aged 4-18). • Primary school age preferred. Classroom-based findings in secondary settings considered relevant to primary aged children. • At least some children participating reported to show attentional difficulties or have diagnosed ADHD. • Studies with general population, treating attention difficulties as a variable, were acceptable.	• Independent variable some form of interaction or communication strategies or approaches from a teaching or supporting adult, to engage children in academic classwork, or successfully transmit academic information in learning, as primary area of focus in intervention or condition. • Relationships between unmanipulated interaction or communication variables acceptable if dependent measure was immediate response to interaction or communication. • Dependent variable some form of real-time engagement or on-task/off-task behaviour. • Dependent variable immediate response to interaction and communication in cognitively demanding learning-related tasks. • Not accepted if dependent variable indirectly related to engagement (e.g. social-skills or	• Peer-reviewed studies and published in English language. • Studies to contribute to the question of what promotes engagement; what works, what is effective, and generally how can children with attention difficulties be helped. Implies solution-oriented and pragmatic focus. Planned focus on deficits therefore not accepted. Due to the small number of studies meeting the criteria, and the exploratory nature of the question, having a range of methodologies was not only accepted, but valued. This helped to address the question from a range of perspectives,

Although not inclusion or exclusion criteria, among other variables, the evidence weighting took into account how medication was treated, sources of reports of attention difficulties, and whether all or some children had attention difficulties.	achievement-based), or delayed (e.g. an overall rating of child's relationship with teacher). • Not accepted if engagement or similar outcomes were delayed beyond actual intervention delivery (e.g. overall learning motivation measures). • Behavioural approaches alone were excluded (e.g. reward-based strategies only). • Peer-based interaction and communication strategies only were excluded.	including qualitative understandings, and taking into account varied levels of findings, from ideographic details (e.g. in a case study), to more generalised understandings.

3.2.2 Searching for Studies

Searches for studies were undertaken using the preferred reporting items for systematic reviews and meta-analyses (PRISMA; Moher et al., 2009), between November 2018 and May 2019 (see appendix 2 for PRISMA flowchart). An updated search was also carried out in May 2020, yielding no additional peer-reviewed papers. The process was structured as follows:

1. Identification of records through multiple database keyword searches, and other sources such as relevant articles' references.
2. Screening all records at title.
3. Eligibility at full text, using the above selection criteria

Search keywords originated from initial background literature, including synonyms, e.g. 'adhd,' or 'attention deficit,' with 'communication,' 'interaction' and 'engagement' or 'on-task' (see appendix 3 for all search terms and searched databases).

Of the 16 studies screened to be eligible at title, 11 were excluded at full-text:

- Three studies had a sample not characterised as having 'attention difficulties' e.g. 'behavioural problems' or a focus on social skills and demand avoidance (Baker et al., 2008). Although findings from Stevens et al. (2000) were highly relevant in the general literature of the current research, attention difficulties were not specifically identified or reported, nor therefore, the effects of the 'attunement strategy' on them.
- Three studies had an achievement-based, conduct-based, or deficit-based dependent variable. One of these measured a deficit-based association between teacher-student relationships and deficit-based cognitive symptoms (Holdaway & Becker, 2018). This was considered unsuitable for implications into 'what is effective', and indirect cognitive symptoms not considered relevant enough to immediate engagement.

- Two studies had an interaction and communication-based peer-focused independent variable, rather than child-adult communication and interaction (e.g. DuPaul et al. 1998).
- Two studies' independent variables and dependent variables were not specific enough to interaction and communication, or engagement in academic learning. E.g. Miranda et al., (2002) investigated a 'multi-component' approach including a wide range of factors such as behavioural strategies and staff ADHD knowledge training. A small part included a self-instruction component with teacher supervision and increasing independence. Although this involved interaction and communication, this was not a primary focus. The dependent variable did not focus on engagement, but a wider range of variables such as cognitive tests, academic records, and observational, rating-based conduct behaviour indicators.
- One case study (part of Carey et al. 2009) was excluded on the basis of lack of peer review.

The included studies' key characteristics and findings are summarised in Table 3.2 below. Following this, they are critiqued, ready for a thematic analysis of salient sound features and emerging concepts.

Table 3.2: Systematic Literature Review Included Studies

Authors & Date	Design	Intervention key characteristics (independent variables)	Outcome Measures (dependent variables)	Sample	Methods of Analysis	Summary of Findings	[2]Evidence-weighting
Wang, Bernas & Eberhard (2004)	Quantitative within-participants experiment.	Teacher scaffolding: variety of hand gesture-types, alone & combined with speech. (ADHD sub-types also treated as a between-subjects factor).	Frequency of response (e.g. complying, reacting), time on-task, task success rate.	45 primary aged boys, ADHD-clinically diagnosed. U.S.	Raw data: time (in seconds) on task, and percentages of success and response. Two-way ANOVA.	Representational and deictic gestures most effective. Children responded significantly more frequently to hand gestures than with speech alone. Children spent significantly more time on-task with hand-gestures, than with speech alone. Children's success rates were significantly different; higher when gestures were used.	Medium (66.7%) C - High

[2] Overall weighting displayed first, then for criteria A, B and C where 'high' or 'low'.

						Each of these findings were unaffected by ADHD subtypes and presence of other disorders.	
Steiner, Sheldrick, Frenette, Rene & Perrin (2014)	Quantitative between-subjects comparison.	Comparison between teaching conditions for ADHD and non-ADHD. Teacher-led instruction vs other instruction.	Passive and active on-task behaviours ('engagement'), motor or verbal off-task behaviours, passive off-task behaviours. (Observation)	104 ADHD diagnosed children, in 19 primary schools. U.S.	Linear regression analysis.	Teacher-led classroom instruction most frequent (45%), and unsupervised seatwork least frequent (7%). During teacher-led classroom instruction, ADHD participants were significantly more inattentive and less engaged than non ADHD. During 'other' teaching formats, no difference in inattentiveness or engagement.	Medium (62.5%) B - High
Ducharme & Harris (2005)	Multiple baseline	Rapport-based approach to embedding independent on-task behaviours within adult-supported	On-task, neutral and off-task behaviours. (Observation)	5 boys, aged 5-9. 1 child with ADHD. Canada.	Visual analysis and descriptive statistics.	All children (including child with ADHD), increased on-task behaviours, even with decreasing support. All children also decreased off-task behaviours.	High (75.5) B - High C - High

		work, to ensure success.					
Stahr, Cushing, Lane & Fox (2006)	Single Case Experimental Design, ABAB.	Functional Behaviour-based multi-component intervention, including support requesting help, contingent praise, and planned ignoring.	On-task behaviour in maths and language class. (Observation)	1 9-year-old boy with ADHD. U.S.	Visual analysis and descriptive statistics.	Mean on-task behaviour increased in all experimental phases, above baseline phase.	Medium (66.7%) B - High C - Low
Vesely & Gryder (2009)	Pretest-posttest	'Word of the Day' – children restating word definitions in their own words, repeated exposure, and actively listening for the key words.	Word recall averages.	40 children, 17 with disabilities. Some with ADHD and ADD – quantity unreported. U.S.	Basic descriptive statistics – Means.		Low (47.1%) A - Low C- Low

2.3.3 Critical Appraisal

Wang, Bernas & Eberhard (2004)

Wang et al. (2004) tested effects of hand gestures alone, and combined with speech on children's performances on puzzle tasks. Task success, frequency of response to gestures, and length of attention on task all improved significantly. The data illustrates effectiveness of two types of gestures in particular, consistently across measures; shapes and motions relating to learning content ('representational') and directing and attracting attention to indicate objects and desired events ('deictic').

Potential practice effects are an internal validity issue, as tasks seem similar between conditions (all tangram-type puzzles). Although the order of conditions was randomised, it could have confounded the performance of children who received the hand gestures intervention after the speech-only condition. A possible validity threat is that teachers folded their arms in the speech-only condition. This is not a realistic representation of communication without specific hand-gestures; it is a communication style of its own, not likely to occur naturally. This may be partially responsible for positive effects of the hand-gestures compared to the speech-only condition. Wang et al. (2004) also conducted the study in settings with a low ecological validity, threatening external validity.

Despite some of these issues making validity less clear, the study is overall clearly-reported, with the intervention clearly described, and consistently positive effects found, supporting the benefit of non-verbal information supplementing verbal information. The authors conclude speech is too abstract alone for children with ADHD, and gestures provide more complete information. Perhaps this makes information richer and easier to imagine, especially for tasks or activities placing demand on processing and understanding visual-spatial information.

Steiner, Sheldrick, Frenette, Rene & Perrin (2014)

Steiner et al. (2014) compared behaviour of children with ADHD and their peers, in relation to factors including 'teaching format' which were very crudely defined: 'Teacher-led instruction', and four other broad categories were collapsed into 'other'

instruction (individually supervised, individually unsupervised, and supervised group work). Lack of specificity severely limited the study's contribution to this review's investigation into what communication and interaction principles engage children with attention difficulties. However, some findings were informative.

Significant interactions were found between ADHD status and teaching format, on measures of passive and active on-task behaviour ($p < .01$), and inattention ($p < .001$), but not for verbal and motor off-task behaviours. This means during teacher-led instruction, passive and active on-task behaviour was lower for children with ADHD, than peers, and inattentiveness higher. For other teaching formats, the authors report there were no differences in engagement or inattention between ADHD and non-ADHD participants.

Non-ADHD peer behaviours were unaffected by teaching format and the authors conclude children with ADHD are therefore more sensitive to the instruction format. This supports the effectiveness of interaction and communication for engaging children with attention difficulties in academic classwork.

The research assistants observing and rating behaviours are reported to have been aware of which children had ADHD, which could have caused expectation effects, threatening internal validity. An issue with construct validity is that the authors consider the child looking at the teacher during presentation, as 'engagement'; directly contradicting that children often process information more efficiently when avoiding the distractingly engaging nature of another person's gaze (Phelps et al. 2010). This implies possible false identification of disengagement. At a wider level, this could be relevant for understanding teachers' expectations and attributions of children with attention difficulties.

Despite these issues, the study's reliability appears strong as it uses a reliable systematic observation schedule, reducing biases and subjectivity. The data support teacher-led instruction carries the most risk of disengagement for children with ADHD, and other instruction is more likely to result in externally obvious engagement for

children showing attention difficulties. The other most engaging instruction formats seem likely to be individual interaction-based, as the authors report that individual supervision accounts for 37% of classroom instruction. However, there can be no further speculation on this due to no further detail in defining interactions or supervision methods in the study.

Ducharme & Harris (2005)

Ducharme & Harris's (2005) multiple baseline study demonstrated effectiveness of embedding slowly decreasing amounts of rapport-based interaction and instruction, in independent classroom work, to maintain independent on-task behaviour. This was with five children, four of which showed conduct disorders and some trauma in their backgrounds. One child had diagnosed ADHD.

The independent on-task behaviour of all children was shown to increase (overall, by 35 percentage points over baseline). The child with ADHD showed a 78% mean gain in on-task behaviour from baseline to post-treatment. The child with ADHD indicates high percentages of on-task and low percentages of off-task behaviour, at intervention phase onset, in the context of less of independent work initially. For this child, on-task levels seem to remain high as independent work increases, fluctuating towards the end. This suggests the initial impact of good-quality rapport and success on task engagement, and the possibility that this success and engagement makes more independent learning possible.

Observations were systematic, based on video-recorded data, and reasonably reliable, with Cohen's Kappa (κ) .79 agreement for observations rated by a second observer. The intervention is well-described. However, one potentially serious threat to internal validity could be the seemingly unrealistic baseline condition; children were left working independently for most of the lesson. Artificially low interaction in the baseline condition could be partially responsible for the difference in on and off-task behaviours between phases.

The artificial nature of the clinical classroom settings also limits external validity, as the classrooms arguably do not represent wider naturalistic classroom settings; e.g. amounts of other children around, access to teaching staff, environment familiarity, and development of routines and habits.

The study's internal validity is strengthened by children working on increasingly challenging tasks, in formats already familiar to them, guarding against practice effects. The intervention was implemented in classroom 'work centres' reported to be the most challenging for the child's behaviour during independent work. This means findings are relevant to activities with a high demand, therefore times when engagement might be more threatened.

Stahr, Cushing, Lane & Fox (2006)

Stahr et al. (2006) conducted a single case experiment on the efficacy of a behavioural intervention for decreasing off-task behaviour of a child with ADHD. The intervention was a multi-component approach, including a traffic-light system to help the child communicate how much help he wanted, adult planned-ignoring of undesired behaviours, praise contingent upon on-task behaviour, and scaffolding the child's requests for help. The adult responded within 5 minutes if the child used the yellow card (signalling anxiety onset); responding to emotional escalation preventatively.

Off-task behaviour decreased during first and second experimental phases. The child's on-task behaviour increased immediately following intervention implementation in language lessons. Baseline mean on-task behaviour was 32.83% and intervention mean was 74.44% (*SD* = 17.24 and 20.94 respectively). 89% of data points did not overlap between baseline and intervention phases which adds further confidence that the intervention resulted in some very different levels of on-task behaviour. Anecdotally, the child's anxious behaviours (such as rocking and tapping) were strongly reduced during the intervention, and he requested the intervention continue after the experiment.

The study's ABAB design adds to its reliability and guards against maturation effects, although it is possible the low on-task behaviour in the second baseline was affected by the intervention being known about but taken away, e.g. due to the child's potential frustration. Baseline on-task behaviour declined in both maths and language, before intervention, further adding to internal validity of the increase in the experimental phase. Inter-rater reliability was high which supports the construct validity of the observation schedule, and treatment integrity was monitored for some of the intervention, also adding to reliability of findings.

The intervention took place in a specialised setting for behaviour and emotional difficulties, limiting external validity for general classroom settings. The presence of a therapist for example, is not representative of many mainstream settings. The focus of the single case study is ideographic which adds interesting and informative detail but understanding of potential effects on other children is limited. The child had language difficulties and needs beyond ADHD; communication might need different scaffolding for other ADHD children.

A factor limiting the internal validity of the intervention is the use of extrinsic 'candy' reward for the child when he used the communication strategy five consecutive times. Whilst this was used as a reinforcer as part of the functional behaviour assessment, not central to the interaction and communication strategies, it potentially interfered with the child's intrinsic desire to engage with them, possibly confounding the on/off-task behaviour. The child might have been motivated to be on-task, by the reward.

Although some interesting interaction and communication components seem present in this intervention, the authors' conclusions mainly support the behavioural psychological understanding of planning behavioural strategies for children with ADHD and complex difficulties. The interaction and communication elements of the intervention are clear and links with findings appear reasonable, although experimentally it is not possible to establish how responsible for the increase in on-task behaviour these components would have been alone.

Behavioural psychology was central to the intervention, such as extinguishing undesired behaviours, and understanding their functions. These principles and techniques are beyond the scope of interaction and communication principles, yet difficult to separate from them in the study. However, the study emphasises the benefit of making communication easier for the child, and the teacher choosing carefully which behaviours they respond to and how they respond.

Vesely & Gryder (2009)

Vesely & Gryder (2009) tested the effects of a 'word of the day' strategy which required children to listen for and record a tally of target words, repeat definitions in their own words, and communicate their listening and detection of words non-verbally to the teacher. The intervention was focused mainly on helping the children's vocabulary recall, but implies impacting their attention and engagement, especially through the active listening strategies.

The study is reported in a brief section of the paper; the rest of which outlines some supporting literature and describing the intervention. The study greatly lacked detail on the outcome measures. The authors report students in a low-average group made average gains of 2 words per week, and students in average or high-average groups made average gains of 1.6. Although these seem like positive effects, it is very unclear exactly what this measured; whether this is recalling the words or understanding them for example.

The study also lacked sample details. Although children with ADHD and attention deficit disorders (ADD) were included, it was not reported how many children had these difficulties, other than 17 children having some form of disability. However, this was the only diversity mentioned other than giftedness and having limited English. Pre-test conditions are not clear, which makes it difficult to ascertain how the intervention differed from typical classroom practice.

The brief report of the study is encouraging in a preliminary way, without further detail on the outcomes, exact methodology, and sample. However, the intervention is

described in relatively good detail. It seems clear the active listening emphasis on key words and re-processing their meanings, and non-verbal feedback to the teacher, were useful. These could help engage children with attention difficulties in activities with a heavy demand on listening and processing language.

3.2.4 Critical Appraisal Summary

The reviewed studies show some specific, interesting communication and interaction strategies for engaging or influencing the attention of children with attention difficulties, and some of them show rigorous quantitative experimental and non-experimental data. Clear limitations include that most of the collective sample were male, with clinical diagnoses of ADHD, and the review findings are based on only five studies. Also, two studies indicated potentially falsely adverse baseline or pre-intervention conditions which could have artificially enhanced the positive effects on interventions.

The mainly 'medium' and 'high' evidence weighting for the studies in categories A, B and C encourages trust in the findings. The Ducharme & Harris (2005) study showed an overall 'high' evidence weighting which shows it is more trustworthy and relevant to the SLR research question. This fits with the high frequency of codes identified in the thematic analysis based on that particular study. The Vesely & Gryder (2009) study was 'low' in the evidence weighting. It had 'low' scoring for overall rigour (category A) and 'low' for centrality to the research question (category B). The findings were useful, although confidence in them relied on the wider literature supporting active processing (e.g. Mishra, 2015).

3.2.5 Initial Emerging Concepts: Indexing and Charting Codes

Codes were elicited from the SLR studies in relation to SLR research question ‘a’ and were made up of strategies and techniques that were perceived to be effective for engagement, and factors promoting engagement. Although the focus was on 'what is effective' and was strengths-based (due the focus being on potential for successful engagement, solutions and ‘what works’), it was necessary to code some ineffective factors or factors promoting disengagement, so the resulting framework can guard against them.

Although ‘engagement’ overall was central to eliciting codes, the Carpenter et al. (2015) Engagement Indicators were not specific to this. This was to avoid a risk of confirmation bias and ensure codes and themes found were representative of wider constructions of 'engagement'. Codes identified are set out in Table 3.3 below and discussed in the paragraphs following.

Table 3.3: Concept Codes

Studies	Codes (& Names)				
Wang, Bernas & Eberhard (2004)	(A1) Combining speech with gestures to supplement understanding of verbal information	(A2) Vivid representational gestures for making concrete information complete	(A3) Deictic gestures for attracting attention and providing directions	(A4) Beating gestures less effective	
Steiner, Sheldrick, Frenette, Rene & Perrin (2014)	(B1) Passive inattentive behaviours likely during adult whole-class instruction	(B2) Child looking at adult is unlikely during teacher whole-class instruction			
Ducharme & Harris (2005)	(C1) Partnership statements from adult to engage through rapport and cooperation	(C2) Adult empathy to child's task adversity, to regulate emotion	(C3) Responsiveness to child's emotional state	(C4) Co-operative learning as momentum for individual learning	(C5) Mediation before disengagement, to sustain on-task and ensure success

Studies	Codes (& Names)				
Stahr, Cushing, Lane & Fox (2006)	(D1) Preventative adult responses to child's disengaged behaviour - contingent on child's emotional escalation, to co-regulate.	(D2) Child having input into levels of teacher mediation, via non-verbal communication, to regulate emotion and attention	(D3) Pre-teaching child's verbal interaction with teacher, to aid communication	(D4) Pre-teaching child's requests for help, to aid communication	(D5) Adult planned-ignoring, to limit reward of adult reaction
Vesely & Gryder (2009)	(E1) Drawing attention to key words related to learning activity, to aid understanding.	(E2) Directing child's attention by instructing to listen for key words and to respond immediately	(E3) Instructing child to give non-verbal response during listening, and adult subsequent response, for active participation		

3.2.6 Emerging Concepts Between Studies: Grouping into Themes

Codes were grouped into initial themes by grouping codes that shared common features related to the research question, to name and define them (Robson & McCartan, 2016; Braun & Clarke, 2006). Although single codes can develop as a theme, none seemed isolated enough for this to happen. However, some themes include codes from just one study.

The process of grouping codes into themes was iterative. Codes were re-checked and redefined to ensure they accurately reflected the pertinent features of the SLR and primary study findings. Themes were redefined a number of times, moving from global understandings of 'what is effective', to more specific understandings of what is effective and what for. Resulting themes are outlined below in Table 3.4, with the codes they are comprised of.

Table 3.4: Themes and Comprising Codes

Theme Number	**Theme**	**Codes**
1	Effectiveness of non-verbal gestures that add or support meaning.	A1, A2, A3, A4
2	Eliciting attention through key task-related words and actions	A3, E1
3	Directing and sustaining attention through encouraging child's active listening and responding during listening	E1, E2, E3
4	Adult awareness of child's cognition and emotion, for co-regulating engagement at early stage	D1, C2, C3, C5
5	Child encouraged to actively share their engagement and help direct the communication with the adult	E3, D2, D3, D4
6	Adult mediation and collaboration to co-regulate and sustain successful engagement momentum	E3, D1, D2, C1, C4, C5

7	Adult's preventative responses to child's disengaged behaviour - contingent on child's activity and emotional state	D1, D5, C3
8	Scaffolding child's communication and interaction for better effectiveness	C3, D3, D4
9	Use of language to purposefully frame the learning activity a particular way	E1, C1
10	Passive or distracted behaviour likely during whole-class instruction	B1, B2

3.2.7 Research Questions

Resulting from SLR themes, and narrative literature review evidence, there appear to be a range of accessible interaction and communication approaches and principles which could be used by teaching staff to effectively engage children with attention difficulties in academic learning. The current research aims to provide answers to the three research questions in table 3.5 below:

Table 3.5: Research Questions & Hypotheses

Research Question	**Hypotheses**
A) Does teacher-report of child academic learning engagement frequency and impact in class increase when an action plan is implemented by the teacher, resulting from the Interaction and Communication for Engagement (ICE) framework?	Teachers will rate children's learning engagement as more frequent when consistently implementing the strategies in the action plan which results from the Interaction and Communication for Engagement Framework. Teachers will rate children's learning engagement as having a more positive impact on learning output when consistently implementing the strategies in the action plan which results from the Interaction and Communication for Engagement (ICE) Framework.

B) Does child self-reported academic learning engagement in class increase when an action plan is implemented by the teacher, resulting from the ICE framework?	Children will rate their own learning engagement more highly when teachers consistently implement the strategies in the action plan which results from the ICE Framework.
C) How practical, useful and effective do teachers report finding the action plan resulting from the ICE framework, if at all?	Teachers will report the practicality, utility, and effectiveness of the strategies in the action plan, resulting from the ICE framework.

As discussed, the themes from the SLR will be triangulated with the broad themes from the wider literature to synthesise an Interaction and Communication for Engagement (ICE) framework. This process is outlined in the Methodology section, to contribute to defining and describing the intervention.

Chapter 4: Methodology

In this chapter, the philosophical underpinnings of the research are discussed, followed by an overview of Single Case Experimental Designs (SCEDs), and this study's design. This includes measures, recruitment, general procedure, and the development of the 'Interaction and Communication for Engagement (ICE) Framework' (following on from the framework synthesis in the systematic literature review). Intervention implementation procedures are explained for each case. Lastly, key reliability and validity considerations are outlined, with ethical considerations and researcher reflexivity.

4.1 Philosophical Assumptions

Methodological choices should clearly link to philosophical paradigms (ways of viewing the world) for rigour and credibility in research (Mertens, 2005). Treatment of 'knowledge' must be underpinned by clear assumptions and parameters, for research to rest on rigorous theoretical, ontological and epistemological foundations.

4.1.1 Ontology

Historically, positivism held that one truth exists, defined by research through direct observation in a value-free, objective way (Robson & McCartan, 2016). Moving on from this came the post-positivist view that reality can be measured imprecisely; within variations of probable theories and human limitations, and the researcher can strongly influence findings and interpretations (Mertens, 2005).

4.1.1.1 Post-Positivism

This research is situated within a post-positivist paradigm that there is an overall objective testable nature to reality, yet it can be constructed or interpreted in multiple ways. Existing literature and theory are seen as part of a shared reality; well-established theory is accepted, with appreciation that phenomena can be explained by multiple theories and understood within various paradigms (Cook & Campbell, 1979). It is assumed findings and emergent concepts in the ICE Framework, that are most salient with each other and with established theory, can be synthesised to build an overall theoretical framework of what is effective. It is assumed the emergent concepts in the ICE Framework are shared by the population to varying degrees.

4.1.2 Epistemology

Epistemology is concerned with the nature of knowledge; the relationship between the researcher or 'knower' and knowledge itself (Lincoln & Guba, 2000). The way the knowledge is sought and underpinning assumptions are key to defining research paradigms.

4.1.2.1 Pragmatism

This research takes a pragmatist stance; a focus on 'what works' by gaining key strengths-based findings from literature, without overt concern for debating the nature of truth (e.g. Teddlie & Tashakkori, 2003). The primary interest is what engages children who show attention difficulties in class, rather than clinical understandings of 'attention' or attempting to isolate attention processes from the ecological environments and connected processes which mediate them.

Research methods are chosen in this research within a pragmatist paradigm; what is practically useful establishes what is held to be true (Mertens, 2005). With acknowledgement of the methodological limitations in mind, teacher respondents' beliefs and impressions are given high value because they are viewed as central to determining what is useful. Qualitative teacher responses are also gained for a constructivist understanding (Mertens, 2005) of how teachers and parents feel about and attribute any effects, also for pragmatic purposes.

From a pragmatist perspective, 'engagement' is treated as an observable dependent variable; a direct product of a range of cognitive, attention-based processes, and the environment. The Carpenter et al. (2015) engagement indicators focus on what is seen behaviourally in the classroom, not what might be measured using clinical tests or highly theoretical parameters.

4.1.2.2 Ideographic Focus with Constructionist Appreciation

In the literature review, the exploration of 'what is effective' carried an assumption that findings have an objective truth for the population, in context of individual experiences.

The experimental nature of the research seeks to find out how an overall understanding of reality from the development of the ICE framework, can be applied dynamically and responsively to individual experiences; to help solve an ideographic set of problems, and assess effectiveness.

The dynamic, collaborative application of the ICE Framework takes the position that there are individual variations in how the overall shared reality is constructed or experienced by individual people. Clinical diagnoses such as ADHD are viewed as one way of conceptualising the individual's difficulties.

The single-case experiments are ideographic exploration of individual experiences; single case experimental designs do not assume shared objectivity (Plavnick & Ferreri, 2013). However, the experiments assume objectivity to the variables; the quantitative experimental data assumes engagement progress can be measured somewhat objectively in the same way across cases.

The use of multiple case studies aims to approach an understanding of how the framework might help a variety of children with attention difficulties; to understand practical utility for a range of needs and situations, beyond one particular child.

4.2 Alternative Methodology

Alternative designs and data collection methods are outlined below in Table 4.1, which were not employed due to infeasibility or lower confidence in their suitability for the current research questions.

Table 4.1: Alternative Methodologies and Rationales for Not Employing

Alternative Methodology and Potential Benefits	**Rationale for Not Employing**
Qualitative diary or log; in-depth via a structured set of questions or prompts about the intervention use (IV) and the child's engagement (DV).	Low objectivity, high level of responsibility and time-consuming for staff. Danger of misreporting. (Robson & McCartan, 2016)
Qualitative data would allow rich and in-depth constructivist understanding.	Constructivist epistemology, not pragmatist.

Researcher observational rating data using Carpenter's (2015) engagement indicators to measure engaged behaviours (DV) in relation to the implementation of strategies in the intervention (IV). Observational data collected by the researcher may carry less risk of missing or inconsistent data, due to less demand on school staff and more researcher control. Direct observation in the natural environment could be more internally valid, although subject to potential ambiguity in interpretation.	Considered infeasible due to the likely distances between participating schools, therefore too time-consuming for the researcher to fit in frequent and regular observations for good reliability and validity.
Multiple baseline design (Robson & McCartan, 2016) whereby engagement (DV) could be measured in a range of learning activities (e.g. phonics practice, creative writing, and whole-class input). A baseline would be established for each, and intervention (IV) applied at different points across the activities, to measure specific impacts on each. This approach could lead to a more specific understanding of any effects.	Specific activities may change with the curriculum or class routine as term progresses, making rating engagement in relation to specific activities more subject to missing or incomplete data.
Action Research allowing intervention beneficiaries to pose and answer their own questions, in an iterative and	Testing potential effects of a specific intervention approach (rather than one moulded by the school staff themselves for specific benefits to their specific

systematic reviewing process (Gulliford, 2015).	setting) could carry further external validity. Whilst pragmatic, like this research, an experimental approach is felt to carry more rigour.

4.3 Single Case Experimental Designs

Single case experiments came about in behavioural psychology through need for an experimental but individually focused method for establishing whether intervention effects are present (Robson & McCartan, 2016). Using Single Case Experimental Designs (SCEDs), the participant becomes their own control, using a pre-intervention (baseline) phase to compare with an experimental (intervention) phase. SCEDs focus on individual cases in real-world ecological settings but are distinct from non-experimental 'case studies.'

Agreed standards for single case designs remain unestablished (Kratochwill, et al., 2013), although Horner et al. (2005) clearly set out their defining features and role. They outline that SCEDs offer an experimental, detailed systematic analysis of intervention effects closely focused on single participants, to attempt to establish causal relationships between deliberately manipulated independent variables, and dependent variables. Horner et al. (2005) highlight SCED methodology guards against many threats to internal validity.

SCEDs aim to provide a rigorous evidence base for effects of interventions on atypical populations; where specific cases with a highly individualised conceptualisation are not possible to assess as a heterogenous group, therefore offering individually focused, controlled assessment and understanding of intervention effects (Gulliford, 2015). The likely complexity of related but unique combinations of difficulties means children's profiles of attention difficulties are likely to be highly individual. A SCED approach allows the effects of a personalised intervention on individual children with individual needs, to be understood ideographically.

SCED research can take a variety of designs, from simple A-B phase comparisons, to staged multiple baseline designs measuring effects on different behaviours or people at different stages in time (Kadzdin, 1982). A-B comparison findings could have a high risk of falsely accepting the hypothesis (type 1 error), as effects may still be explained by factors external to the deliberately manipulated variables. Kazdin (1982) outlines benefits of ABAB designs, which stop or reverse intervention effects and re-implement them, for greater confidence in any effects being explained by the intervention. Kazdin also acknowledges ethical concern around deliberately stopping or reversing desired intervention effects, and the likely difficulty reversing them. For example, positive intervention effects transferring to or influencing other variables which then do not stop even when the intervention does.

4.4 This Study's Overall Design

SCEDs should study naturalistic real-world interventions, carrying high social validity (Ganz & Ayres, 2018). This research has a 'real world' concern of current applications of knowledge in real settings (Robson & McCartan, 2016); namely schools' needs and interests in engaging children with attention difficulties in classroom learning. The intervention in this research aims to be practical and replicable. SCEDs' ecological focus help findings and implications closely match the practical settings in which they occurred. The current research takes place in the exact settings any effects are intended to benefit.

'The intervention' in this research is an action plan of tailored interaction and communication strategies, for the teacher to apply in class, aiming to improve the child's engagement, resulting from the ICE Framework applied in observation and consultation. The effects of the intervention on teacher reports of children's engagement and on children's self-reports, are measured quantitatively in SCEDs, and teacher views are measured qualitatively in brief post-intervention semi-structured interviews.

It was anticipated that for teachers to simply stop or retract the intervention would be difficult, unnatural and unethical. Interaction and communication-based strategies will have strong interpersonal qualities and simply changing or stopping using them could be confusing for children, and difficult to achieve. Due to these considerations, a simple 'A-B' design was used; baseline phase (A) was compared to experimental phase (B).

The SCEDs attempted to measure the effect of the independent variable (the intervention), on the dependent variable (teacher reports of children's engagement and children's self-reports).

4.4.1 Participant Recruitment

Ten primary-aged children with attention difficulties were recruited from schools within the Local Authority where the researcher-practitioner was placed as a TEP.

The recruitment criteria for children to participate were as follows:

- Children struggling to sustain, shift or regulate their attention, reported by home and school, and across activities (in line with the CAP dynamic view of attention; Deutsch & Mohammed, 2010), or;
- Children showing either impulsive and hyperactive behaviours, or inattentive behaviours (in line with the DSM-IV ADHD criteria; APA, 2013).
- Children with or without formal ADHD diagnosis were accepted.
- Children currently attending mainstream primary school.

Although the intervention has a solution-focused approach, the deficit focus in initial screening was required to establish objectively whether the child shows 'attention difficulties'; a deficit-focused concept. Overall screening procedures are explained below, and individual screening results for each case are briefly described in the case summaries section.

As well as children, participating teachers were also active participants as they were key to intervention implementation and dependent variable data (teacher views). The recruitment criteria for teachers was that they had to be directly teaching or working with the child on a routine basis for the focus lesson, on a whole-class or individual level. They did not have to be qualified teachers; it was anticipated some children with difficulties often receive input from support staff.

Schools were known to the researcher's host Educational Psychology Service (EPS). Ten children were originally identified as potential participants via 'school planning meetings' or informal discussions between the researcher and Special Educational Needs and Disabilities Co-ordinators (SENDCos) in the researcher's or researcher's practice supervisor's link schools. In these discussions the researcher either knew of a child from existing involvement and suggested they may be a suitable participant or spoke about her research and the SENDCo thought of a potentially suitable child or children. Following these discussions, the SENDCo spoke to the parent(s) to establish interest.

Parents and teachers who were interested in participating were provided with initial information letters (see appendix 4). Then a brief 'screening' semi-structured interview was conducted with interested parents or carers, to assess suitability (see appendix 5 for questions and considerations guiding this). Screening questions aimed to identify the child's presentation of attention difficulties using the above 'selection criteria', and key ecological information. SENDCo staff or teachers also had to report the difficulties in the 'selection criteria' at school.

Neither gender or sex were specified in recruitment. All recruited participants happened to be male. The researcher was keen to recruit females also, however without actively seeking these cases out, this was not feasible. For ethical reasons and social validity, recruitment needed to be natural; representing typical children with attention difficulties, receiving EPS involvement.

4.4.2 Measures

The dependent variable was the teachers' and children's own views about the children's 'engagement'. Attention is acknowledged as a set of complex interlinking cognitive processes, not necessarily directly observable. Attempting to measure attention was felt to be removed from classroom learning behaviours, therefore less relevant. Despite the overlap in the literature on 'engagement', the practical and generally observable nature of Carpenter et al.'s (2015) 7 engagement indicators is favoured for the purposes of this research.

SCED variables must associate closely to those in the settings the findings are applied to (Horner et al, 2005). The Carpenter et al. (2015) engagement indicators are viewed as practical and ecologically relevant, therefore used as a basis for the SCED measures. Engagement is viewed as a practical effect of attention.

Despite the above, not all attention may result in learning engagement (good attention might be present but unrelated to classroom learning). The measures here only attempt to measure learning engagement, with the assumption that children with attention difficulties would inherently struggle to sustain and regulate engagement with effortful academic learning tasks.

Engagement was measured in the study using the following approaches, set out by the research questions:

Research question A:

"Does teacher-report of child academic learning engagement in class increase when an action plan is implemented by the teacher, resulting from the Interaction and Communication for Engagement (ICE) framework?"

- Teacher-rated scales of child's engagement 'frequency' (SCED measure; see appendix 6)

- Teacher-rated scales of child's engagement 'impact' (SCED measure; see appendix 6)

(Teacher-rated frequency and impact are subsumed under research question A because they are each viewed as interdependent but separately focused measures of the teacher's report of the child's overall engagement).

Research question B:

"Does child self-reported academic learning engagement in class increase when an action plan is implemented by the teacher, resulting from the ICE framework?"

- Child's own rating scales of the level of engagement they personally felt (SCED measure; see appendix 7).

Research question C:

"How practical, useful and effective do teachers report finding the action plan resulting from the ICE framework, if at all?"

- A post-SCED measure was an informal semi-structured interview with the teacher at a review (see appendix 8 for questions). 'Follow-up' and 'post intervention' are avoided; in reality, teachers were still applying and refining the intervention strategies.

4.4.3 Teacher-Rated Engagement Scales

The scales aimed to measure teachers' views of the dependent variable 'engagement' as systematically as possible. Rating 'engagement' as a concept can be ambiguous and subjective, although some objectivity is assumed with structure.

Teacher-ratings aimed for data to reflect key stakeholder perceptions. Teacher views are assumed to be accurate and important reflections of children's engagement.

Rating scales aimed to be accessible, to help ratings be undertaken reliably. Whilst teacher-ratings may be biased towards teachers' own expectations or hopes, steps were taken to mitigate these effects, outlined in the procedure section below.

The Carpenter et al. (2015) engagement model includes descriptors for each indicator and a rating scale. The rating scale was adapted for the rating measures in this research: 'Engagement' was split into two 'frequency' and 'impact' scales for a fuller practical understanding of the effects of 'engagement' on learning. Also the number of rating options was changed from 5 to 4; Robson & McCartan (2011) outlines the need for an equal number of 'positive' and 'negative' items within the scales, although the descriptors used are not overtly positive or negative. Robson & McCartan (2011) also highlights the need for scale statements to be consistent along one dimension. E.g. for frequency, the statements were re-phrased as to what extent engagement 'occurred'.

The teacher-rating measures were developed as a summated scale or 'Likert' structure (Robson & McCartan, 2016) in which participants rated the following:

- Teachers: A) Frequency of each engagement indicator; the sum of which was used to reach an overall engagement score. The scale consisted of (0-3) 0 = did not occur, 1 = occurred seldomly, 2 = occurred often, 3 = almost constantly occurred. If they did not apply, 'N/A' was used.

- Teachers: B) Impact on learning of each engaged indicator; the sum of which was used to reach an overall engagement score. The scale consisted of (0-3) 0 = no impact (also for engaged indicators that did not occur), 1 = low, 2 = medium, 3 = high. If the indicators had not occurred (as indicated by N/A in frequency), N/A was used here also[3].

[3] No participants used 'N/A' therefore the total possible scores for each participant's engagement frequency and engagement impact were both always 21 (a maximum of 3 for each of the 7 engagement indicators).

The end engagement frequency and impact 'scores' for each rated lesson were the sums of the seven individual engagement indicator ratings (separate for frequency and impact). They were grouped in this way because the focus was on establishing overall 'engagement' scores each for frequency and impact. All engagement behaviours are assumed to be present in most learning to a lesser or greater extent, mutually compensatory, and positively correlated.

For engagement frequency, it is assumed teacher perception of its occurrence can be quantified using the amount and extent of combined behavioural indicators they felt the child showed. For engagement impact, teacher perception of the impact of engagement on the child's immediate learning is assumed to be quantifiable based on on-task contributions, work output, and further engaged behaviours.

Impact and frequency are assumed to be different from one another, with some overlap; not mutually exclusive. They were viewed as independent but naturally related measures. Engagement indicators could potentially be infrequently occurring but highly impactful or effective, or frequently occurring with little or no impact or effect. For example, a child may show infrequent curiosity but one highly pertinent question which focuses their understanding. Conversely, a child could show frequent curiosity with low impact on learning due to curiosity being disorganised and unfocused.

The measures were intended to be trialled with the first two participants as a pilot (Alistair and Bailey; all names are pseudonyms to protect participants' identities). Due to Alistair's teacher taking early maternity leave, there was no measurement data provided for Alistair; only Bailey.

Internal consistency was calculated with Bailey's baseline and experimental data to assess reliability within both teacher-rating measures, by establishing correlation between the individual engagement indicator ratings, using Cronbach's alpha (α). This yielded values of .97 for frequency, and .95 for impact at baseline, and .92 for frequency and .89 for impact at intervention. Acceptable reliability is .7 or greater (Loewenthal, 2001), supporting the measures' strong internal consistency. This

indicates strong salience amongst the individual items making up the overall engagement scores for impact and frequency, supporting that the measures reliably measure 'engagement' as it is constructed here.

Inter-rater reliability was not calculated as the teacher-ratings were overtly within-participant, ideographic and not necessarily designed to be comparable to or consistent with other raters' ratings.

Teachers were asked to complete ratings straight after lesson, for fresh recall, therefore better reliability.

4.4.4 Child Self-Rated Scale

A simple visual analogue scale was used to gather children's views on how engaged they felt overall, undertaken by the child with the teacher's help, in the same lesson the teacher rated. Visual analogue scales are ideal for measuring constructs (McQueen & Knussen, 2006). The simplicity was attractive because children's understanding of 'engagement' is anticipated to widely vary.

On one end of a horizontal line was a happy face and on the other was a sad face. Words were avoided to enhance accessibility. The visual analogue was split up into ten sections to allow a mark along the line to be turned into a score out of ten.

Teachers were asked to pre-teach how to use the scale, and what 'engagement' is. On the scaling sheet was a brief and basic definition based on the engagement indicators. Teachers were asked to present the rating scale to the child at the end of each rated lesson to obtain their score.

During Bailey's pilot, the teacher reported the child self-rating measures to be feasible and manageable, however Bailey struggled to understand 'engagement' as distinct from 'enjoyment' or 'being good', so pictures were added to the rating sheets for each of the seven engagement indicators, to supplement the teacher's explanation of

'engagement'. Other changes resulting from the pilot are related to the intervention implementation and explained in the 'piloting the intervention' section.

4.4.5 Semi-Structured Interviews Post-SCED

Interviews are useful in multi-methods approaches for triangulating quantitative findings with qualitative views and impressions (Robson & McCartan, 2016). Teachers' views were deemed an important non-experimental understanding of what they thought about the intervention strategies' effectiveness, practicality and usefulness.

Semi-structured informal interviews took place with non-pilot teachers, using 6 main questions to help guide discussions. Bailey's teacher (pilot case) was not asked to take part in an interview because the interview questions and focus were not developed at this point.

The interview took place at a review between 2 weeks and 1 month following intervention onset. The interview questions were phrased neutrally, aiming to establish limitations and guard against findings being deterministic, helping ensure data extracts were not influenced by the affirmative nature of the research question (e.g. what 'is' effective rather than what 'is not').

The researcher aimed to take a neutral approach in data collection and analysis, placing no particular emphasis on positive or negative responses, yet aimed to be sensitive to detecting negative responses. Social desirability effects were anticipated to make negative feedback or critiquing points less overt, possibly over-representing positive feedback.

Interview questions aimed to capture a genuine reflection of what was important to teachers about the intervention and the children's engagement, and avoided reference to the ICE Framework, its themes, or its elements, so that any discussion about these would be organic and respondent led. Interviews took place before teachers were informed about the experimental data findings, so as not to bias their views either way.

Recording interviews would have captured detail and nuance in discussion, however this can be intrusive in informal discussions (Robson & McCartan, 2016); the purpose was to gather the teachers' main views as naturally as possible. Information most relevant to research question C was assumed to be useful and valid without in-depth analysis of the discourse for example.

Data deemed pertinent to answering research question C was noted using the teachers' actual phrases and sentences, typed directly under the question headings, where applicable. The researcher decided what was important to record based simply on whether it was deemed to help answer at least one of the questions in the semi-structured interview or research question C overall. Where teacher and researcher discussion led to a new joint understanding, the researcher clarified with the teacher their final meaning before typing.

4.5 Procedure

Data collection for participants in the main study took place between the September 2019 and January 2020 (pilots took place in summer term of 2019). No data was collected in the first two weeks of September, to avoid potentially confounding effects of children and teachers familiarising themselves with each other and new environments at the start of the academic year. This was deemed a realistic amount of time without delaying data collection.

Table 4.2 below outlines the main stages of the A-B SCED design procedure, which is detailed in the paragraphs following.

Table 4.2: SCED Design Procedure Stages

Stage	Event	Summary
1	Devising the Intervention	Synthesising the ICE Framework from literature by triangulating themes from both the systematic and narrative literature reviews.
2	Setup and Baseline (A) Phase	Initial meeting with teacher to train them how to implement teacher and child rating measures. Baseline ratings begin.
3	Intervention Implementation	Research-practitioner's assessment: Observation and Consultation, then writing and providing an action plan of bespoke strategies.
4	Experimental (B) Phase	Intervention strategies begin to be implemented and ratings continue.

4.5.1 Setup and Baseline Phase

As per stage 2 in Table 4.2, an initial 15-minute meeting took place with the teacher, for the researcher to explain the research and measures, and setup baseline measures. It was explained that the research aims to look into feasibility and effectiveness of an interaction and communication framework for engaging children showing attention difficulties.

The researcher explained the rating procedure and purpose, that child and teacher ratings need to take place directly following the lesson, to capture real-time engagement in relation to the lesson. Teachers were asked to rate the child's engagement ideographically; without comparison to general age-related expectations or peers, in relation to what current engagement expectations are and would be for that child, without intervention. The aim was for teachers to capture the child's engagement pattern in context of the child themselves.

The teacher was asked to explain to the child that some new teaching strategies might be used to help them learn, but not to give specific details unnecessarily. The lack of intervention detail at this stage aimed to limit expectation effects, helping ensure a valid baseline.

A core curriculum lesson was agreed between researcher and teacher; a routine lesson for the ratings to take place in. This was either English or Maths. The teachers were asked to rate the child's engagement in that lesson between 3-5 times a week (no more than once a day) for at least two weeks.

The researcher collected baseline data from the school before the start of intervention phase to help mitigate possible teacher expectation effects (e.g. by comparing emerging experimental data with baseline).

4.5.2 Intervention Implementation Structure

The intervention is comprised of three parts: observation, consultation and finally an action plan of strategies. Each part was underpinned by the ICE framework. The ICE framework was developed from the literature (stage 1 in Table 4.2 above; see sections below for detail), then after baseline, it was implemented by the researcher ('researcher-practitioner') in each case, via observation and consultation (stage 3 in Table 4.2). This formed an action plan of evidence-based, personalised strategies, intended for use in the teacher's everyday interactions with the child at whole-class and individual level.

The researcher-practitioner's understandings from observation and consultation were matched with combinations of the ICE framework elements, then turned into a series of specific strategies, by the researcher-practitioner. The specific strategies were described in an 'ICE Action Plan' (example in appendix 9) and sent to the teacher and SENDCo for use with the child in class, and for sharing with the parent(s).

The intervention is set out in more detail in the sections following; firstly, the roles of observation and consultation, then ICE framework development, followed by the

details of two pilot participants' interventions and a brief outline of resulting small process changes. The practical implementation is then set out for each case in the main study. Lastly, construct validity, overall validity and reliability, ethical considerations, and researcher reflexivity are each outlined, leading to the Results chapter.

4.5.3 Experimental Phase

Teachers were asked to apply the strategies for a handful of days to establish some familiarity before commencing intervention ratings. It was left to the teacher to decide specific timescales, so as not to impose pressure. As per stage 4 in Table 4.2, teachers were asked to record the same engagement measures just as they had in the baseline phase, for at least two weeks.

4.5.3.1 The Role of Observation

For the first part of intervention set-up, the Carpenter et al. (2015) engagement indicators and ICE framework formed an observation schedule (see appendix 10), leading to situation-based 'what works' and 'what is needed' insights. The child was observed for forty-five minutes in their focus lesson. Following observation, the researcher-practitioner took around fifteen minutes to identify which ICE elements initially applied to which observations, grouping observations into themes.

4.5.3.2 The Role of Consultation

Following observation, consultation took place with the research-practitioner, parent and teacher (see appendix 10 for the structure used). This aimed to help develop a contextual, triangulated understanding of 'what works' on a wider level, from parent and teacher perspectives, beyond the observation in-class.

Consultation can remain 'collaborative' when consultant expertise fits alongside consultee expertise of the situation, and is consultee-sought (Gutkin, 1999). Collaborative consultation can lead to successful interventions for children with ADHD (DuPaul et al. 2006). Collaborative approaches are especially important for addressing

attention difficulties consistently in class and can be successful when teachers lead the identification of the problem at the start of consultation (DuPaul et al. 2011).

During the consultation the researcher-practitioner explained the intervention approach to the teacher and parent, then sought their initial thoughts about the child's needs. She outlined the themes from her observations and situated them with the consultees' experiences. The teachers' and parents' existing interpersonal relationship with and knowledge of the child were viewed as central to the intervention setup, rather than an advice-giving model. Researcher-practitioner interpersonal skills were viewed as just as important as domain-specific knowledge (West & Idol, 1987), such as use of carefully phrased open questions to refine a specific understanding of what behaviours look like and how the parents and teachers attributed them.

4.5.3.3 Synthesising the ICE Framework

As per stage 1 in Table 4.2, the intervention was devised before setting up baselines. The ten 'systematic themes' from the systematic literature review were viewed as central to the framework, although limited by the small number of studies which came up in the SLR searches, and some systematic themes are based on codes from only one study. The SLR research question 'a' and the inclusion criteria were deliberately focused on what interaction and communication techniques and strategies are found to work in classroom settings with teachers, to remain pragmatically focused. It was felt to be more theoretically sound to supplement the systematic themes found, with the rich theory and research found in the wider literature (grouped into broad themes). This triangulation between valuable sources aims to enhance theoretical rigour and validity, and to enable comprehensiveness and coherence. This led to development of a greater number of more specific 'redefined themes'. The question guiding this process is below. It formulated the framework, rather than being a typical research question:

What apparently effective principles and approaches will result from a combination of the salient concepts from the thematic analysis in the SLR and the existing narrative literature which supports them?

The original codes making up the systematic themes were each triangulated with the literature of the broad theme(s). The systematic themes were treated as central, and the literature from the broad themes, supplementary. Some systematic themes matched with more than one broad theme or matched with one broad theme in more than one way. In these cases, combinations of systematic themes and broad themes seemed to suggest more than one isolated principle or technique. This process delineated most systematic themes further into 'redefined themes'; outlined below in Table 4.3.

An example of how the literature from the broad themes in the narrative literature review were used to supplement the systematic themes is described as follows, for systematic theme 2 ('eliciting attention through key task-related words and actions'): This theme was reflected in the literature from the perspectives of both non-verbal influence (e.g. Hayward & Lidz, 2007) and influential language (e.g. Churches & West-Burnham, 2008; and Cooper et al., 2014) which therefore led to the development of 2 redefined themes, from this initial systematic theme.

Table 4.3: Redefining Themes Through Triangulation

1. Systematic Theme Number (refer to Table 3.4 for systematic theme names)	**2. Related Broad Themes**	**3. Quantity of Redefined Themes (and resulting element names)**
1	*Non-Verbal Influence*	1 ('supplementary gestures')
2	*Non-Verbal Influence* *Influential Language*	1 ('directing gestures') 1 ('key words')
3	*Reciprocity*	2

		(‘eliciting active learning’) (‘active choices’)
4	*Receptiveness*	1 (‘cognition and emotion awareness’)
5	*Reciprocity*	1 (‘pre-taught help-seeking’)
6	*Reciprocity*	2 (‘scaffolded contributions’) (‘re-processing Instructions’)
7	*Receptiveness* *Influential Language* *Rapport*	1 (‘task-related empathy’) 1 (‘reframing’) 2 (‘emotionally matched response’) (‘child’s worldview’)
8	*Receptiveness* *Reciprocity*	1 (‘pursuing desired behaviour’) 1 (‘embedded mediation’)
9	*Influential Language* *Rapport*	2 (‘affirmative instructions’) (visualisations and imagery’) 1 (‘positive regard’)
10	*Non-Verbal Influence*	1 (‘gaze aversion’)

The 19 redefined themes were named ICE framework ‘elements’ (named in table 4.3 above). The related broad themes were named ‘overarching principles’ as these originate in the wider theory and literature more generally. The elements were

assigned a number and shorthand descriptive name which encompasses the central principle and technique. The elements were organised into groups under the overarching principles. The final framework is outlined below in Table 4.4 (see example ICE action plan in appendix 9 for a graphic representation of the ICE Framework).

Table 4.4: Tabulated Interaction and Communication for Engagement (ICE) Framework

Element Name	***Expanded Definition***	***Overarching Principles***
1. *'Embedded Mediation'*	Successful learning with adult mediation which links to individual learning. Adult mediation returning before child disengages.	Reciprocity
2. *'Eliciting Active Learning'*	Adult asking questions at cognitive and motivational level of child, and eliciting regular feedback/contribution during learning, especially during listening or whole-class instruction.	Reciprocity
3. *'Active Choices'*	Adult eliciting child's active choices in how they go about or understand tasks, to promote independence and goal-focus through reciprocal discussions and decisions.	Reciprocity
4. *'Scaffolded Contributions'*	Scaffolding explicitly contained ways to actively share and contribute task-related and/or meta-cognitive information.	Reciprocity
5. *'Re-Processing Instructions'*	Child repeating instructions back to adult.	Reciprocity
6. *'Pre-Taught Help-Seeking'*	Strategies pre-agreed with child for giving feedback about their understanding or asking for help, with immediate teacher response.	Reciprocity

7. *'Pursuing Desired Behaviour'*	Early preventative detection and planned ignoring of low-level disengaged behaviour, whilst pursuing desired engagement as soon as it emerges.	Receptiveness
8. *'Cognition and Emotion Awareness'*	Adult building an immediate dynamic awareness of child's cognition, motivation and emotion, for allowing co-regulation of engagement.	Receptiveness
9. *'Task-Related Empathy'*	Building shared awareness of what child might be feeling, and need to communicate, in relation to their engagement in the activity.	Receptiveness
10. *'Key Words'*	Use of key words that the child has been directed to listen for.	Influential Language
11. *'Affirmative Instructions'*	Affirmative rules and instructions before wrongdoing/escalation.	Influential Language
12. *'Reframing'*	Using language key to child's experience, to re-frame activities in desired positive ways.	Influential Language
13. *'Visualisations and Imagery'*	Sensory-rich visualisations and imagery to draw attention to aspects of the activity. Can include emotionally rich visualisations and qualities in speech to match.	Influential Language
14. *'Gaze Aversion'*	Awareness of adult's presence in visual field, or gaze, having an engaging or distracting impact.	Non-Verbal Influence
15. *'Directing Gestures'*	Indicative gestures to directing attention to objects and necessary actions	Non-Verbal Influence

16. 'Supplementary Gestures'	Indicative or representational gestures to make adult instruction meanings more complete.	Non-Verbal Influence
17. 'Positive Regard'	Adult responses to child's disengaged behaviour, characterised by unconditional positive regard	Rapport
18. 'Child's Worldview'	Awareness of child's worldview and current attention. Using this to influence or link to desired engaged behaviour.	Rapport
19. 'Emotionally Matched Response'	Immediate, personalised adult responses to child's behaviour, contingent on child's emotional state, and initially mirroring/pacing child.	Rapport

The overarching principles ‘Rapport’, ‘Reciprocity’ and ‘Receptiveness’ are considered relational, interpersonal principles, and ‘Non-verbal’ influence and ‘Influential Language’, adult delivery principles.

As expected with subjective, qualitative phenomena, the overarching principles and elements do not claim to be exhaustive or mutually exclusive. The elements are arranged in the visual framework under each of the broad themes, in a continuum wheel format; each element aims to relate most to the ones next to it. This is subjective and simply for observation ease and consultation flow.

The elements in the framework do not aim to be standalone advice or 'tips.' They aim to be specific evidence-based principles to apply dynamically, informing and underpinning personalised strategies in context of the child, teacher, and child’s learning, through observation and consultation.

4.5.3.4 Intervention Construct Validity

The intervention was a three-part intervention. The intervention content itself was the action plan strategies put into practice by the class teacher, resulting from the process parts of the intervention; the researcher-practitioner’s use of the ICE Framework in observation and consultation. This carries complexity and detail, mitigated by ensuring the ICE Framework is a core part of each process and clearly underpins all strategies in each action plan.

An observation-based understanding of implementation or fidelity of the action plan strategies was not undertaken. The aim was to understand the possible teacher view of what the effectiveness might have been, however they realistically applied the strategies, from a pragmatic practice-based evidence point of view. Also due to the physical spread of the schools across the county it was not practical to observe each teacher’s use of the action plan strategies for each child. ‘Feasibility’ Information was gathered from the teachers during the implementation phase to aim to understand how

many strategies might have been applied and how often, to give an overall insight into the likely implementation fidelity.

Frequency charts are outlined for each individual case's action plan. All ICE Framework elements were used overall, and elements from all five broad themes were used in each action plan, except Simon's which did not contain 'rapport' elements. All action plans contained strategies underpinned by over half of the ICE Framework elements. Five contained strategies underpinned by over two-thirds.

Fidelity checks enhance internal validity (Horner et al., 2005), however this was infeasible due to time constraints. However, teachers were asked to rate their progress and use of strategies during the intervention phase, identifying strategies used and not used, to further understand how the intervention was being implemented. The findings showed the intervention fidelity may have been moderate in general, varying between cases. This information is reported in more detail in Chapters 5 and 6 (Results and Discussion).

4.5.4 Piloting the Intervention

The intervention was applied with the first two participants (Alistair and Bailey) as a pilot to address unexpected challenges; presented here for both participants. As SCED measures were not piloted with Alistair, feedback was received about the intervention strategies from Alistair's maternity cover teacher Mrs Brand at a review.

Bailey's intervention was piloted with the SCED measures. His case details and experimental results are presented with the other cases (labelled as a pilot) because the intervention changes resulting from the pilot were considered minor.

4.5.4.1 Intervention Pilot Findings

Feedback comments were not sought from Bailey's teacher at review due to time constraints although over email she said the action plan provided some encouraging starting points for how to plan ways to engage Bailey in class. However, she was not sure how much time she would get to implement the strategies before the end of term.

Feedback comments from Alistair's maternity cover teacher at review were positive overall. She particularly liked the use of pacing and matching to validate Alistair's feelings about the task (such as 'ah, you're feeling frustrated about not knowing how to do that one?', then reframing this as an impermanent state, by adding 'yet'). She also liked the use of key language to frame tasks as collaborative (such as adding 'we' and 'together').

Brief feedback from Alistair's maternity cover teacher and Bailey's teacher indicated the ICE Framework was interesting and useful in observation and consultation. The researcher felt no changes to the ICE Framework were necessary from pilot implementation. Pilot findings are outlined below with some small changes made to the consultation and observation processes, action plan structure, and action plan strategy wording:

- Observations led to a range of specific ideas which were challenging to share in a concise, coherent way in consultation. A section was added on the observation schedule for summing up the main themes found in observation.
- The consultations both took exactly the time allowed overall (40 minutes, with an additional 20 minutes for the research-practitioner to write up a draft action plan of strategies). This indicates these are realistic timeframes.
- The 'when to apply strategy' column in the action plan was to be removed. Teachers have more of a practical idea of when certain strategies would be feasible or useful. Specific recommendations about when a strategy is necessary were to be included in the wording of the strategy itself.
- Some action plan strategies were felt by the researcher to be somewhat intangible and potentially vague. The feedback from Alistair's teacher was that tangible examples were useful. Strategies were to include example phrases or descriptions of exactly what strategies might look like where possible.
- Some strategies were felt by the researcher to be too tied to a unique situation. Strategies were to be triangulated with more ICE Framework elements most

relevant to the child, resulting in wider-reaching strategies underpinned by more principles closely matched to the child's main needs.

4.5.5 Case Summaries

Of the 10 participants recruited, two received the intervention as a pilot in the summer term, 2019 (Alistair and Bailey). One participant's school did not provide experimental data (Cameron). One participant was not able to participate within the timescales of the study, due to teacher illness. The other 6 participants received the intervention within the main study, between autumn term, 2019 and winter term, 2020, with data reported for all planned measures, for both phases.

Cases are outlined in Table 4.5 with summarised contextual information which is important in SCED research for utility and replication (Horner et al., 2005). All names used are pseudonyms, to protect participants' identities.

Table 4.5: Contextual Details for Each Case

Child Psuedonym	**Bailey (Pilot)**	**Callum**	**Oscar**	**Gregor**	**Christopher**	**Giovanni**	**Simon**
Teacher Pseudonym	Mrs Allworth	Mrs Crawford & Mrs Harrington	Mrs Crawford & Mrs Harrington	Mrs Monkhouse	Mrs Jarvis (TA)	Mrs Miller	Mrs Brown
Chronological Age & Year Group at Start of Baseline	10 years, 7 months (Year 5)	8 years, 2 months (Year 4)	8 years 4 months (Year 4)	9 years, 6 months (Year 5)	7 years 9 months (Year 3)	7 years, 11 months (Year 3)	8 years, 8 months (Year 4)
Educational Setting	Mainstream primary school. Single-form entry, rural.	Mainstream primary school. Multiple-form entry, rural.	Same school and class as Callum.	Mainstream primary school. Single-form entry, rural.	Same school as Gregor.	Mainstream primary school. Double-form entry, rural.	Mainstream primary school. Medium (double-form entry), rural.
Background to EPS involvement	Concerns around attention arose during a planning meeting between school, the researcher-practitioner and her supervisor.	School recently received attention difficulties training (run by the research-practitioner's EPS). During informal discussions at the end, the SENDCo raised anonymous	As with Callum.	Researcher-practitioner working with school for casework. Gregor and Christopher mentioned by SENDCo in relation to researcher-practitioner's research.	As with Gregor.	Researcher-practitioner's supervisor working with school for casework. Giovanni mentioned by SENDCo in relation to research-practitioner's research.	Reseacher-practitioner's supervisor working with Simon as casework with school. Researcher's research mentioned and school expressed interest.

		concerns about Callum and Oscar's ongoing attention difficulties.					
Other Releant Case Details	Possible physical co-ordination or motor skills difficulties.	Substantial sensory feedback seeking in addition to attention difficulties.	Recent ADD diagnosis in Autumn 2019, no medication. Autism diagnosis.	ADHD diagnosis, no medication. Lives between two parental homes; both parents report somewhat different routines and expectations which can affect Gregor's compliance and engagement.	Speech and Language Therapy involvement due to speech and language delay. Social and communication difficulties, impulsivity, hyperactivity, and difficulty regulating attention. ADHD diagnosis was given during intervention phase. No medication.	Recent ADHD diagnosis in 2019, no medication. Used to have 'blank seizures' (no awareness of his surroundings, for short concentrated periods of time). Speech and Language Therapy previously. Possible ASD being investigated.	Autism diagnosis.

Each case is summarised further below with the initial screening information about the child's attention difficulties, brief researcher-practitioner understanding from the assessment, and researcher-practitioner intervention implementation (as part of intervention setup).

To illustrate the intervention for the individual case, frequency charts are presented to outline how many ICE Framework elements underpinned each action plan.

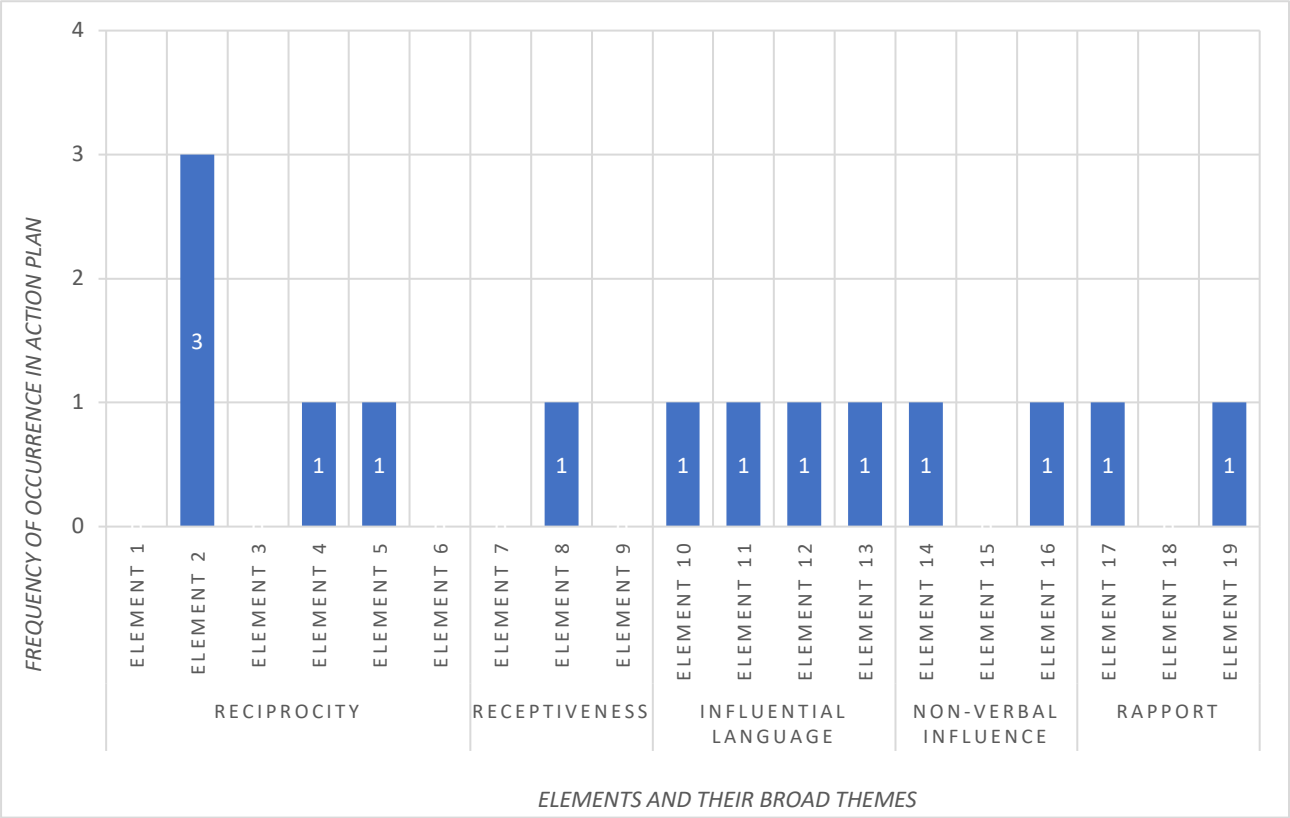
4.5.5.1 Bailey

During the participation suitability screening phone call, Bailey's mother reported inattentiveness difficulties distraction susceptibility, indicating difficulty sustaining engagement on tasks requiring effortful attention, and difficulty filtering out competing stimulation.

Bailey's action plan was measured in literacy. Researcher-practitioner consultation took place with his teacher and mother. Bailey's mother also reported Bailey's struggle with gross and fine motor skills. Bailey was reported to love music, responding well to melodic, song-based instructions and information.

Bailey's intervention consisted of 6 strategies underpinned by 12 ICE Framework Elements. Figure 4.1 below outlines the frequency of each element. The most frequently occurring element was 2 ('eliciting active learning'). Bailey's action plan was most focused on the teacher gaining his active participation and using language to affirm and reframe instructions.

Figure 4.1: Frequency of ICE Framework Elements Underpinning Bailey's Action Plan



4.5.5.2 Callum

At screening, Callum's mother reported he struggles to stay focused and frequently daydreams, resulting in him falling behind and being removed from lesson for one-to-one TA help, from whom he follows instructions and engages well.

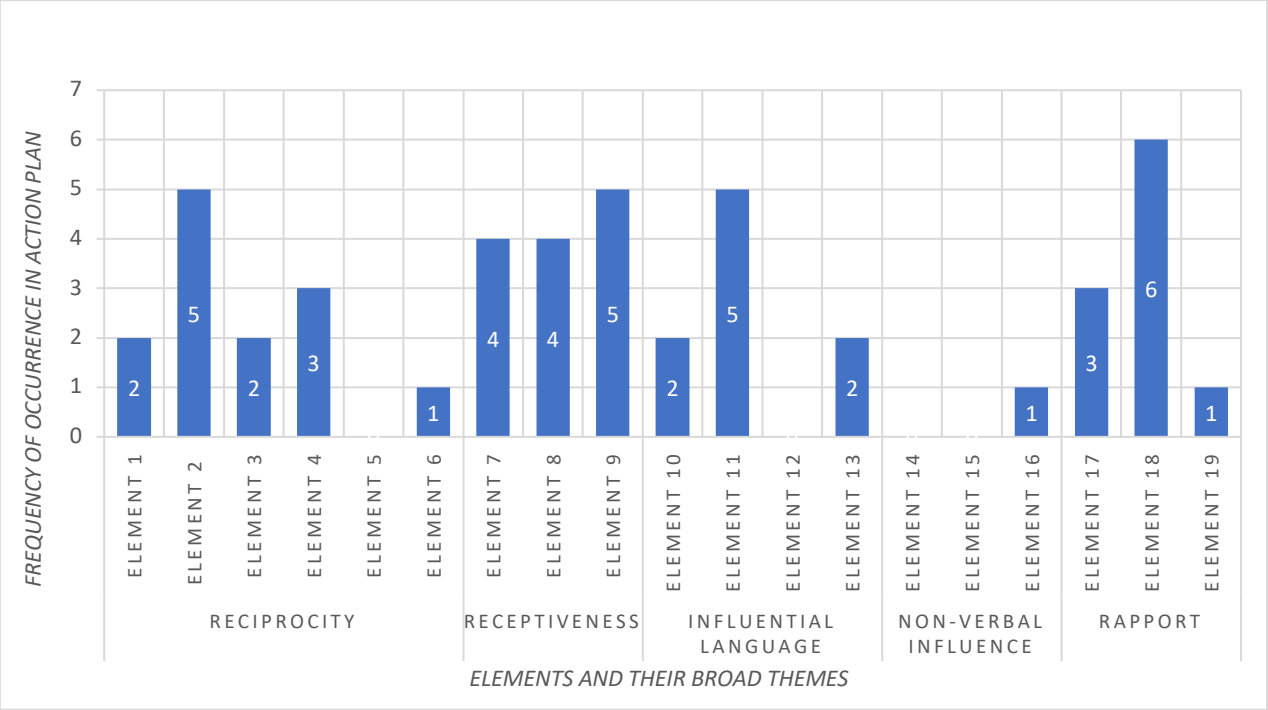
Callum's lesson of focus was maths. At observation he showed physical hyperactivity and responded well to affirmative calm and concise instructions, and intermittent praise. He sought sensory stimulation whilst focusing on his maths tasks independently; jigging his legs and chewing his jumper sleeve, remaining on-task.

Callum's mother attended consultation with Mrs C. Mrs Harrington joined at the end for a summary. Ongoing concerns shared at consultation were continuous fidgeting and needing sensory input, although Callum can often recall learning content despite

this. Callum's mother outlined his emotional escalation and need for co-regulation. Callum's mother said Callum responds very well to humour and Mrs Crawford agreed he needs this and recognition of his emotional state.

Callum's plan contained 17 strategies, underpinned by combinations of 15 ICE elements. The most frequently occurring was 18 ('Child's Worldview') and three others, one of which was element 2 ('eliciting active learning'); matching Callum's inattentiveness.

Figure 4.2: Frequency of ICE Framework Elements Underpinning Callum's Action Plan



4.5.5.3 Oscar

At screening, Oscar's mother said he struggles to sustain effort and is easily and frequently distracted. He struggles with verbal and written comprehension, felt by school and home to link with his attention difficulties.

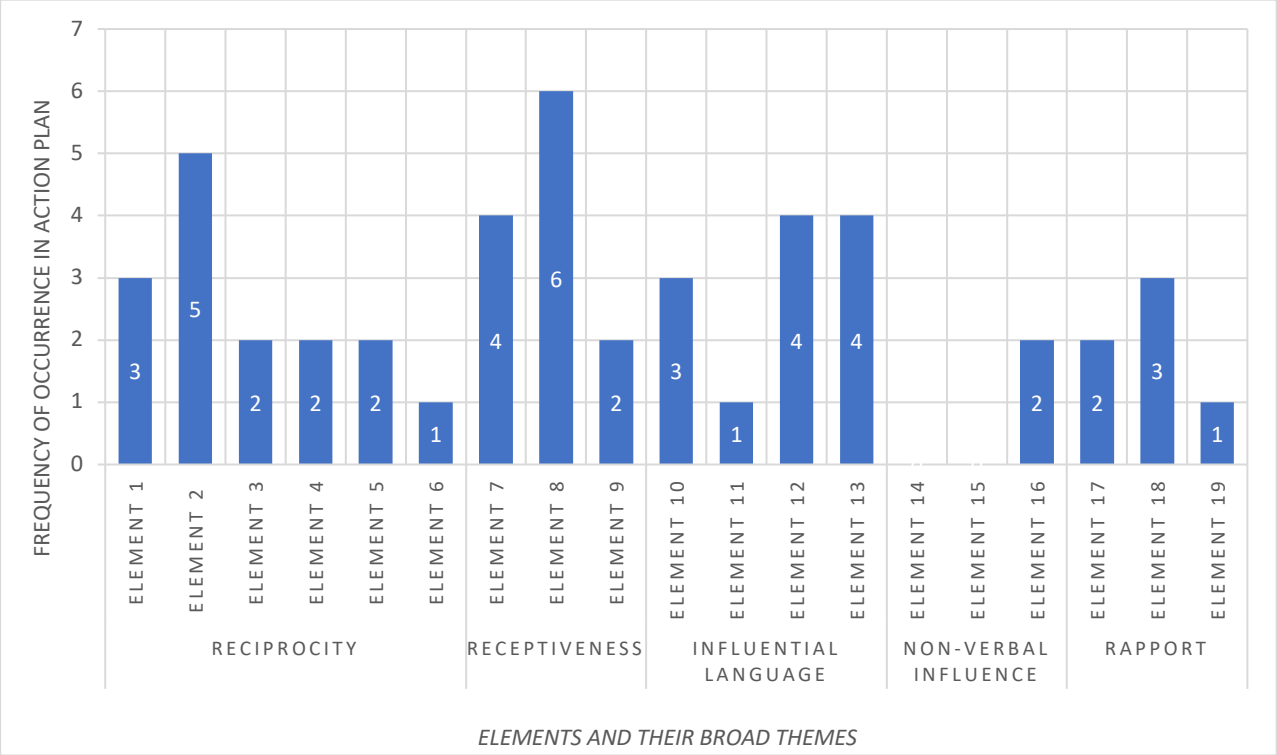
For Oscar, observation was two weeks before consultation and intervention setup. The aim was for this not to affect the baseline; observations were not shared or discussed with staff until intervention setup.

Oscar's lesson of focus was maths. He was observed to rush work, struggling to maintain engagement at the pace of the lesson, being keen to contribute but impulsively. Teacher comments such as 'wait' and 'shh' showed little influence; there seemed to be a need for more reciprocal interaction to pace his enthusiasm and input. Oscar responded well to expressive interactions and key phrases.

Mrs Crawford and Oscar's parents attended consultation. His parents described him as compassionate, expressive, and competitive and had concerns about him rushing work. It was agreed rapport-based approaches would harness his genuine interest and scaffolding his engagement would be helpful.

Oscar's action plan contained 18 strategies, underpinned by 17 elements. The most frequently occurring was element 8 ('cognition and emotion awareness') closely followed by 2 ('eliciting active learning').

Figure 4.3: Frequency of ICE Framework Elements Underpinning Oscar's Action Plan



4.5.5.4 Gregor

At screening, Gregor's father said Gregor is lively and keen to jump ahead in tasks. At school he is reported to disengage from work frequently and easily, craving novelty. Gregor is good at maths, often disinterested if not challenged. School were concerned about his hyperactivity.

Gregor's lesson of focus was literacy. He was observed to become most distracted when the teacher was out of his visual field, and when his distractedness was not dealt with early. Questions focused him, and teacher empathy mediated his distractedness.

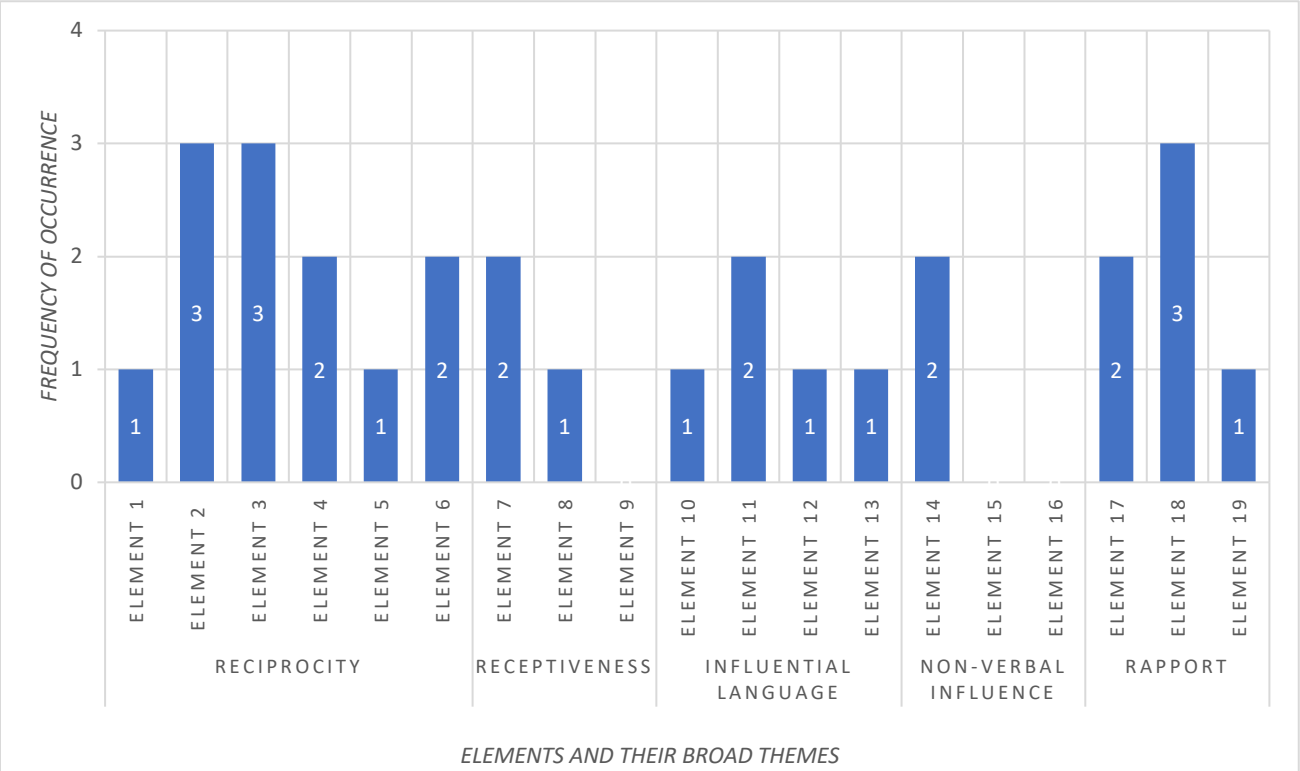
As with Oscar, Gregor's consultation and intervention setup took place around two weeks after observation.

In consultation, Gregor's teacher, mother, father and stepmother agreed Gregor needs reciprocal interactions to maintain engagement and control his distractedness.

Gregor's teacher and parents felt he struggles to organise and inhibit his many thoughts and ideas and struggles to process verbal information.

Gregor's action plan contained 12 strategies, underpinned by 16 elements. The most frequently occurring elements were 2 ('eliciting active learning') and 3 ('active choices') both in the 'reciprocity' theme, and 18 ('child's worldview'). Strategies focused on using back-and-forth interaction to influence Gregor's engagement, and meeting his focus and interest to influence it.

Figure 4.4: Frequency of ICE Framework Elements Underpinning Gregor's Action Plan



4.5.5.5 Christopher

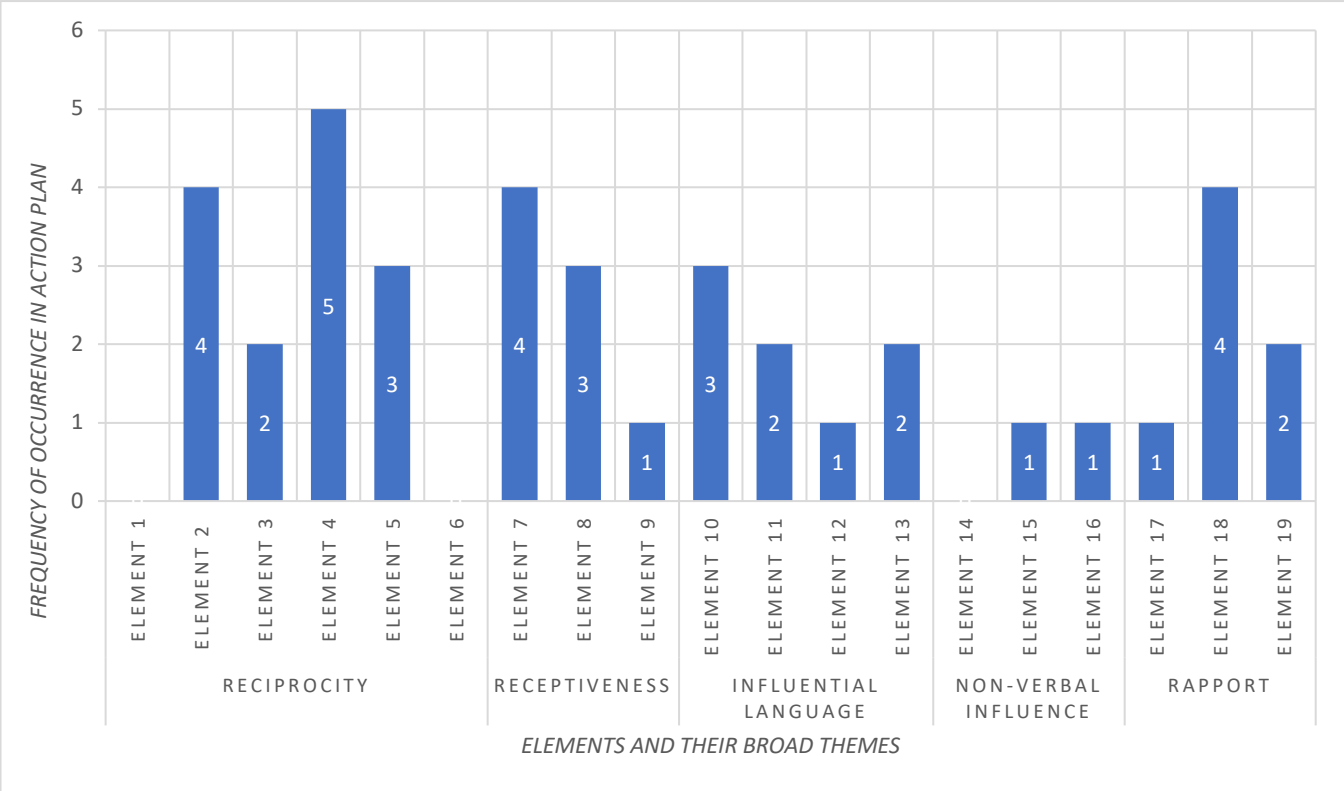
At screening, Christopher's mother outlined his impulsivity and hyperactivity. Home and school say he is disorganised in his thinking, speaking and activity, but sometimes able to comprehend and recall information when appearing disengaged. He struggles to maintain reciprocity in conversation, often interrupting.

Christopher's lesson of focus was literacy. At intervention setup, Christopher was observed responding well to jovial, rapport-based interactions of his interest. He responded well to calmly repeated instructions especially when concise.

Christopher's mother and TA attended the consultation (the TA implemented the intervention and took the ratings, as most of Christopher's learning is in one-to-one sessions). In consultation it was agreed Christopher needs patience, rapport, repetition, and lots of questions to focus his attention back to learning before distraction becomes established.

Christopher's plan contained 16 strategies, underpinned by combinations of 16 elements. The element underpinning most strategies was 4 ('scaffolded contributions'). His intervention was centred around the teacher's input influencing Christopher's learning output to maintain focused engagement.

Figure 4.5: Frequency of ICE Framework Elements Underpinning Christopher's Action Plan



4.5.5.6 Giovanni

At screening, Giovanni's mother said he is easily distracted and inattentive, struggling to comprehend or process verbal and written information, and using his sense of humour reliably maintains his interest and engagement.

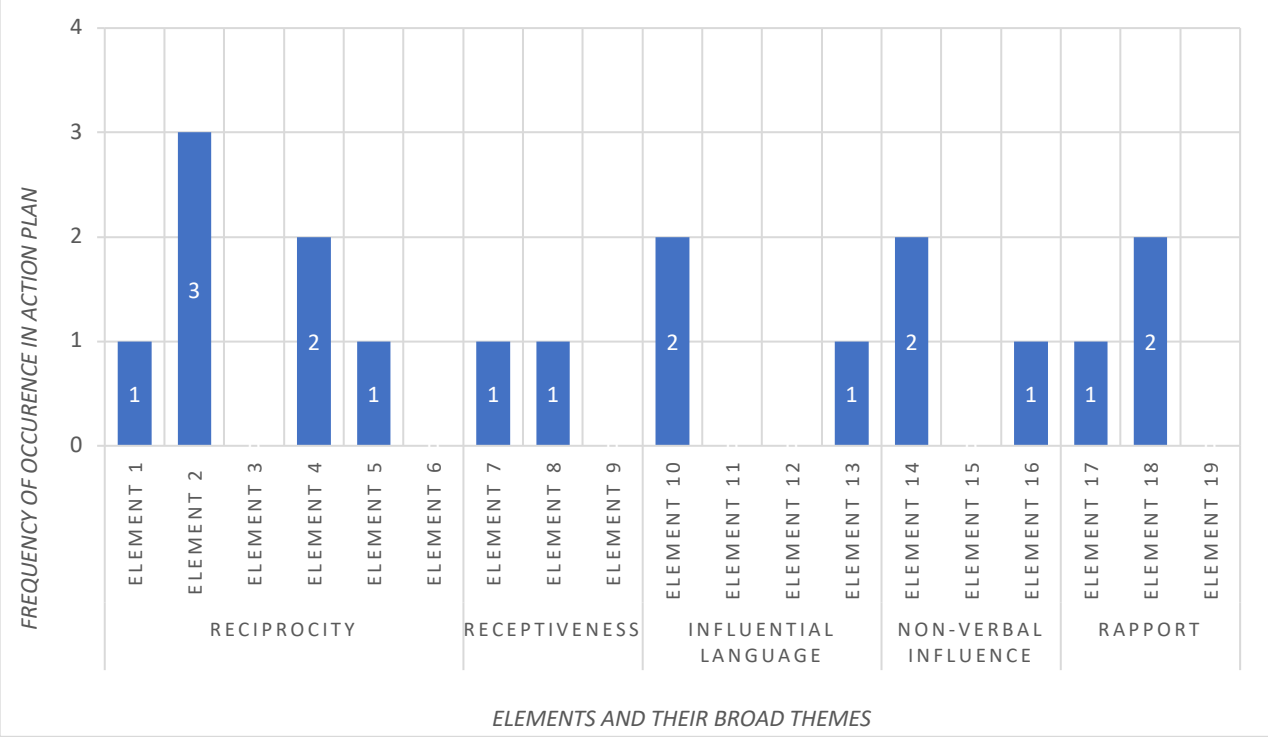
Giovanni's lesson of focus was maths. He was observed to be largely inattentive in lesson. The teacher's whole class input was directed towards the middle of the class and Giovanni was sat at the very edge which seemed to limit his active involvement. In task completion, Giovanni 'daydreamed', turning his attentions elsewhere before starting the task, indicating need for early scaffolding to build his interest.

Giovanni's mother was not able to attend the consultation so the SENDCo attended to share hers' and Giovanni's mother's insights, and the class teacher. The SENDCo fed back the agreed action plan to Giovanni's mother, offering her a phone call with

the researcher if she wanted more clarity or to share missing information, which she didn't.

Giovanni's plan contained 10 strategies, underpinned by combinations of 12 strategies. The strategy underpinning most strategies was element 2 ('eliciting active learning'). Gaining and establishing Giovanni's expressions and active involvement was a key focus, relating to his inattentiveness.

Figure 4.6: Frequency of ICE Framework Elements Underpinning Giovanni's Action Plan



4.5.5.7 Simon

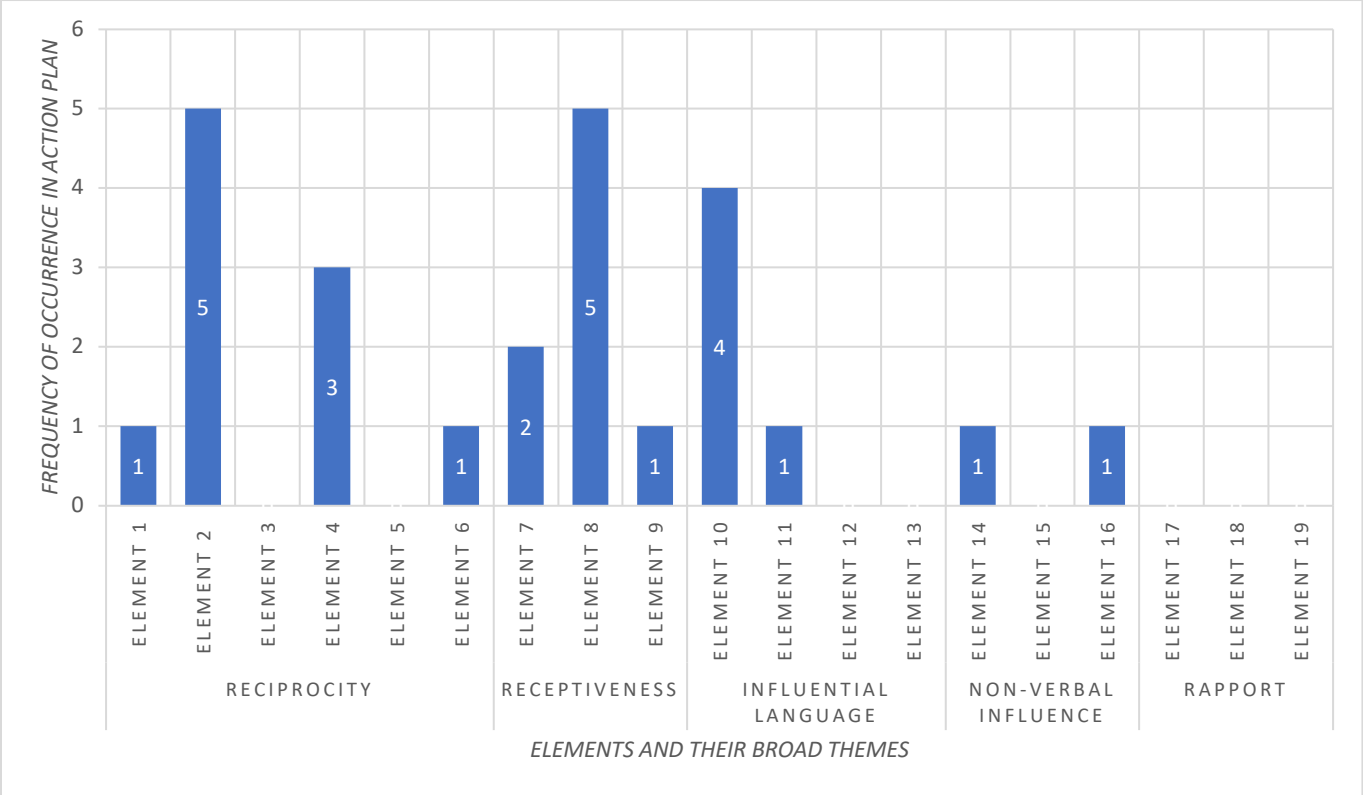
Simon already had involvement with an EP in the service where the research was taking place, so initial observation and consultation in casework served as a screening process. Simon was observed and reported to show inattentive behaviours in learning and a difficulty sustaining attention on tasks directed by someone else (he sustains his attention effortlessly on tasks he has decided to do by himself).

Simon's lesson of focus was Maths. He was observed responding to the teacher's change in tone and pace, and use of tangible language, by looking back at the board or stopping sensory-seeking or fidgeting behaviours. Simon's engagement seemed much easier to influence when his teacher re-engaged him at early signs of inattentiveness.

Simon's father and teacher attended the consultation. Catching distracted behaviours early was agreed to be of key importance, and making whole class input relevant directly to him intermittently to sustain his interest.

The action plan contained 10 strategies, underpinned by combinations of 11 elements. The most frequently occurring strategies were 2 ('eliciting active learning'), and 8 ('cognition and emotion awareness'). The strategies focused on gaining learning output to mediate inattentiveness, and the teacher tailoring the approach based on her receptiveness of his current state of stimulation or emotion for example.

Figure 4.7: Frequency of ICE Framework Elements Underpinning Simon's Action Plan



4.6 Reliability and Validity

For research to be empirical and findings robust, study design and methodology must address threats to reliability and validity, only then can a causal explanation of effects be considered (Robson & McCartan, 2016). Reliability concerns results being consistent on numerous occasions in the same conditions; for single case research, data are mainly observational, which should be objectively defined (Mertens, 2005).

Validity concerns the soundness of assumptions and theory, their direct relevance to the study, and confidence about data interpretations. Cook and Campbell (1979) outline multiple potential threats to internal validity. Causal validity is important for accurately determining whether there are functional relationships between the independent and dependent variable (Kratochwill et al., 2013) and social validity is important for ensuring findings are relevant and useful to the population they are intended for (Horner et al., 2005).

Table 4.5 below outlines the main threats to reliability and validity in this research, and how they were attempted to be mitigated.

Table 4.5: Threats to Reliability and Internal Validity, and This Study's Mitigations

Threats	**Actions and Measures for Mitigating and Managing Threats**
Observation subjectivity; possible threat to unreliability of ratings (Mertens, 2005).	Teachers subjectively rate behaviours they have observed and are influencing. Providing the teacher with engagement indicator definitions (on the child ratings in appendix 6, adapted from Carpenter et al., 2015); attempted to add objectivity and limit ambiguity. Teachers were also instructed to rate directly after lesson to help ensure accuracy.
Instrumentation (Cook & Campbell, 1979).	Increasing familiarity with ratings could cause 'engagement' definition to change. Clear instructions were given to the teacher from the outset and they were encouraged to practice their rating procedure with the researcher at the set-up meeting and ask questions. Teacher fidelity to the measures and their procedures cannot be certain, however honest data was encouraged via reassurances that missed datapoints and potential environmental/situational confounds were expected.
Construct validity	Steps were taken to ensure intervention parameters were clearly defined. The ICE Framework was core to the intervention. All procedures involved its use, and all strategies were underpinned by elements from it.

	The Carpenter (2015) engagement indicators were central to the construct of 'engagement' (dependent variable).
Environmental confounds or 'history' (Cook & Campbell, 1978).	Most data were collected before Christmas break, although not possible in all cases. The lead-up to Christmas can be considered a threat to internal validity due to the likely variation in classroom activities. Data was collected at least two weeks into the start of the school year, allowing familiarity to develop before measures began, to limit potential effects of this on data.
Ecological validity (Horner et al. 2005).	Measures took place in the participants' existing classroom lessons with their existing teachers delivering the intervention strategies.
Regression to the mean (Cook & Campbell, 1979).	A statistical phenomenon whereby outliers and extreme scores are more likely to be closer to the mean upon repeat measures. It is a risk for this study that engagement ratings expected from the teachers of children with attention difficulties will be extreme, therefore showing a regression to the mean.
Maturation (Cook & Campbell, 1979).	It is a risk that children's possible increased engagement as a result of natural maturation could confound any intervention effects, although the measures take place over no more than a term, aiming to keep maturation effects as minimal as possible.
Researcher expectation bias	Data was collected by teacher participants, limiting the researcher having a direct effect.
Teacher expectation bias	An inevitable limitation, although mitigated by ensuring teachers were fully aware of the exploratory nature of the research, limiting their expectation of the intervention necessarily being effective.

	Qualitative interviews post-SCED took place before teacher participants or parents were aware of research findings or data analysis, to limit potential effects of this knowledge on their expectation or views. Qualitative interviews post-SCED were conducted by the researcher with a neutral perspective, without the researcher leading any overt discussion about the ICE Framework.
Social validity (Horner et al. 2005)	Children recruited were either already involved with the EPS or made known through existing EP relationships with SENDCos in schools. Teacher and child participants are felt to represent stakeholders that EPs are likely to come across in everyday real-world practice. The intervention itself is designed to fit into everyday staff practice and is comprised of techniques and approaches readily available to integrate into everyday practice via refinements to existing interaction and communication. Relevance and utility for teaching and support staff is also assumed based on the measures aiming to measure how 'engagement' appears to teachers and children themselves. Engagement in learning is assumed to be a socially important variable.
Social response bias (Robson & McCartan, 2016).	Teachers were reminded that all comments whether negative, neutral or positive were useful to the research and there was no expectation for their responses.

4.7 Ethical Considerations

The BPS (2014) Code of Human Research Ethics highlights psychologists' responsibilities to respect the dignity, autonomy and privacy of individuals and communities. The code says research benefits must be maximised and risk of harm must be no greater than that encountered in everyday life, and ultimately avoided. Main ethical considerations throughout the research are outlined here. Ethical approval can be seen in appendix 11.

The small-scale nature of SCEDs means effects can be closely monitored and the intervention refined before larger scale implementation (Heyvaert et al., 2015); especially important here because the intervention approach is new and exploratory.

Schools' head teachers and SENDCos were 'gatekeepers' for initial access to potential participants. They were written to first and were making first contact with potential participants. They were provided with the researcher's initial letters which made clear to parents that the intervention is based on published literature, has ethical approval, and is being trialled to understand whether there are effects on engagement.

The child and parent participants had to have already been aware of concerns about the child's attention. It was considered unethical for the research to instigate this being raised.

At initial suitability screening with parents, it was explained that selection criteria were not diagnostic in any way, but to ensure the intervention matched the child's current behaviours and needs. The researcher gained informed consent from participants following screening discussions; a consent form was sent to school for the parent or carer with parental responsibility to sign. All screened participants were deemed suitable.

Of all initially recruited participants, one parent decided not to proceed at screening phase. She was unsure about the intervention's role compared to the child's existing EP assessment with the local authority. The researcher explained the research as separate to and independent of any other involvement with an EP. The parent felt

uncertain and decided not to take part. The researcher reassured her that this was entirely acceptable.

Child verbal assent was required for participation. Parents were made aware that they were signing to say the child has verbally assented. They were encouraged to share their child's questions with the researcher or school prior to consenting. The researcher became aware of none.

Parents and children were made aware they can withdraw their contribution/involvement at any time and were not obligated to be part of the study regardless of receiving the intervention.

If child participants were taking prescribed medication for ADHD or ADD, or took part in an added intervention, it would be unethical for the intervention to stop or influence it. Parents were asked to inform school and researcher if there was existing medication or intervention, and of any changes, with the reassurance that this was solely for honest reporting within research analysis and write-up. The researcher became aware of none.

In the research process, the researcher communicated mainly with teachers and parents. Involvement with the child directly was through observation. Removing the child from the lesson to explain the research would risk impacting their learning or wellbeing unnecessarily. Parents and teachers were asked to inform the researcher if the child wanted to meet the researcher at length and address any concerns. No children came forward for this.

Teachers were asked to think in advance about any responses to questions from other children. The researcher suggested that responses such as 'we're looking at what works to help some children enjoy their learning even more' might be appropriate.

Measures were repetitive which may have been frustrating for participants, so they were simple non-invasive ratings which consumed no more than a few minutes per day. Teachers were explicitly reminded they were not expected to continue if they felt the measures impacted upon their work or wellbeing (e.g. adding to workload stress).

Teachers were asked to stop using the intervention strategies if they felt for any reason that they were negatively impacting the child's engagement, learning or general wellbeing, although this was not anticipated to be the case.

Teachers may have found it emotional or contentious to share their practices and attributions with the researcher, parents, and/or other staff (e.g. in consultation). At initial setup meeting, before teacher consent was gained, the teachers were briefed on what to expect for reflecting on one's own practice, and a debrief at review stage checked for concerns, of which there were none.

Engagement measures could potentially feel similar to being 'on report', for the child. The researcher outlined to the teacher and parent they would need to be clear how the baseline/experimental measures differ from being 'on report' (i.e. the child is being measured for formative, encouraging purposes, from a non-judgemental point of view, with no negative consequences as a direct result).

Once research was complete, a summary of anonymised findings was shared with all participants, via the main contact. Participants were given the researcher's university contact information to enable them to ask further questions.

4.8 Reflexivity

The researcher was the practitioner setting up the intervention. This involved assessing the child through observation and consultation and writing the action plan strategies. Researcher reflexivity as to the potential confounds and influences upon the data and findings was essential, and how this could be mitigated.

During intervention set-up (observation, consultation and action-plan writing), the researcher aimed to work in practitioner mode, without concern for what the resulting action plan 'should' contain. The researcher followed the procedures she had designed without, for example, making extra effort to include or emphasise any particular aspects of the underpinning theory, as this would not represent typical implementation by any other practitioner.

The researcher aimed to communicate the action plans to the teachers without any expectation beyond the affirmative and gently positive approach that would be typical of an EP practitioner. The researcher made no reference to staff or parents about her hopes for research findings or implications and refrained from talking about this at all during the implementation or review, to limit any expectation biases.

Because the intervention is a newly devised approach, the researcher was aware she would be gaining familiarity with the intervention as time progressed (not just at pilot stage), which is anticipated to be reflected in the SCED results.

Chapter 5: Results

In this chapter, interpretation and analysis of single case experimental data is outlined generally, then for this study. Descriptive results from all cases are tabulated together, followed by SCED findings displayed case-by-case: Related contextual information is outlined, then tabulated visual analysis results, followed by a graph depicting baseline and intervention data. Following case-by-case results, salient findings are outlined across all cases. Then thematic analysis from the qualitative review with teachers is described and the resulting themes set out.

5.1 Analysing Single Case Experimental Data

There is growing trust in single case experimental research evidence bases, and visual analysis is the traditional analysis and interpretation method (Heyvaert et al., 2015). Visual analysis calls for careful analysis of data and interpretation, especially when obvious effects are absent. Visual analysis aims to identify magnitude and rate of effects; important characteristics to analyse separately as well as viewing them as linked (Kazdin, 1982).

Visual analysis involves interpreting level (mean), trend, variability, quantity of overlapping datapoints, and immediacy of effects; comparing baseline and intervention phases (Horner et al., 2005). The level and overlap of datapoints can be

considered a measure of effect magnitude. Trend and immediacy of effects can be considered a measure of rate of effects.

The criteria for judgements in visual analysis can be unclear, and integrating these judgements reliably can be challenging, with raised likelihood of ambiguity where effects are subtle (Kazdin, 1982). However Kazdin acknowledges the limitation in how useful detection of subtle effects can be, when in single-case research, outcomes that are impactful with therapeutic importance carry more meaning than statistical significance for example.

There appears a lack of consensus over which statistical tests can be most useful in analysing single case experimental data (Campbell, 2004). However, typical parametric tests are usually inappropriate in single case research because data are unlikely to meet their assumptions (Heyvaer et al. 2015), such as normal distribution and independence. A clear use for statistical analysis is when baseline data is unstable, especially when changing in the direction of what would be predicted for intervention phase (Kazdin, 1982).

Kazdin (1982) outlines statistical tests which can be used with single case experimental data; bulleted below with the various challenges posed.

- *t* and *f* tests measuring significance of change between phases. These depend on values being independent and not correlating with each other (autocorrelation), and equal numbers of datapoints across phases, for matched comparisons.
- Time-series analysis, measuring significance of change between phases and accounting for autocorrelation. This depends on a large dataset (over 50 datapoints).
- Randomisation tests measuring whether data differs between conditions. This calculates the probability of obtaining the difference between conditions, using all comparisons of the datapoints between conditions. This depends on the datapoint occasion being randomly assigned to experimental phases.

'Non-overlap' analysis attempts to identify changes between phases based on relative positions of datapoints between phases (Campbell, 2004), useful when data are heavily skewed and measures of central tendency may not accurately describe the dataset (Parker et al., 2011). A range of data 'non-overlap' analysis methods are reviewed by Parker et al. (2011), such as Percentage of Non-Overlapping Datapoints (PND) and Percentage of All Non-Overlapping Datapoints (PAND). The former relies on a baseline phase without positive outliers, as the highest baseline score is used as the basis of comparison, and the latter is sensitive to baseline trend. Parker et al. (2011) warn against the use of most non-overlap calculations where baseline trend is positive, and in the absence of strong improvement trend in the intervention phase.

5.2 Single Case Experimental Data Analysis in This Study

Statistical data analysis is not deemed appropriate in this study because autocorrelation in single case studies is likely (Campbell, 2004); adjacent datapoints are likely to influence one another simply because the measurements took place over time and will relate to one another. Also, datapoints are fewer than 50 in all cases, and conditions and measurement occasions are not randomised. These attributes make statistical analysis using the above-mentioned approaches, invalid, potentially causing a type 1 error (false identification of effects), or type 2 error (false identification of lack of effects).

Non-overlap approaches are usually appropriate for less stable data (Parker et al., 2011), however the highly irregular data and conflicting trends in many of this study's cases would be likely to produce misleading calculations, potentially causing a type 2 error.

Descriptive statistics and visual analysis were used to analyse results. For reliability in interpretation of the data, the researcher and researcher's practice supervisor each rated whether they thought the graphs showed a significant change between phases, out of a scale of 0-5 from 'strongly disagree' to 'strongly agree' (Harbst et al. 1991). This enabled calculation of inter-rater reliability using Cohen's Weighted Kappa

Coefficient (κ) (Cohen, 1968). This takes into account inter-rater agreement occurring by chance and is suitable for ordinal data due to its sensitivity to the varying gravity of disagreements between ratings. The value achieved was .29, which can be considered 'fair' agreement (McHugh, 2012).

The visual analysis for this study includes the below characteristics in Table 5.1. For each individual case, these are set out descriptively, before each corresponding graph.

Table 5.1: Visual Characteristics Analysed in This Study

Changes in Level	Change in means between phases (Horner et al., 2005). Mean scores are compared for each case between baseline and experimental phases. Mean scores are reported for all data in Table 8, with score changes of more than one score unit, highlighted in bold. 'Level' is the difference in means (Horner et al., 2005). Although Kazdin (1982) defines this as the change between the end of the first phase to the beginning of second phase, this is considered less useful or reliable here due to high variability and inconsistency of the data.
Changes in Trend	Trendlines are best-fit lines to represent the overall direction and slope of increase or decrease (Horner et al., 2005). Linear trendlines are plotted on Excel graphs (version 2016) for cases where there appears to be low variance and more than five datapoints (Horner et al, 2005). These are compared between baseline and experimental phases.
Changes in Variability	Spread of data from the mean during the phase (Horner et al., 2005). Range values are compared between baseline and experimental phases, and standard deviations where

	range values are the same. All range values and standard deviations are reported in Table 8.
Immediacy of Effects	Difference between the last few baseline datapoints is compared to the first few intervention phase datapoints. Sudden increase in scores may indicate immediate effects.
Overlap of Datapoints	Proportion of datapoints in each phase which overlap. (Horner et al., 2005). The percentage of overlapping datapoints is reported.

Cases were analysed individually because of the ideographic nature of the SCEDs, then salient findings across the individual cases are considered for a wider understanding of possible effects.

Baseline and intervention data were collected and analysed for teacher-rated child engagement (frequency and impact) and child self-rated engagement, to answer the first two research questions:

Research Question A: Does teacher-report of child academic learning engagement in class increase when an action plan is implemented by the teacher, resulting from the Interaction and Communication for Engagement (ICE) framework?

Research Question B: Does child self-reported academic learning engagement in class increase when an action plan is implemented by the teacher, resulting from the ICE framework?

5.2.1 Cautions

In SCED methodology, five or more data points are generally acceptable for confidence in trend predictability, and baseline phases should continue until a predictable level can be ascertained (Horner et al., 2005). Due to time-constraints, and teacher autonomy in completing measures without ongoing researcher supervision, datapoint quantities are lacking in some cases and baseline stability in most; caution

is needed in interpreting results. Findings are treated tentatively and triangulated with review comments from teachers at the end of this chapter.

5.3 Individual SCED Results and Visual Analyses

Table 5.2 below details mean scores (*M),* standard deviations (*SD),* and ranges between scores for each measure in each case (to two decimal places). These descriptive statistics help outline possible changes in level and variability between baseline and intervention scores. Mean values which are different between baseline and intervention by one or more score unit, in either direction, are highlighted in bold.

Table 5.2: Score Means and Ranges for Each Case Comparing Baseline and Intervention

Child	**Child Self-Rated Engagement**		**Teacher-Rated Engagement Frequency**		**Teacher-Rated Engagement Impact**	
	Baseline	*Intervention*	*Baseline*	*Intervention*	*Baseline*	*Intervention*
Bailey (Pilot)	*M* 6.75 *SD* 3.66 Range: 8	*M* 6.5 *SD* 2.38 Range: 5	*M* **4.75** *SD* 2.62 Range: *5*	*M* **7.25** *SD* 0.5 Range: 1	*M* 12.8 *SD* 3.35 Range: 8	*M* 12.75 *SD* 3.94 Range: 9
Callum	*M* 8.83 *SD* 1.7 Range: 3	*M* 8.5 *SD* 2.2 Range: 5	Mrs C *M* **6** *SD* 4.95 Range: 7 Mrs H *M* **7.4** *SD* 3.1 Range: 9	Mrs C *M* **8.5** *SD* 3.33 Range: 6 Mrs H *M* **2.33** *SD* 1.15 Range: 2	Mrs C *M* 6.75 *SD* 4.5 Range: 11 Mrs H *M* 3.88 *SD* 2.77 Range: 6	Mrs C *M* 7.5 *SD* 2.75 Range: 8 Mrs H *M* 3 *SD* 0 Range: 0
Oscar	*M* **8** *SD* 2.74 Range: 7	*M* **7** *SD* 1.15 Range: 2	Mrs C *M* **6.38** *SD* 2.62 Range: 9 Mrs H *M* **2.22** *SD* 1.41 Range: 9	Mrs C *M* **8.5** *SD* 3.11 Range: 7 Mrs H *M* **12.5** *SD* 0.71 Range: 1	Mrs C *M* **6.13** *SD* 2.85 Range: 10 Mrs H *M* **3.88** *SD* 2.23 Range: 7	Mrs C *M* **10.5** *SD* 0.71 Range: 10 Mrs H *M* **9** *SD* 1.41 Range: 2
Gregor	*M* 7.46 *SD* 1.98 Range: 6	*M* 7.13 *SD* 0.64 Range: 2	*M* **17.15** *SD* 5.26 Range: 17	*M* **19** *SD* 2.39 Range: 7	*M* **16. 54** *SD* 5.85 Range: 19	*M* **18.38** *SD* 2.07 Range: 7
Christopher	*M* **7.11** *SD* 2.95 Range: 9	*M* **8.46** *SD* 0.89 Range: 3	*M* **8.05** *SD* 3.78 Range: 11	*M* **4.8** *SD* 2.44 Range: 7	*M* 6.44 *SD* 2.64 Range: 9	*M* 6.2 *SD* 3.04 Range: 9
Giovanni	*M* **4** *SD* 5 Range: 9	*M* **7.56** *SD* 2.46 Range: 7	*M* **3.44** *SD* 2.46 Range: 7	*M* **7.33** *SD* 4.33 Range: 15	*M* **3.67** *SD* 2.5 Range: 7	*M* **6.88** *SD* 3.79 Range: 11
Simon	*M* **5.35** *SD* 2.64 Range: 9	*M* **7.1** *SD* 1.2 Range: 4	*M* **7.67** *SD* 3.83 Range: 11	*M* **9.2** *SD* 2.78 Range: 9	*M* **7.29** *SD* 4.36 Range: 11	M **9.2** *SD* 2.78 Range: 9

For the 7 cases, the SCED results are illustrated individually for each measure, within each case, with tabulated visual analysis results, graphs, and summarised descriptions.

The measures for each case are described and graphed separately; child self-rated engagement (maximum score 10), teacher-rated engagement frequency, and teacher-rated impact (maximum scores 21). Missing data is identifiable by gaps between data points. Intervention onset is denoted by a dashed vertical grey line.

5.3.1 Bailey (Pilot)

A true pilot aims to clarify research questions (Robson & McCartan, 2016). Bailey's case simply helped to pilot and refine the measures and intervention; the research questions guiding the implementation of this case experiment were the same as for the other cases. Therefore, Bailey's results are reported with the main results; they can be analysed in the same way and contribute to the overall findings. The minor changes made to the measures and intervention in the pilot, outlined in the previous chapter, were not considered to make either the measures or the intervention fundamentally different to the other cases following the pilot. However, they are a potential contextual influence on the results for this case, which is a consideration in results analysis and interpretation.

Bailey's data was collected throughout June and the start of July 2019, generally every 2-3 days throughout the week. Intervention measures began at the start of the teacher's implementation of the intervention strategies, at the start of July.

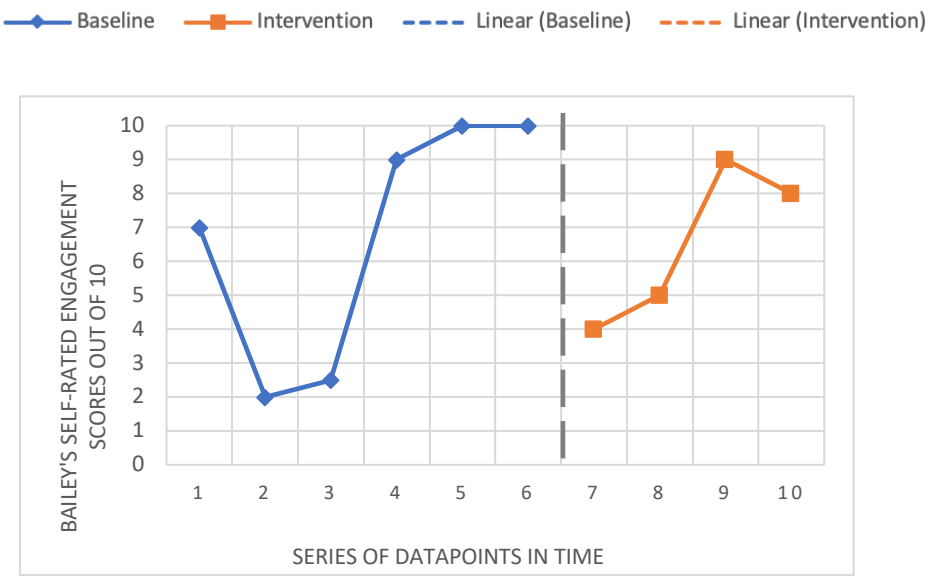
It is worth noting that although not part of the thematic analysis, at review, Bailey's teacher said his engagement depended on the structure of activities in the particular lesson, which did vary.

5.3.1.1 Bailey's Self-Rated Engagement

Table 5.3: Visual Analysis of Bailey's Self-Rated Engagement

Changes in Level	Mean score for baseline data is 6.75 which is similar to the intervention at 6.5, but slightly higher, indicating no improvement in score 'level' for this measure.
Changes in Trend	The trendline shows both trajectories move upwards in a similar direction overall.
Changes in Variability	The baseline and intervention data both have high variability. The range scores decrease from 8 at baseline to 5 at intervention.
Immediacy of Effects	The last few baseline datapoints could show emerging stability at 10, then at intervention onset the score drops to 4 but climbs again quite sharply.
Overlap of Datapoints	The second two baseline datapoints are lower, and the last two higher, than any at intervention, illustrating higher variability at baseline. The percentage of data overlap between phases is 60%.

Figure 5.1: Scatter Graph of Bailey's Engagement Self-Rated Engagement Scores

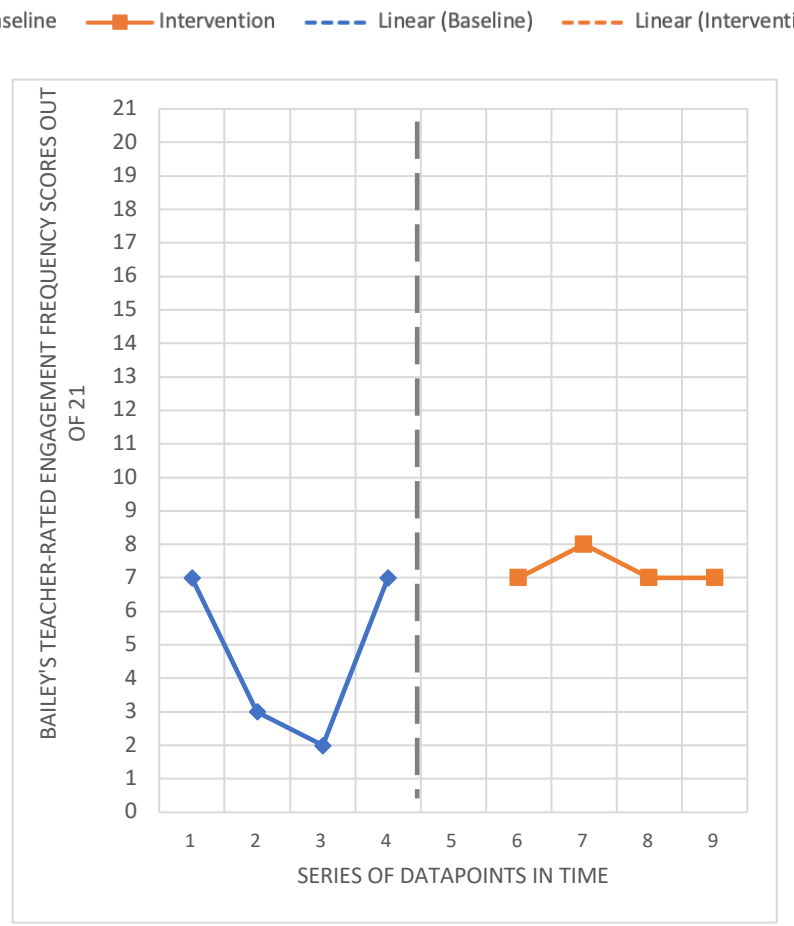


5.3.1.2 Bailey's Teacher-Rated Engagement Frequency

Table 5.4: Visual Analysis of Bailey's Teacher-Rated Engagement Frequency

Changes in Level	Mean score for baseline data is 4.75 which is lower than intervention at 7.25, indicating improvement in overall 'level' of scores between phases.
Changes in Trend	The trendline shows both trajectories move downwards in a similar direction overall, although the inconsistent baseline severely limits meaning and reliability of trend.
Changes in Variability	Bailey's teacher-rated engagement frequency shows an inconsistent baseline and more stable intervention data, with ranges of 5 and 1 respectively.
Immediacy of Effects	At intervention onset, the score remains the same as the last baseline score, remaining relatively high and stable, compared to baseline.
Overlap of Datapoints	The three highest scores in the intervention phase are also shown at two points in baseline, although the highest score in intervention data is one score higher than any at baseline. Two baseline scores are also much lower than any in the intervention phase. The percentage of data overlap between phases is 73%.

Figure 5.2: Scatter Graph of Bailey's Teacher-Rated Engagement Frequency Scores

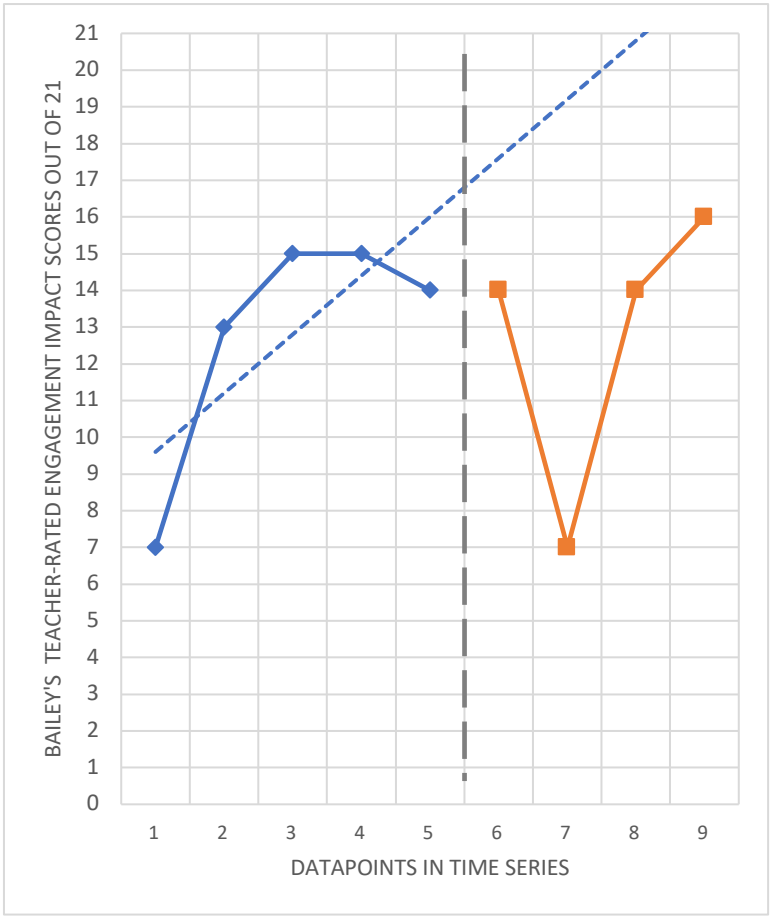


5.3.1.3 Bailey's Teacher-Rated Engagement Impact

Table 5.5: Visual Analysis of Bailey's Teacher-Rated Engagement Impact

Changes in Level	Mean score for baseline data is 12.8 with a negligible drop at intervention, to 12.75, indicating no improvement in level.
Changes in Trend	The trendline shows both trajectories move upwards in a similar direction overall, although the baseline more sharply.
Changes in Variability	Variability increases slightly from baseline to intervention, with score ranges of 8 and 9 respectively. Baseline and intervention both appear inconsistent.
Immediacy of Effects	The highest datapoint above any at baseline is the last in the intervention phase, indicating any possible intervention effect is delayed.
Overlap of Datapoints	The baseline and intervention data are mostly overlapping, apart from the last intervention datapoint which is higher than any at baseline. The percentage of data overlap between phases is 89%.

Figure 5.3: Scatter Graph of Bailey's Teacher-Rated Engagement Impact Scores



5.3.1.4 Summary of Findings for Bailey

Bailey's self-rated engagement indicates a sudden drop at intervention onset, followed by a sharp climb, but not beyond the highest baseline score. This shows no intervention effects on this measure.

Bailey's teacher-rated engagement frequency appears to improve slightly with intervention. Effects on impact are more inconclusive; it is unclear whether the one datapoint rise in score at the end of the intervention phase is an outlier.

Baselines are all unstable and only comprised of between 4 and 5 datapoints in each phase across each measure, severely limiting reliability and confidence.

5.3.2 Callum

Callum had two class teachers in job-share roles; each taught the class for separate halves of the week. Both teachers rated Callum's engagement frequency and impact separately, which was analysed separately, to maintain internal validity. This is due to the ideographic and subjective nature of the measures and individual variation in intervention implementation. Callum's self-rated engagement is analysed as one measure.

Each teacher rated Callum's engagement generally twice a week, from mid-September to early October. Callum rated his own engagement generally every day during this period. The measures were not always taken in a consistent pattern due to teacher job-share changes and Callum working outside of the main lesson occasionally.

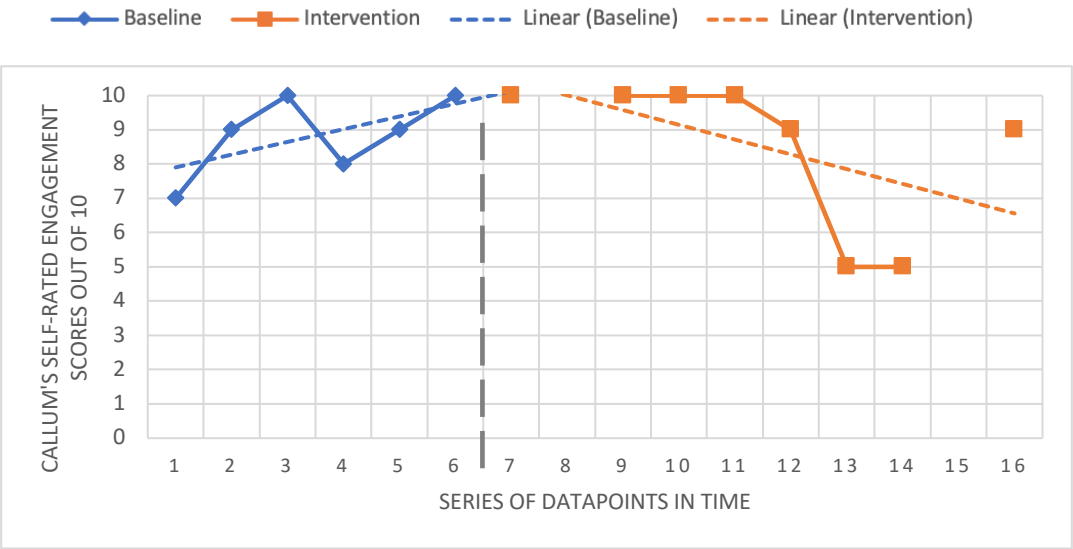
It is worth noting here that during intervention setup for both Oscar and Callum, both teachers separately commented that both Oscar and Callum's engagement depended heavily on types of tasks in the lessons.

5.3.2.1 Callum's Self-Rated Engagement

Table 5.6: Visual Analysis of Callum's Self-Rated Engagement

Changes in Level	Mean score moved from 8.83 to 8.85 between phases, indicating almost no change between baseline and intervention.
Changes in Trend	The trendlines indicate a rising trajectory at baseline and falling at intervention.
Changes in Variability	Score range increases from baseline to intervention; from 3 to 5 respectively. Two of the lowest datapoints at intervention are two scores lower than any at baseline. However, the consecutive high scores following intervention onset show less variability at intervention.
Immediacy of Effects	The consecutive high scores at intervention onset could indicate immediate effects but ceiling scores limit interpretation.
Overlap of Datapoints	The two lowest datapoints at intervention are lower than any at baseline. The percentage of data overlap between phases is 86%.

Figure 5.4: Scatter Graph of Callum's Self-Rated Engagement Scores

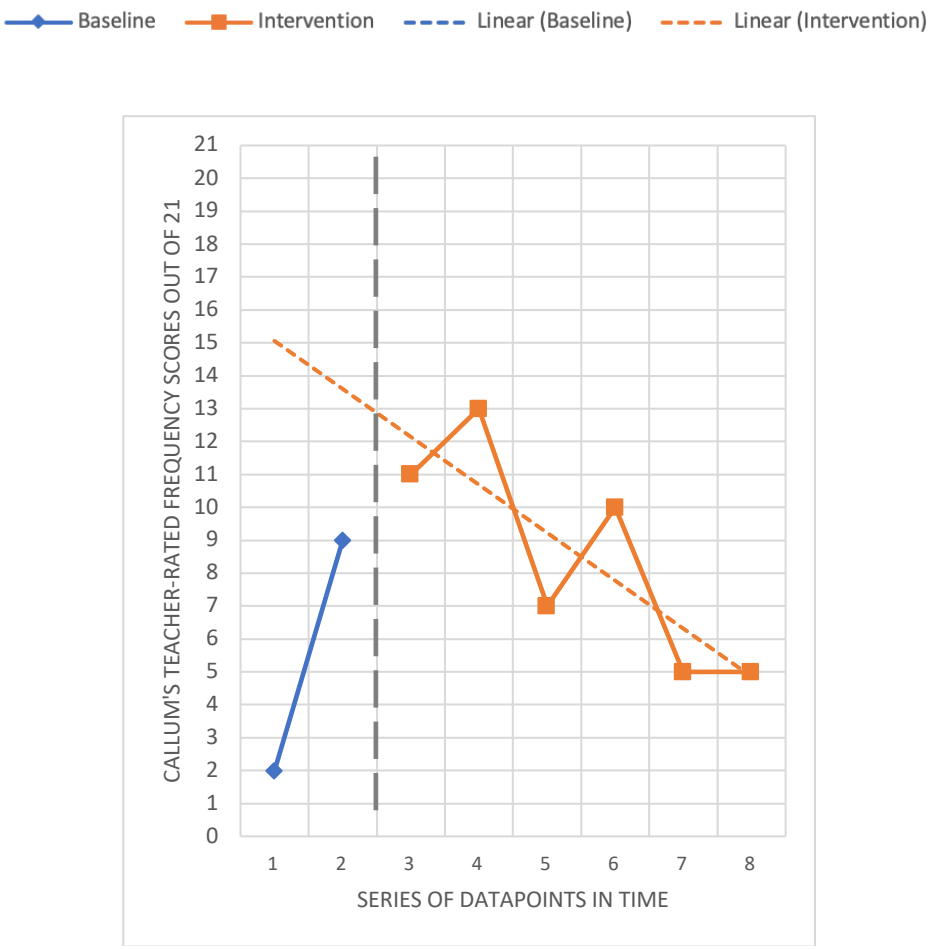


5.3.2.2 Callum's Teacher-Rated Engagement Frequency (Mrs Crawford)

Table 5.7: Visual Analysis of Callum's Teacher-Rated Engagement Frequency (Mrs Crawford)

Changes in Level	Mean baseline and intervention scores are respectively 6 and 8.5, indicating an overall rise in level between baseline and intervention phases.
Changes in Trend	The trend of the two baseline datapoints indicates a sharp climb, although this can only be speculative due to low predictability when there are only two datapoints. The intervention trendline shows overall decrease with high variability and somewhat inconsistent pattern.
Changes in Variability	Variability increases from baseline to intervention, with score ranges 7 and 8 respectively.
Immediacy of Effects	The score rises immediately at intervention phase onset, beyond any baseline score, remaining above any baseline score for the next datapoint also.
Overlap of Datapoints	Three of the highest datapoints at intervention are higher than any at baseline, and one at baseline is lower than any at intervention. The percentage of data overlap between phases is 50%.

Figure 5.5: Scatter Graph of Callum's Teacher-Rated Engagement Frequency Scores (Mrs Crawford)

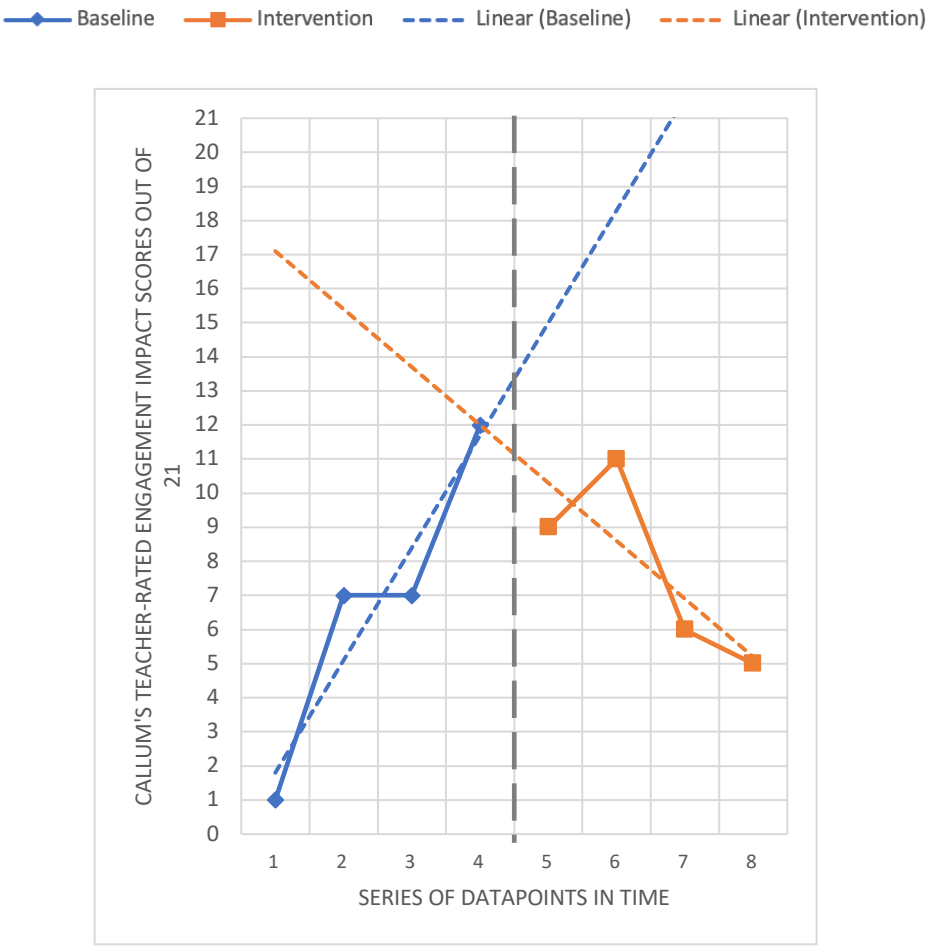


5.3.2.3 Callum's Teacher-Rated Engagement Impact (Mrs Crawford)

Table 5.8: Visual Analysis of Callum's Teacher-Rated Engagement Impact (Mrs Crawford)

Changes in Level	Mean baseline and intervention scores are respectively 6.75 and 7.5, possibly indicating a rise in the overall level between baseline and intervention phases.
Changes in Trend	The trendline of the intervention phase rises sharply upwards for baseline and decreases at intervention, with a slightly shallower gradient.
Changes in Variability	Score range decreases from baseline at 11 to intervention at 6. Intervention datapoints show lower variability. The highest and lowest datapoints overall are found at baseline.
Immediacy of Effects	At intervention onset the score drops but climbs again at the next datapoint.
Overlap of Datapoints	All datapoints at intervention overlap with baseline scores. The percentage of data overlap between phases is 75%.

Figure 5.6: Scatter Graph of Callum's Teacher-Rated Engagement Impact Scores (Mrs Crawford)

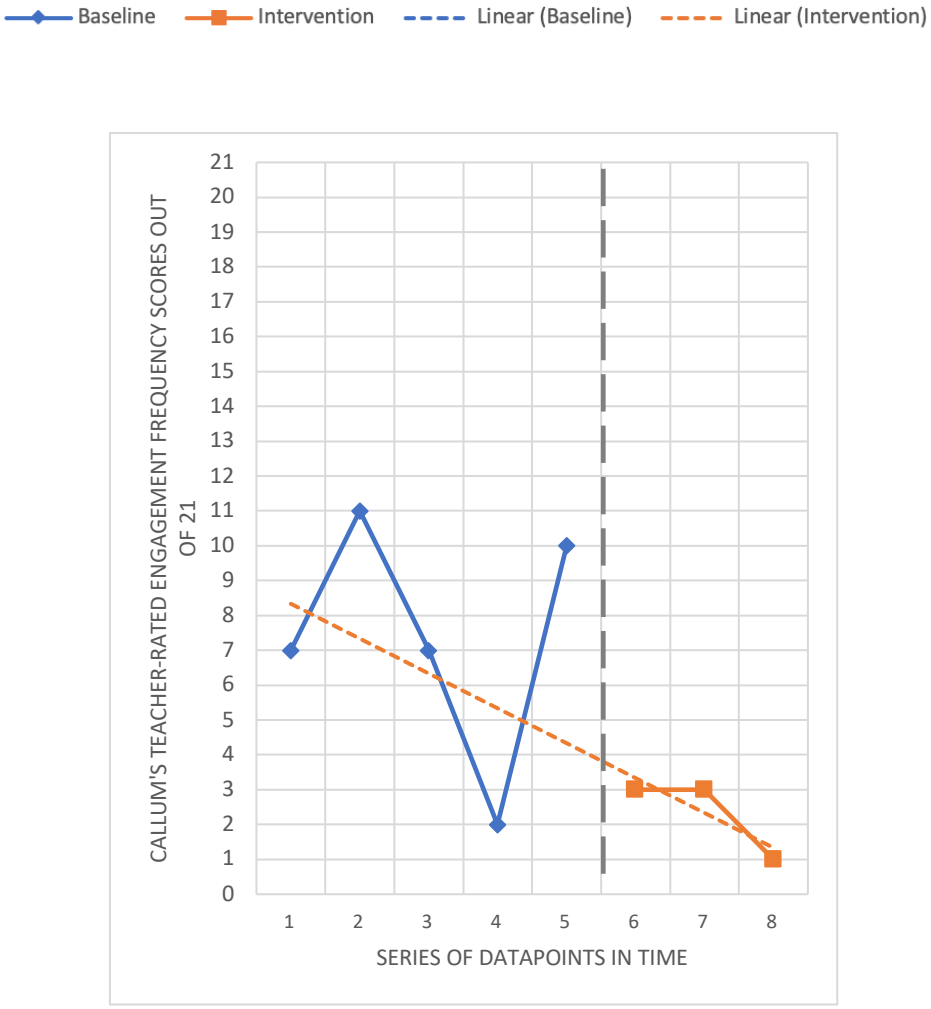


5.3.2.4 Callum's Teacher-Rated Engagement Frequency (Mrs Harrington)

Table 5.9: Visual Analysis of Callum's Teacher-Rated Engagement Frequency (Mrs Harrington)

Changes in Level	A higher score level is shown at baseline than at intervention, with means of 7.4 and 2.33 respectively, indicating an overall drop in score at intervention.
Changes in Trend	Both trendlines show a downwards slope, although it is sharper at intervention.
Changes in Variability	Data are highly variable at baseline compared to intervention. Score ranges decrease from 9 to 2.
Immediacy of Effects	The score drops immediately at intervention onset, but the datapoint preceding the last baseline datapoint was at a lower level than the drop at intervention onset.
Overlap of Datapoints	Four baseline datapoints are above that of any at intervention and one intervention datapoint is below any at baseline. The percentage of data overlap between phases is 27%.

Figure 5.7: Scatter Graph of Callum's Teacher-Rated Engagement Frequency Scores (Mrs Harrington)

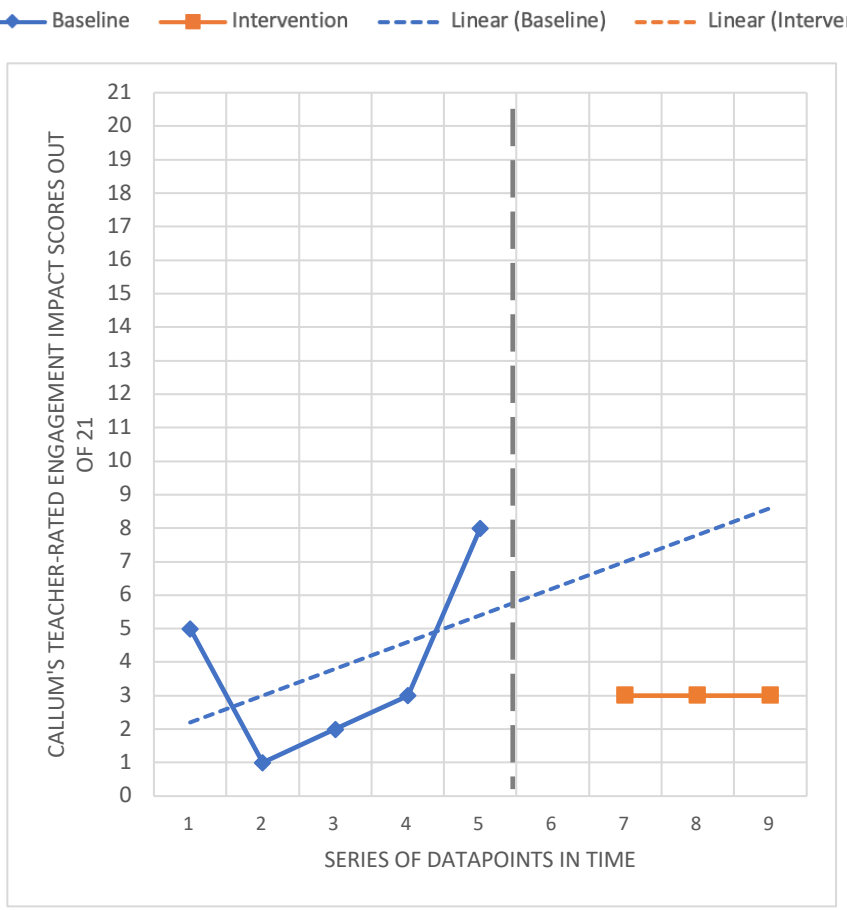


5.3.2.5 Callum's Teacher-Rated Engagement Impact (Mrs Harrington)

Table 5.10: Visual Analysis of Callum's Teacher-Rated Engagement Impact (Mrs Harrington)

Changes in Level	Mean score decreases from intervention to baseline; from 3.88 to 3, respectively.
Changes in Trend	The climbing trendline compared to the flat trajectory of the intervention phase indicates a deceleration of increase in score at intervention phase.
Changes in Variability	Score range decreases from baseline at 6 to intervention at 0. The baseline is highly variable and inconsistent, with 2 datapoints above any at intervention, and 2 below, compared to the three identical intervention datapoints.
Immediacy of Effects	Scores level out at intervention onset, although at a level below the two highest baseline datapoints.
Overlap of Datapoints	All intervention data are within the baseline data range. The percentage of data overlap between phases is 50%.

Figure 5.8: Scatter Graph of Callum's Teacher-Rated Engagement Impact Scores (Mrs Harrington)



5.3.2.6 Summary of Findings for Callum

Callum's self-ratings show a different pattern to his teacher ratings because his self-rated data was combined for both Mrs Crawford's and Mrs Harrington's lessons. It is unclear whether the consecutive self-rated high scores following intervention onset could suggest possible intervention effects due to the same high score occurring at the last baseline datapoint. Unstable intervention phase data, climbing baseline trend, and possible ceiling effects also severely limit reliability. Where a maximum score of ten was reached, given the option it may have been rated higher in either phase.

Callum's teacher-rated engagement frequency from Mrs Crawford cannot be reliably interpreted due to few datapoints and climbing trendlines. It is unclear whether the intervention score rising above any at baseline suggests intervention effects at

intervention onset, also due to scores decreasing after the raised level. This onset pattern is not shown for impact, but the decreasing trend in intervention data is.

Callum's teacher-rated engagement frequency and impact from Mrs Harrington show reduced variability, however interpretations are very limited again due to few datapoints. Callum's results seem inconclusive overall with no clear effects.

5.3.3 Oscar

Oscar also had two class teachers in job-share roles. Both teachers' ratings are treated separately again, with self-rated engagement analysed as one measure.

Oscar rated his own engagement generally every day from late-October to mid-November (half term in-between). Both teachers rated his engagement generally twice a week, from late-October to mid-November. Intervention implementation started in the first week of November, and intervention phase immediately followed. The missing datapoint in the baseline self-rating data was an un-rated measure labelled 'unrecorded'. Measures were not always taken in a consistent pattern due to changes to teacher job-share routines and unexpected change such as Oscar working with a TA, therefore delaying some measures by a day.

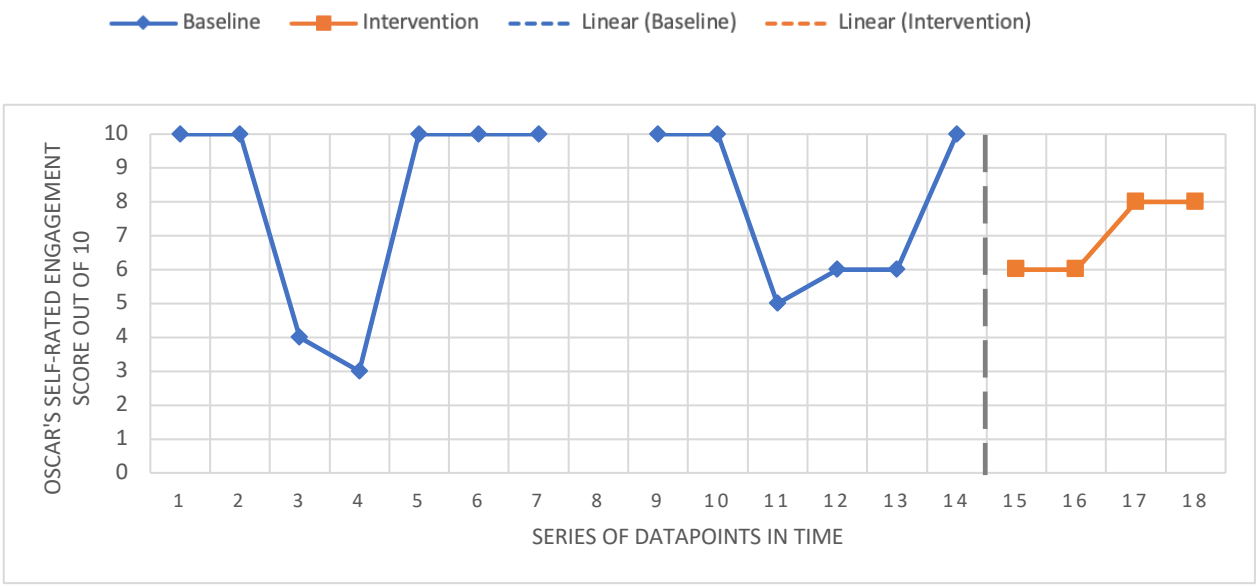
Although included in the thematic analysis, it is also worth noting here that at review, Mrs Harrington reported she felt that for Oscar's self-ratings, he seemed to be rating his enjoyment of the lesson topic or content, rather than engagement.

5.3.3.1 Oscar's Self-Rated Engagement

Table 5.11: Visual Analysis of Oscar's Self-Rated Engagement

Changes in Level	Mean score decreases from baseline at 8 to intervention at 7.
Changes in Trend	Slight downwards slope in baseline and, and a sharper upwards slope for intervention.
Changes in Variability	Highly variable and inconsistent baseline and possible ceiling effects. Eight baseline datapoints are above any intervention datapoints, and three are below. Range decreases from 7 at baseline to 2 at intervention.
Immediacy of Effects	Score drops at intervention onset but remains within baseline range.
Overlap of Datapoints	All intervention datapoints are within the baseline data range. The percentage of data overlap between phases is 35%.

Figure 5.9: Scatter Graph of Oscar's Self-Rated Engagement Scores

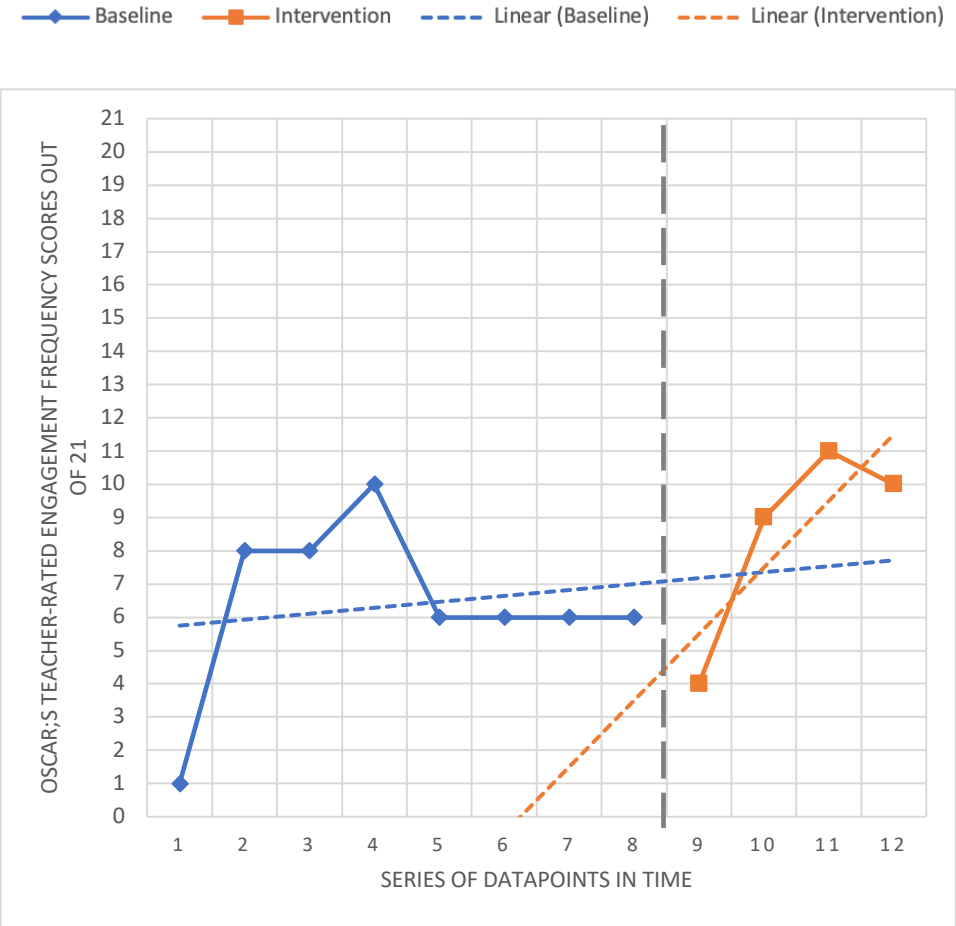


5.3.3.2 Oscar's Teacher-Rated Engagement Frequency (Mrs Crawford)

Table 5.12: Visual Analysis of Oscar's Teacher-Rated Engagement Frequency (Mrs Crawford)

Changes in Level	Mean score increases from 6.38 at baseline to 8.5 at intervention.
Changes in Trend	The trendlines indicate a gentle climb at baseline and sharper climb at intervention.
Changes in Variability	Both phases have high variability although baseline stabilises for the last few datapoints. The range decreases from 9 at baseline to 7 at intervention.
Immediacy of Effects	At intervention onset, the score drops slightly and climbs sharply, with a peak datapoint above that of any at intervention, within the first three datapoints.
Overlap of Datapoints	The first score at baseline is lower than any at intervention, and the highest intervention score is higher than any at baseline. The percentage of data overlap between phases is 84%.

Figure 5.10: Scatter Graph of Oscar's Teacher-Rated Engagement Frequency Scores (Mrs Crawford)

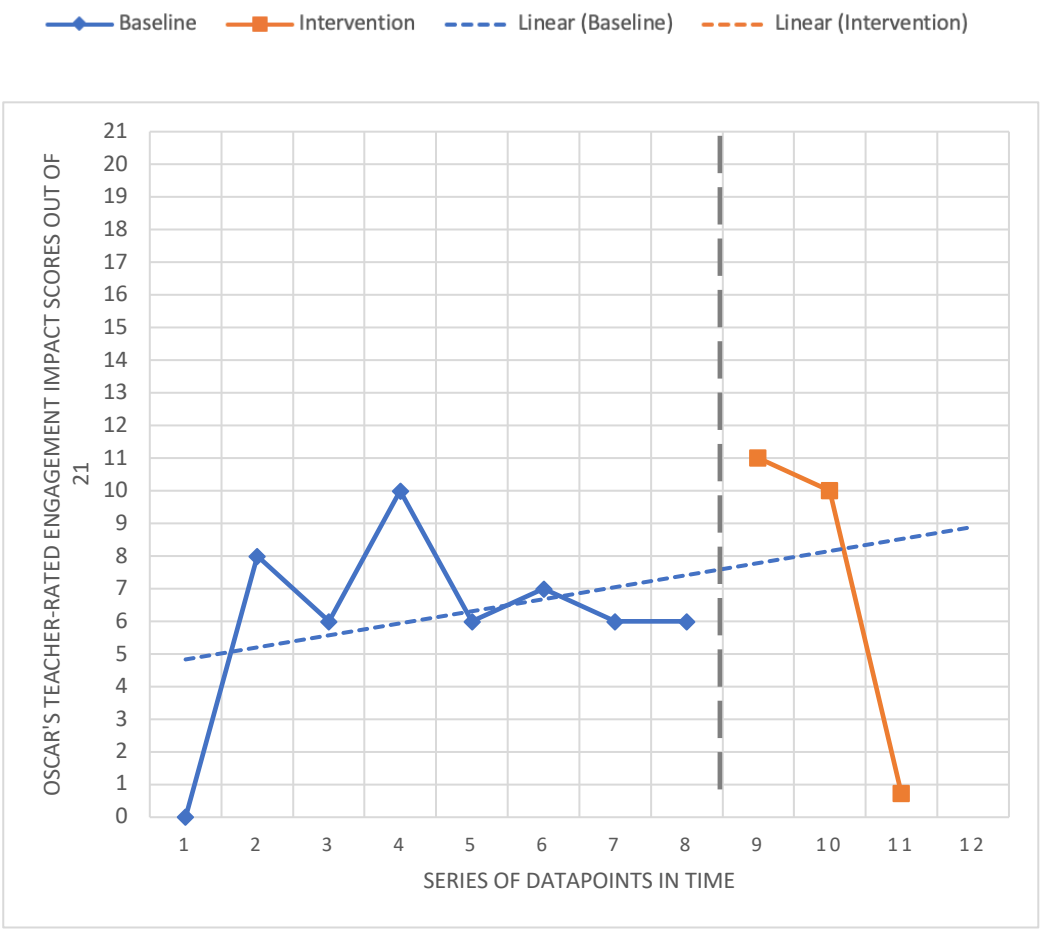


5.3.3.3 Oscar's Teacher-Rated Engagement Impact (Mrs Crawford)

Table 5.13: Visual Analysis of Oscar's Teacher-Rated Engagement Impact (Mrs Crawford)

Changes in Level	Mean scores increase from baseline at 6.13 to intervention at 10.5.
Changes in Trend	The baseline trendline gently increases and shows a sharp downwards slope at intervention.
Changes in Variability	Baseline seems more stable for the last half of the baseline phase. The range remains the same between phases (10), although the standard deviation decreases from 2.85 at baseline to 0.71 at intervention.
Immediacy of Effects	Possible immediate effects can be seen, with a sharp increase in intervention score above any at baseline.
Overlap of Datapoints	The lowest baseline score is lower than any at intervention, and the highest intervention score is higher than any at baseline. The percentage of data overlap between phases is 82%.

Figure 5.11: Scatter Graph of Oscar's Teacher-Rated Engagement Impact Scores (Mrs Crawford)

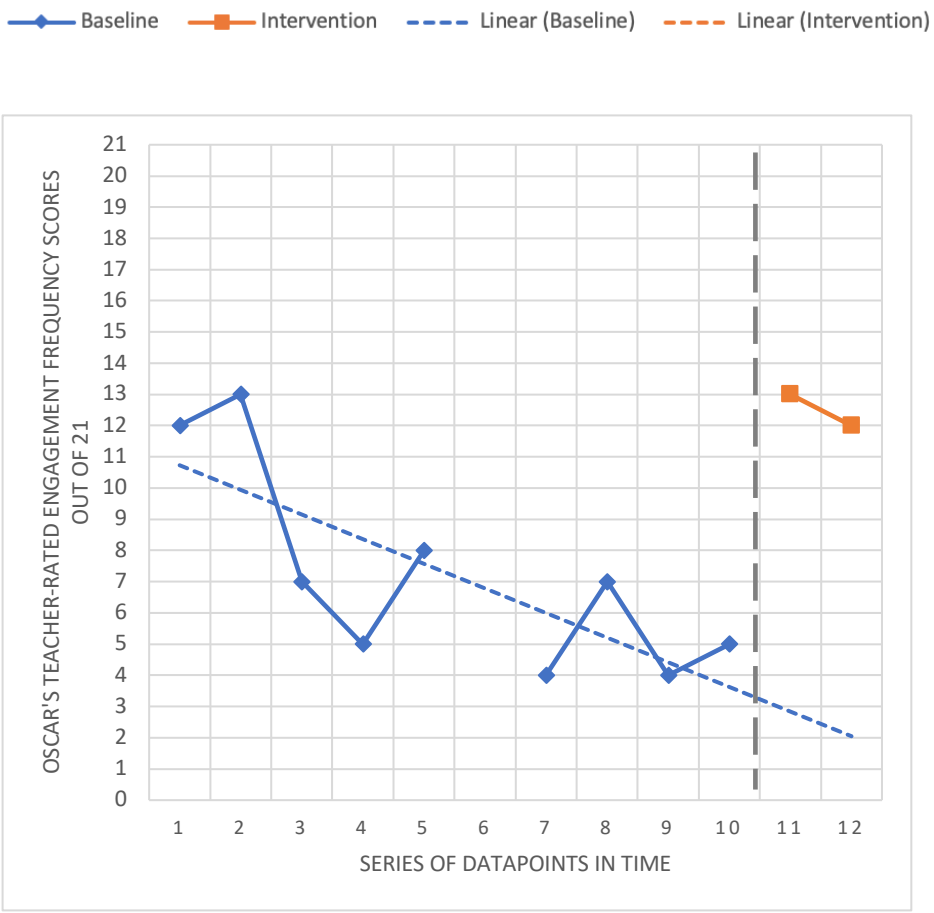


5.3.3.4 Oscar's Teacher-Rated Engagement Frequency (Mrs Harrington)

Table 5.14: Visual Analysis of Oscar's Teacher-Rated Engagement Frequency (Mrs Harrington)

Changes in Level	Mean scores rise from 2.22 at baseline to 12.5 at intervention.
Changes in Trend	The baseline trendline decreases overall, and the intervention appears to decrease.
Changes in Variability	Score range decreases from baseline at 9 to intervention at 1.
Immediacy of Effects	Sharp immediate increase at intervention onset to the highest score found at baseline.
Overlap of Datapoints	The two intervention scores overlap with the two highest baseline scores. The percentage of data overlap between phases is 36%

Figure 5.11: Scatter Graph of Oscar's Teacher-Rated Engagement Frequency Scores (Mrs Harrington)

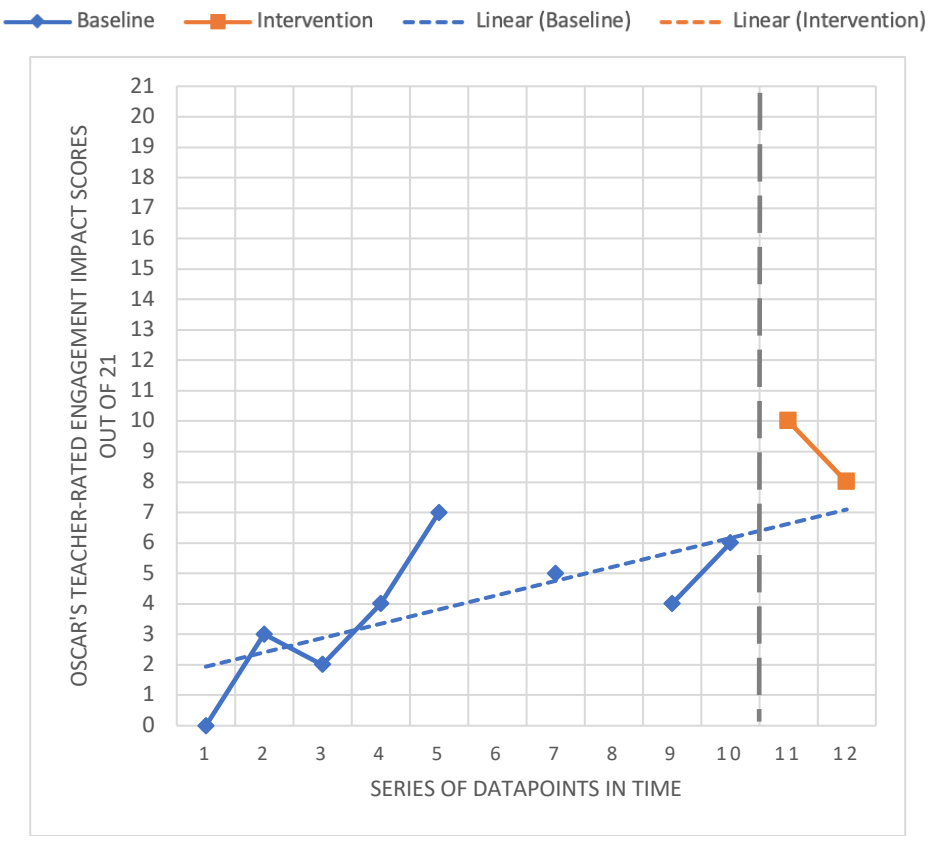


5.3.3.5 Oscar's Teacher-Rated Engagement Impact (Mrs Harrington)

Table 5.15: Visual Analysis of Oscar's Teacher-Rated Engagement Impact (Mrs Harrington)

Changes in Level	Mean scores increase from baseline at 3.88 to intervention at 9.
Changes in Trend	Baseline shows a climbing trend, whilst intervention suggests a decreasing trend.
Changes in Variability	Score range decreases from baseline at 7 to intervention at 2.
Immediacy of Effects	The first intervention score is higher than any at baseline and above the baseline's climbing trendline.
Overlap of Datapoints	The percentage of data overlap between phases is 0%

Figure 5.12: Scatter Graph of Oscar's Teacher-Rated Engagement Impact Scores (Mrs Harrington)



5.3.3.6 Summary of Findings for Oscar

Oscar's self-ratings show a different pattern to his teacher ratings, as for Callum. The seemingly reduced self-rated engagement at intervention onset suggests a negative effect but interpretation is unreliable due to high variability and few intervention datapoints.

Oscar's teacher-rated engagement frequency from Mrs Crawford shows an increase in score level from baseline to intervention and a sharply climbing trend, indicating positive intervention effects. However, reliability is again very limited.

As with engagement frequency, baseline for engagement impact from Mrs Crawford seems stable for the last half of the baseline phase. The sharp score increase above any at baseline could indicate immediate intervention effects, although the downwards sloping trend contradicts this. Despite extremely low reliability due to lack of datapoints, the data might suggest a positive effect.

Oscar's teacher-rated engagement frequency from Mrs Harrington also suggests possible immediate intervention effects although it reaches the same score as the first at baseline. Again, very few datapoints and unstable baseline severely limit reliability.

Despite a climbing baseline trend making intervention effects unreliable, the sharp score increase at intervention onset for Oscar's teacher-rated engagement impact from Mrs Harrington suggests a possible immediate intervention effect.

5.3.4 Gregor

Gregor's teacher taught him three consecutive days a week. His data was collected by the same teacher between mid-September and mid-December. The baseline ran from mid-September to mid-November, with measures taking place each day he was taught by the teacher.

The first three missing baseline datapoints are when measures did not take place due to Gregor's school absence. Intervention strategies were implemented in early December and the intervention measures began immediately following this.

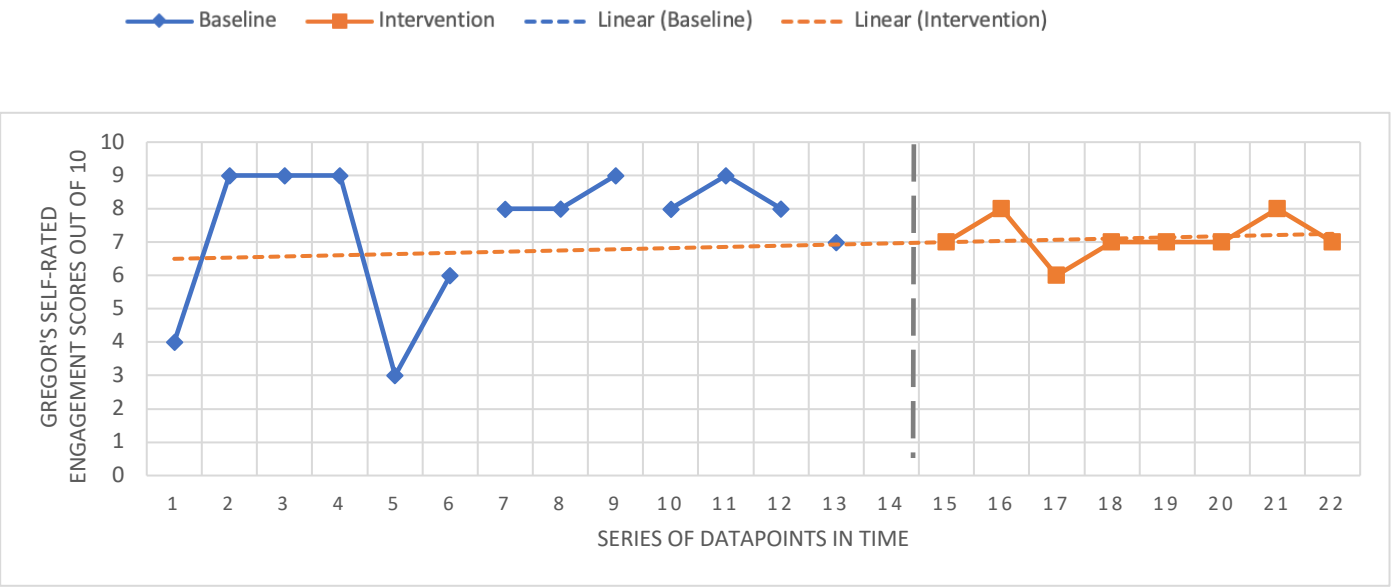
There was a two-week gap between baseline and intervention phases due to the initial intervention set-up being scheduled for the start of this period but being cancelled and delayed by two weeks, and baseline measurements did not continue during this period. This gap is signified on the graphs by a missing datapoint at the end of the baseline phase, although in reality, it is more.

5.3.4.1 Gregor's Self-Rated Engagement

Table 5.16: Visual Analysis of Gregor's Self-Rated Engagement

Changes in Level	Mean score drops slightly from baseline at 7.46 and to intervention at 7.13.
Changes in Trend	The trendlines climb with gentle slopes, with the baseline climbing at a slightly sharper rate.
Changes in Variability	The scores Range score decreases from baseline at 6, to intervention at 2.
Immediacy of Effects	There is no change in score at intervention onset.
Overlap of Datapoints	The 5 highest and 2 lowest scores at baseline are not reached at intervention. The percentage of data overlap between phases is 33%.

Figure 5.13: Scatter Graph of Gregor's Self-Rated Engagement Scores

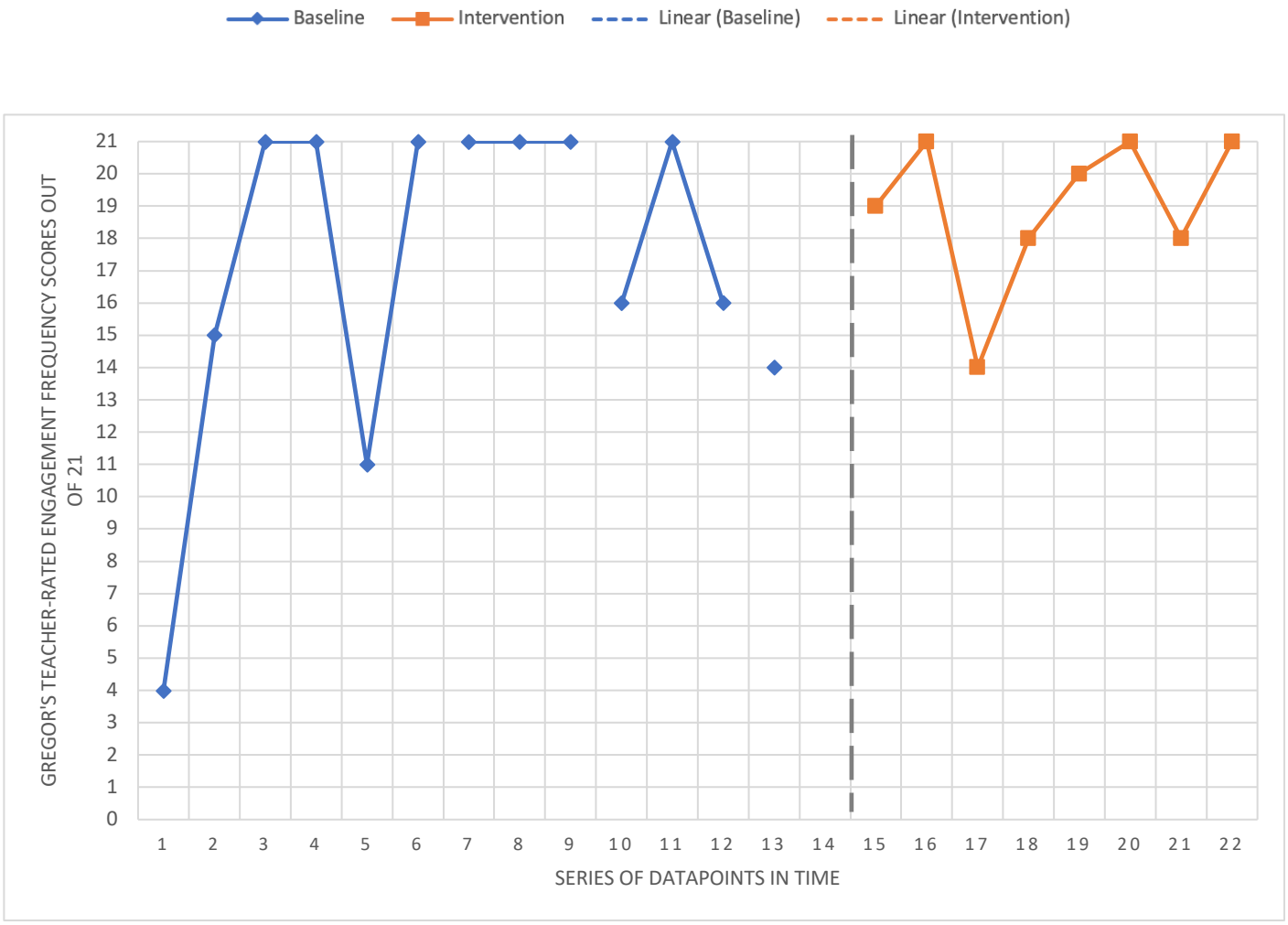


5.3.4.2 Gregor's Teacher-Rated Engagement Frequency

Table 5.17: Visual Analysis of Gregor's Teacher-Rated Engagement Frequency

Changes in Level	The overall level difference between baseline and intervention shows an increase in mean scores, from 17.15 to 19.
Changes in Trend	The trends in the data indicate an upwards slope for both baseline and intervention, with intervention data showing less of a steep slope.
Changes in Variability	The data are more variable at baseline, with two data points lower than any at intervention. Range score decreases from 17 at baseline to 7 at intervention.
Immediacy of Effects	The score rises at intervention onset for the first two datapoints, but not beyond the range of baseline scores.
Overlap of Datapoints	The percentage of data overlap between phases is 89.5%.

Figure 5.14: Scatter Graph of Gregor's Teacher-Rated Engagement Frequency Scores

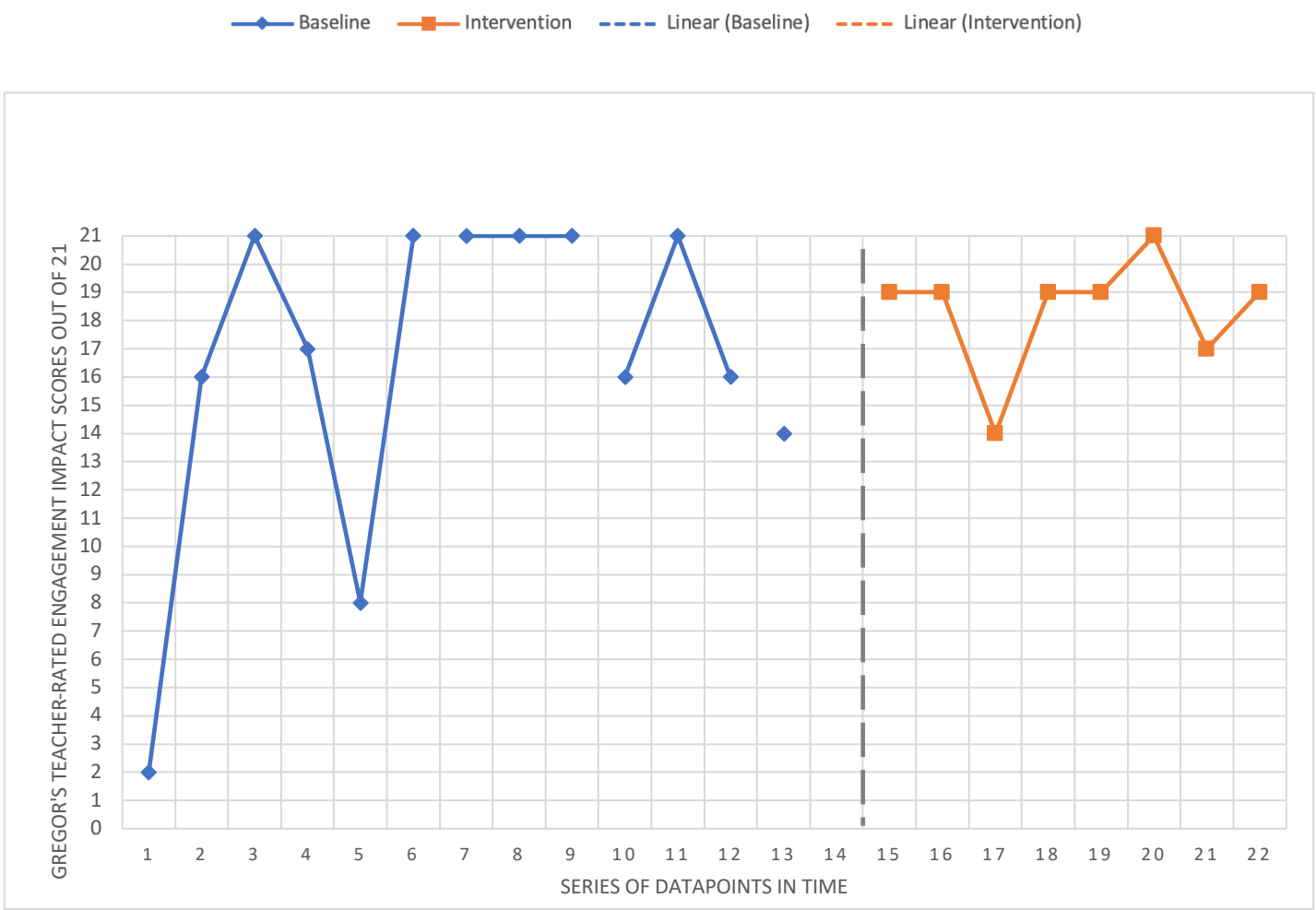


5.3.4.3 Gregor's Teacher-Rated Engagement Impact

Table 5.18: Visual Analysis of Gregor's Teacher-Rated Engagement Impact

Changes in Level	Mean scores increase from 16.54 at baseline to 18.38 at intervention.
Changes in Trend	The trends in the data indicate an upwards slope for both baseline and intervention, with intervention data showing less of a steep slope. The range score decreases from 19 at baseline to 7 at intervention.
Changes in Variability	The data are more variable at baseline, with two data points lower than any at intervention.
Immediacy of Effects	The first two datapoints rise at intervention onset, but not beyond baseline levels.
Overlap of Datapoints	The percentage of data overlap between phases is 90%.

Figure 5.15: Scatter Graph of Gregor's Teacher-Rated Engagement Impact Scores



5.3.4.4 Summary of Findings for Gregor

Gregor's self-rated engagement appears very variable at the start of baseline, stabilising towards the end, but before intervention onset, therefore indicating no intervention effects.

For Gregor's teacher-rated engagement frequency It is unclear whether the downward trajectory of the last few baseline datapoints, compared to the two increasing scores at intervention onset, could indicate a slight immediate effect or not, due to unstable baseline. It is also unknown whether intervention scores would be above top ceiling baseline scores, so this result appears inconclusive.

Gregor's teacher-rated engagement impact shows a similar pattern to the frequency; variability may have reduced although variable baseline and ceiling scores make it unclear whether this is an effect of the intervention.

The ceiling scores are a clear mode at baseline for both teacher rating measures. The absence of this effect at intervention indicates more frequently occurring high scores at baseline than intervention.

5.3.5 Christopher

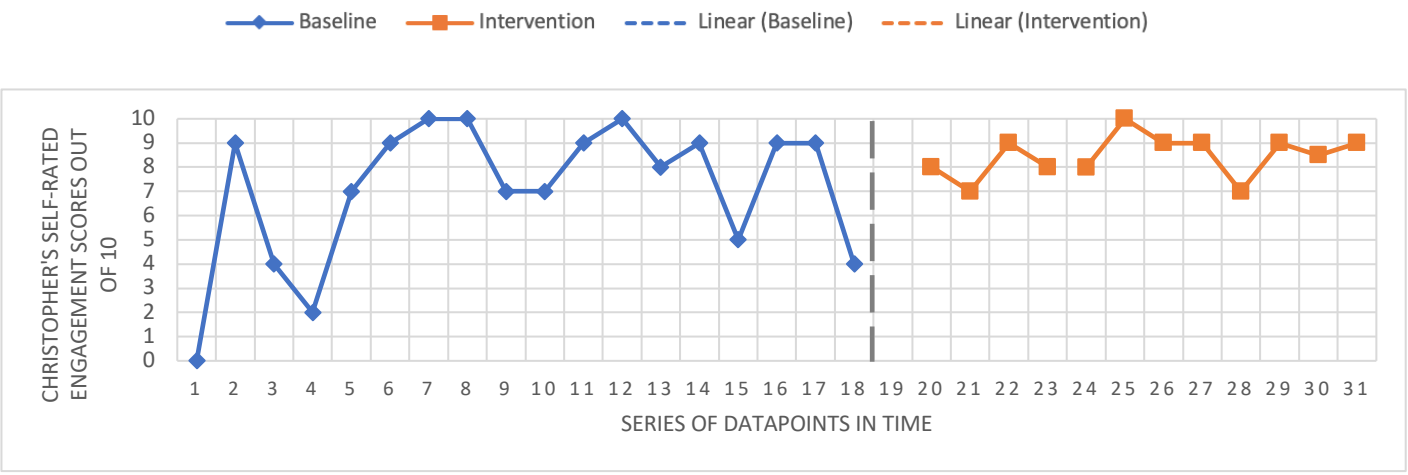
Christopher's data was collected by his TA between mid-September and mid-January, between 2-4 times a week, when he was working one-to-one with her (occasionally he was in class for whole-class input or activity in which case the measures did not take place). This was a reasonably regular pattern, so the absent measures are not recorded as missing datapoints. The intervention was implemented in mid-December with the start of intervention measures a week and half after the last baseline datapoint; this gap is signified as a missing datapoint at the end of the baseline. Half-term took place after the third intervention datapoint; also indicated by a missing datapoint although in reality this was just over two weeks.

5.3.5.1 Self-Rated Engagement

Table 5.19: Visual Analysis of Christopher's Self-Rated Engagement

Changes in Level	Mean scores increase from baseline at 7.11 to intervention at 8.46.
Changes in Trend	The trends are similar between phases, with the baseline indicating a slightly sharper climb.
Changes in Variability	Greater variability and less stability at baseline. Range score decreases from baseline at 9, to intervention at 3.
Immediacy of Effects	A rise in score is shown at intervention onset but not beyond the highest baseline scores.
Overlap of Datapoints	The percentage of data overlap between phases is 83%.

Figure 5.16: Scatter Graph of Christopher's Self-Rated Engagement Scores

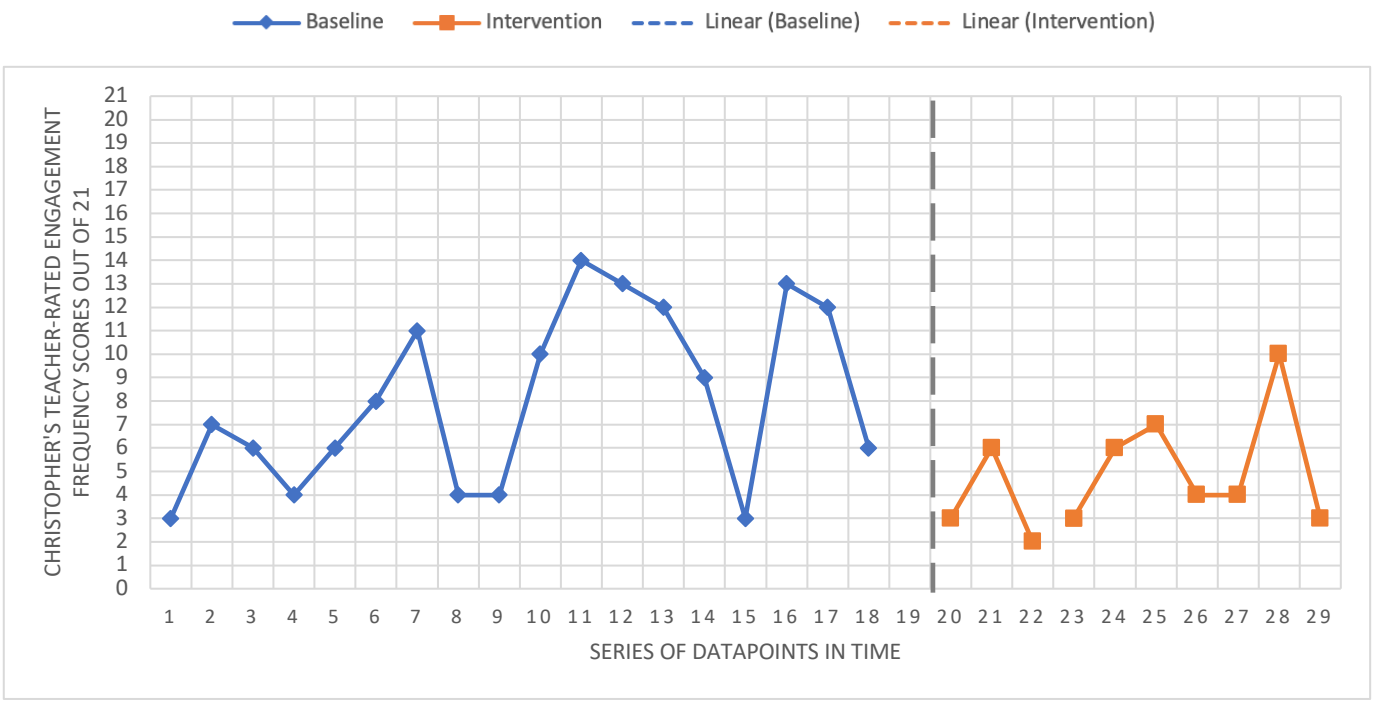


5.3.5.2 Teacher-Rated Engagement Frequency

Table 5.20: Visual Analysis of Christopher's Teacher-Rated Engagement Frequency

Changes in Level	Mean level decreases from baseline at 8.05 to intervention at 4.8.
Changes in Trend	Baseline and intervention trendlines both climb but baseline slightly more sharply.
Changes in Variability	Score range decreases from baseline at 11 to intervention at 7.
Immediacy of Effects	Score drops at intervention onset, with a falling trajectory in the preceding baseline scores.
Overlap of Datapoints	The percentage of data overlap between phases is 75%.

Figure 5.17: Scatter Graph of Christopher's Teacher-Rated Engagement Frequency Scores

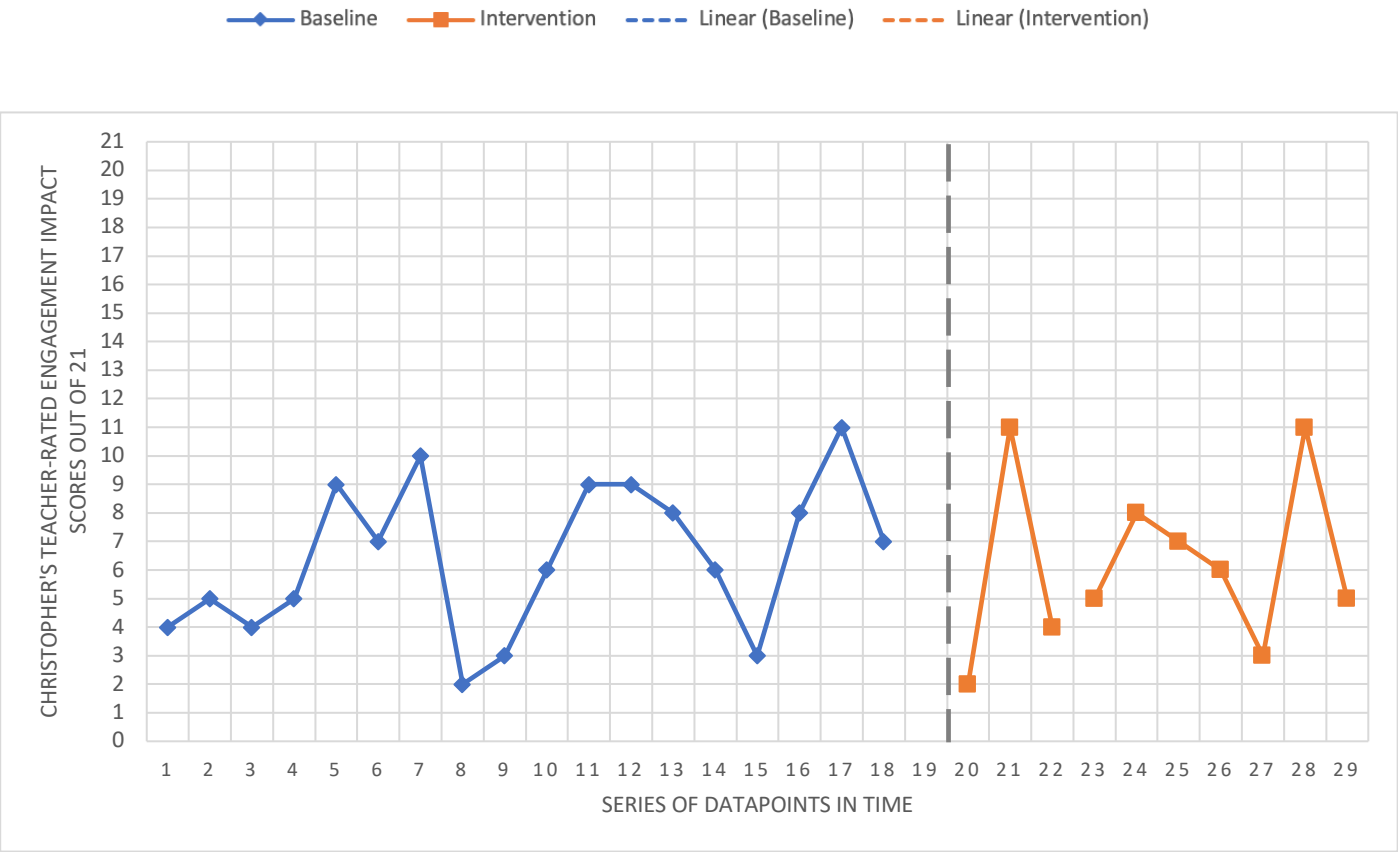


5.3.5.3 Teacher-Rated Engagement Impact

Table 5.21: Visual Analysis of Christopher's Teacher-Rated Engagement Impact

Changes in Level	Mean scores decrease slightly from 6.44 at baseline to 6.2 at intervention.
Changes in Trend	The trendlines for both phases climb at very similar rates, the baseline with an almost imperceptibly steeper climb.
Changes in Variability	Baseline has five scores below any at intervention phase. Score ranges remain the same at both phases (9), although the standard deviation increases from 2.64 at baseline to 3.04 at intervention.
Immediacy of Effects	Score drops at intervention onset, with a falling trajectory in the preceding baseline scores.
Overlap of Datapoints	The percentage of data overlap between phases is 100%.

Figure 5.18: Scatter Graph of Christopher's Teacher-Rated Engagement Impact Scores



5.3.5.4 Summary

The highly variable baseline for Christopher's self-rated engagement severely limits reliability. Intervention scores are less variable than baseline but are all within the range of the baseline scores, suggesting slightly reduced variability. The intervention scores rising above and remaining above the last baseline datapoint might indicate a slight but immediate intervention effect, although high variability makes this inconclusive.

Christopher's teacher-rated engagement frequency also shows unstable, highly variable baseline. The overall change in level shows a decrease from baseline to intervention which might suggest a reduced engagement frequency in intervention phase.

For Christopher's teacher-rated engagement impact the overall level shows little difference from baseline to intervention, indicating no intervention effect. Reliability is severely limited due to a highly unstable baseline and intervention.

5.3.6 Giovanni

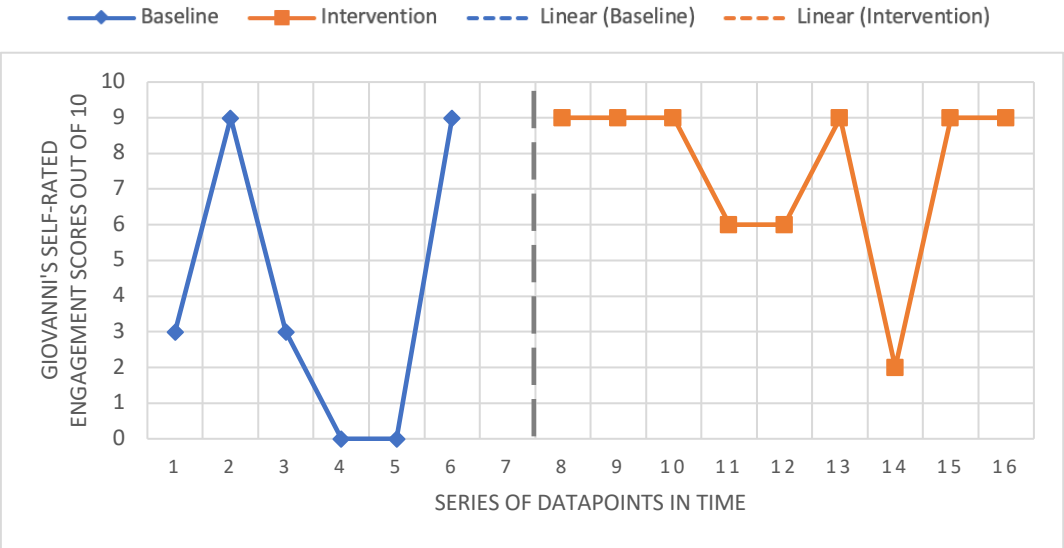
Giovanni was taught by his teacher three days a week due to teacher job-share. His data was collected between the start of October to the end of January. There was a substantial gap between baseline and intervention data due to October half term, winter holidays, and very low attendance in between these holidays. This limits the reliability of interpretation as there is little to no experimental comparison possible due to the long period of unknown variables and engagement score patterns between phases. This gap is signified on the graphs with one missing datapoint, although in reality this would be many. Baseline phase ran for the first three weeks of October, and intervention for the last three weeks in January. Data collection took place over three consecutive days in the week when Giovanni's teacher taught him.

5.3.6.1 Self-Rated Engagement

Table 5.22: Visual Analysis of Giovanni's Self-Rated Engagement

Changes in Level	Mean scores increased from 4 at baseline to 7.56 at intervention.
Changes in Trend	The trend for the intervention phase slopes downwards whereas baseline trend appears flat.
Changes in Variability	The three consecutive highest scores of 9 at intervention indicate some stability but this is not maintained. Score range decreases from 9 at baseline to 7 at intervention.
Immediacy of Effects	At intervention onset there are three consecutive scores of 9, although this is the same score as the last baseline score.
Overlap of Datapoints	The percentage of data overlap between phases is 89%.

Figure 5.18: Scatter Graph of Giovanni's Self-Rated Engagement Scores

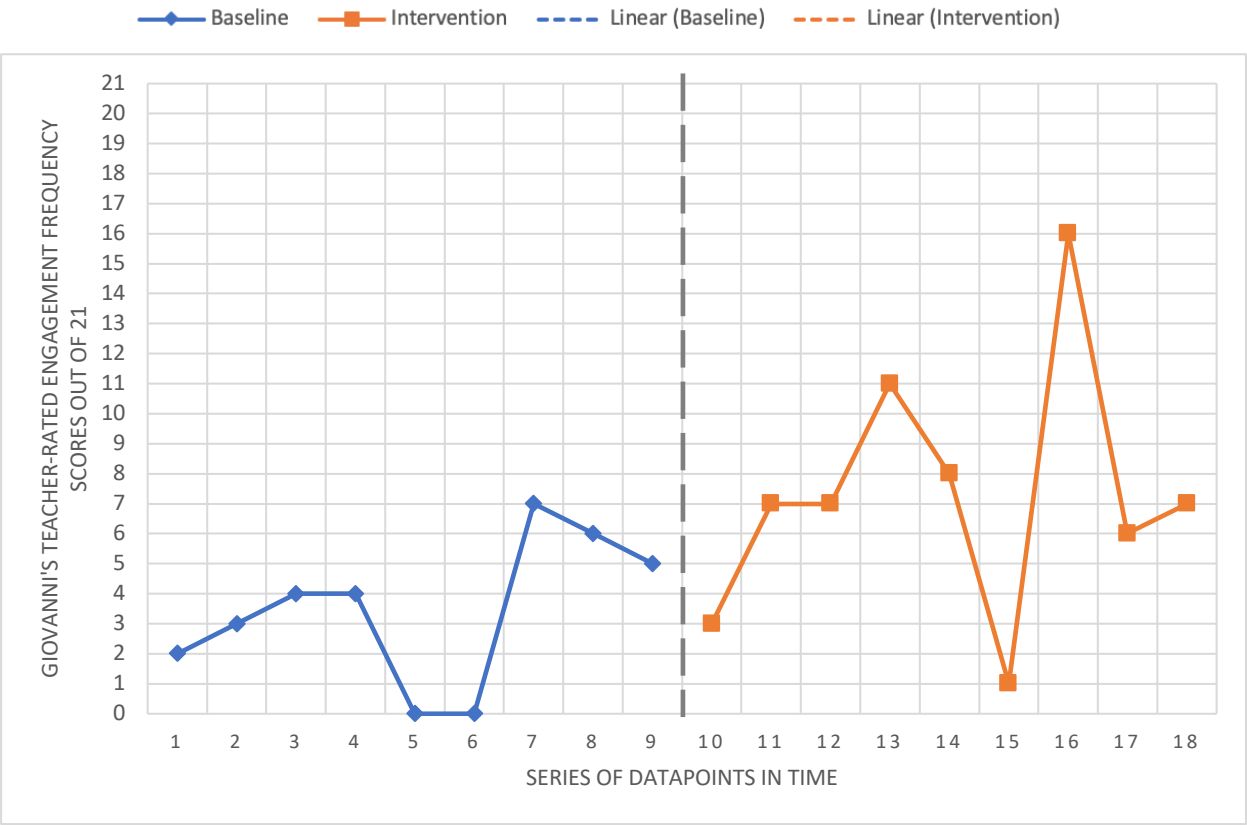


5.3.6.2 Teacher-Rated Engagement Frequency

Table 5.23: Visual Analysis of Giovanni's Teacher-Rated Engagement

Changes in Level	Mean score increases from baseline at 3.44 to intervention at 7.33.
Changes in Trend	The overall baseline and intervention trendlines show very similar upward slopes.
Changes in Variability	Score range increases from baseline at 7, to intervention at 15.
Immediacy of Effects	There is a rise in score one datapoint after intervention onset, to the top baseline score, then a rise above baseline at the fourth datapoint, indicating a small delay in effects.
Overlap of Datapoints	Three of the intervention data points are higher scores than any at baseline phase, and 2 baseline scores are lower than any at intervention phase. The percentage of data overlap between phases is 72%.

Figure 5.19: Scatter Graph of Giovanni's Teacher-Rated Engagement Frequency Scores

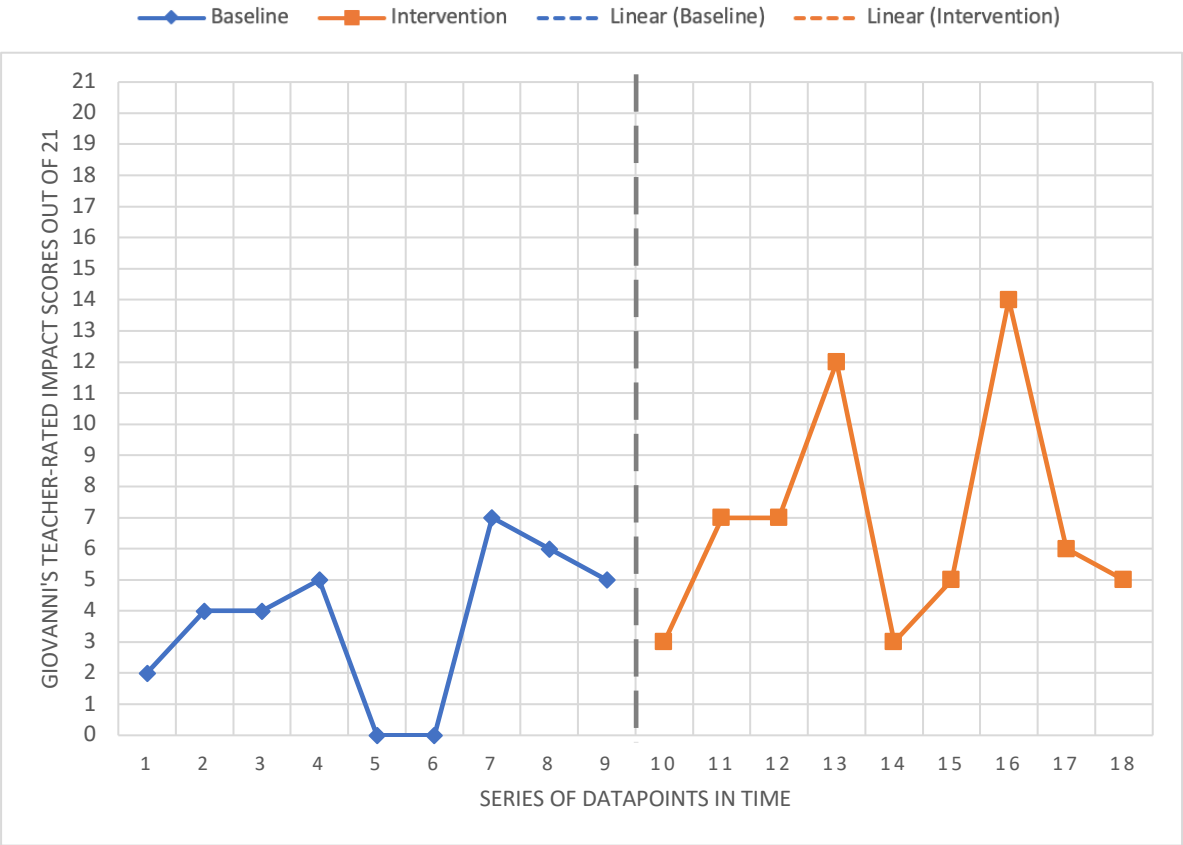


5.3.6.3 Teacher-Rated Engagement Impact

Table 5.24: Visual Analysis of Giovanni's Teacher-Rated Engagement Impact

Changes in Level	Mean score increases from baseline at 3.67 to intervention at 6.88.
Changes in Trend	The overall baseline and intervention trendlines show very similar upward slopes and the baseline trendline shows a slightly steeper slope.
Changes in Variability	Score range increases from baseline at 7, to intervention at 11.
Immediacy of Effects	There is a rise in score one datapoint after intervention onset, to the top baseline score, then a rise above baseline at the fourth datapoint, indicating a small delay in effects.
Overlap of Datapoints	Two of the intervention data points are higher scores than any at baseline phase, and 3 baseline scores are lower than any at intervention phase. The percentage of data overlap between phases is 72%.

Figure 5.20: Scatter Graph of Giovanni's Teacher-Rated Engagement Impact



5.3.6.4 Summary

Despite lack of experimental control due to the large gap between phases, and highly variable data, all of Giovanni's measures appear to increase in level during intervention phase overall.

For Giovanni's self-rated engagement, consecutive high scores at intervention onset might indicate a positive, immediate effect, although these scores are the same as the last baseline datapoint, so this trajectory could have taken place without intervention. There appears a general increase from baseline to intervention for self-rated engagement although the trendline declines at intervention and the highly variable inconsistent baseline data makes interpretation unreliable.

The score rises slightly between phases for both teacher-ratings, showing a slight delay. The first intervention scores being similar to baseline indicates low likelihood that possible effects could be explained by confounding variables related to the gap between phases.

Giovanni's teacher-rated engagement frequency and impact show increased variability at intervention phase, particularly for engagement frequency. Despite these reliability limitations, there is an overall increase in level between baseline and intervention phases, suggesting positive intervention effects within the first few intervention datapoints.

5.3.7 Simon

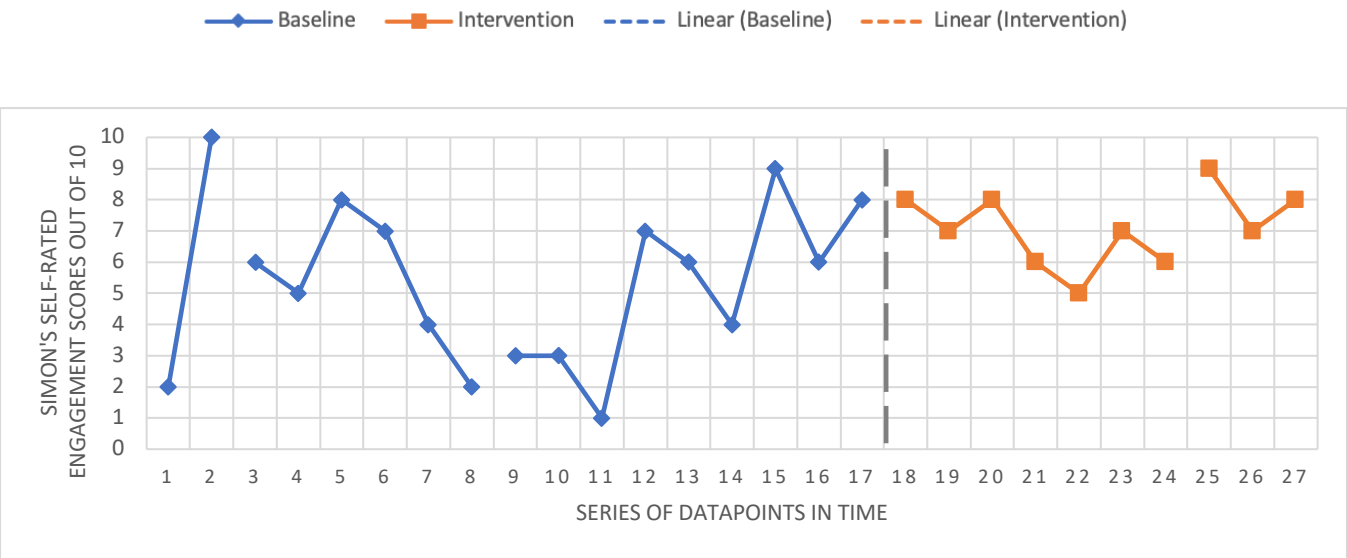
Simon's data was collected from the end of October to the end of February. The intervention setup had to be delayed twice due to staff illness and Simon's absence, therefore the baseline ran from the end of October to the end of January with breaks due to half term, winter holidays, and absence. The intervention phase ran between the start and end of February. The holiday breaks are indicated with single missing data points but realistically totalled three weeks. There is a missing datapoint at the end of baseline for teacher rated impact due to a missing rating.

5.3.7.1 Self-Rated Engagement

Table 5.25: Visual Analysis of Simon's Self-Rated Engagement

Changes in Level	Mean score increased from baseline at 5.35 to intervention at 7.1.
Changes in Trend	The trendlines climb gradually, with almost exactly the same slope.
Changes in Variability	Score range decreases from baseline at 9, to intervention at 4.
Immediacy of Effects	The score at intervention onset is the same at baseline.
Overlap of Datapoints	One baseline score is higher than any at intervention phase, and 7 are lower than any at intervention. The percentage of data overlap between phases is 70%.

Figure 5.21: Scatter Graph of Simon's Self-Rated Engagement Scores

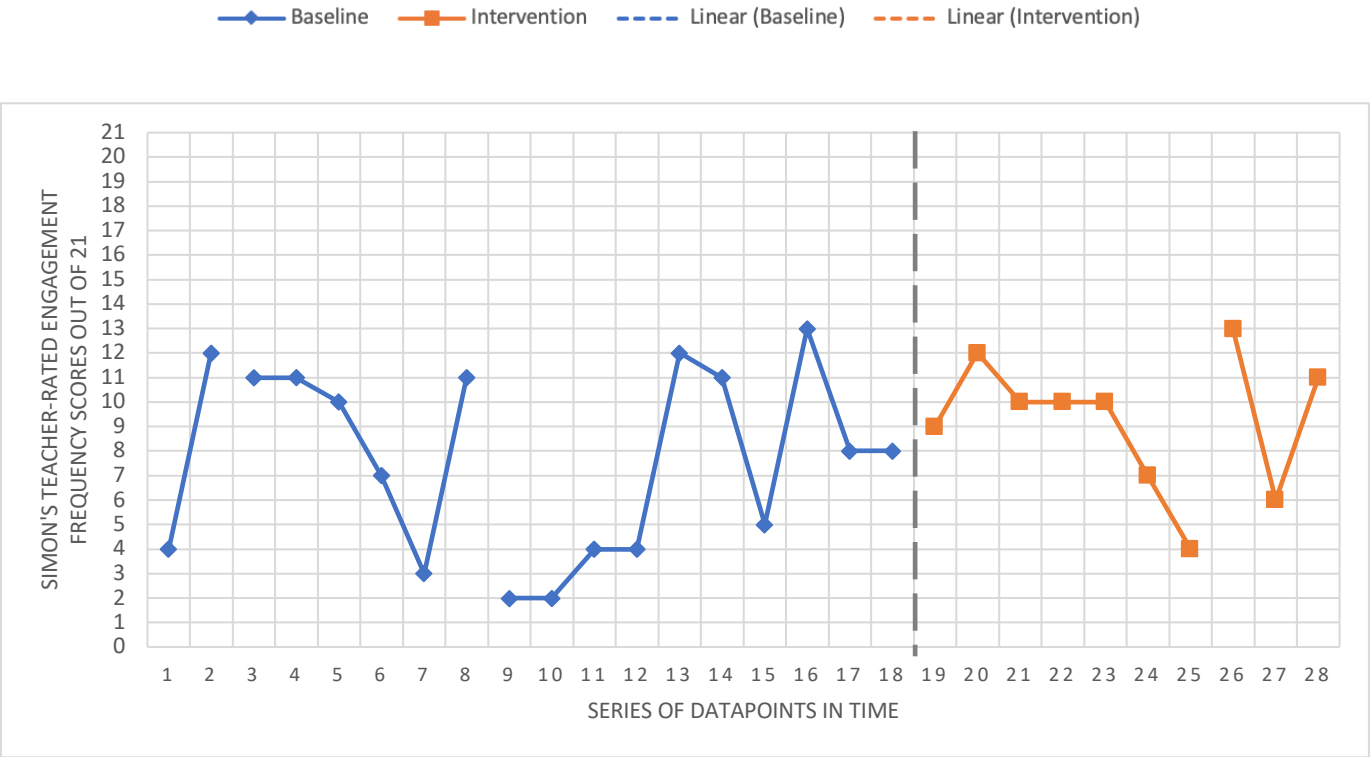


5.3.7.2 Teacher-Rated Engagement Frequency

Table 5.26: Visual Analysis of Simon's Teacher-Rated Engagement Frequency

Changes in Level	Mean score decreases from baseline at 7.67 to intervention at 9.2.
Changes in Trend	The baseline shows a flat trend and the intervention shows a downwards trend.
Changes in Variability	Score range decreases from baseline at 11 to intervention at 9.
Immediacy of Effects	The first intervention score is above the last baseline score, rising again at the next, but not at or beyond the top baseline score.
Overlap of Datapoints	The percentage of data overlap between phases is 89%.

Figure 5.22: Scatter Graph of Simon's Teacher-Rated Engagement Frequency Scores

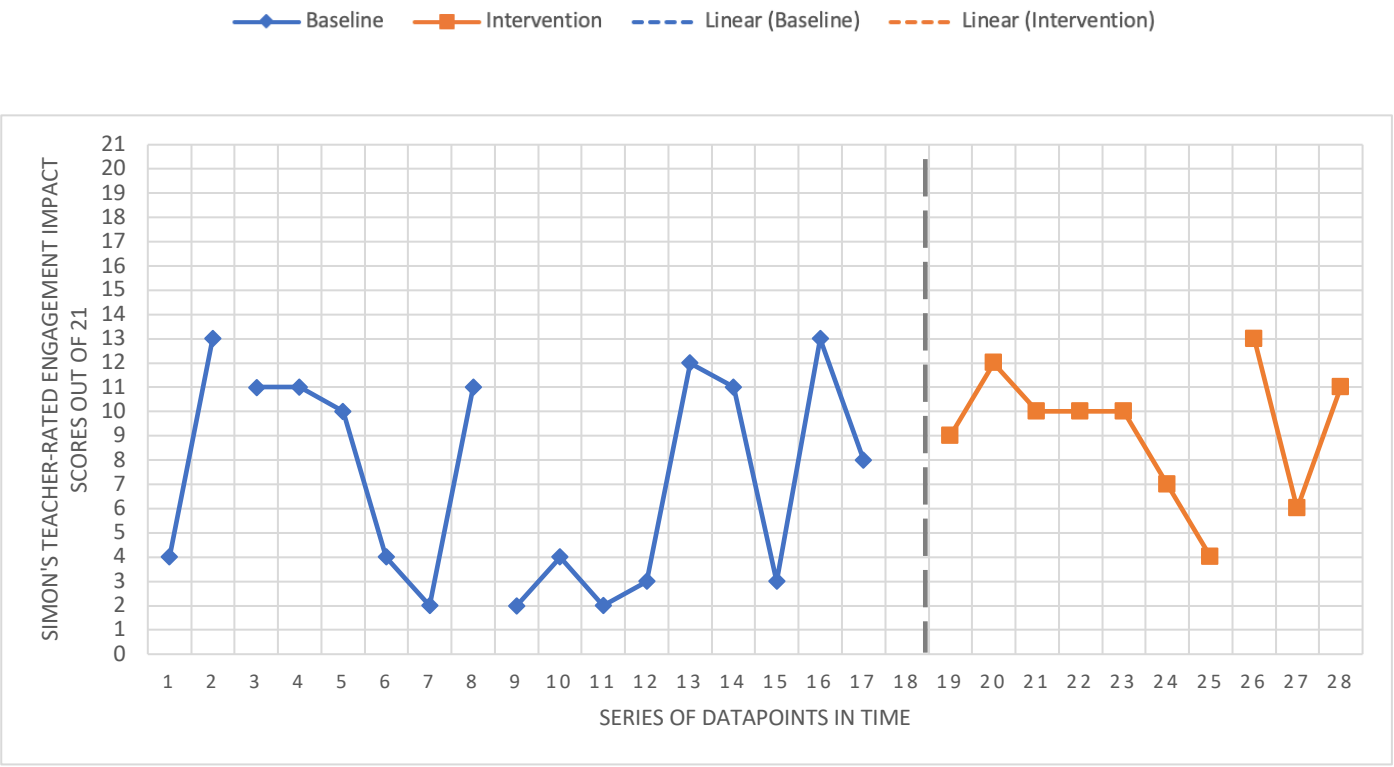


5.3.7.3 Teacher-Rated Engagement Impact

Table 5.27: Visual Analysis of Simon's Teacher-Rated Engagement Impac

Changes in Level	Mean score increases from baseline at 7.29, to intervention at 9.2.
Changes in Trend	Both trendlines slope downwards, with the intervention a little more sharply.
Changes in Variability	Score range decreases from baseline at 11 to intervention at 9.
Immediacy of Effects	The first intervention score is above the last baseline score, rising again at the next, but not at or beyond the top baseline score.
Overlap of Datapoints	The percentage of data overlap between phases is 81%.

Figure 5.23: Scatter Graph of Simon's Teacher-Rated Engagement Impact Scores



5.3.7.4 Summary

Highly variable baseline limits the reliability in determining the relationship between Simon's self-rated engagement baseline and intervention scores. The overall level appears slightly improved at intervention, with reduced variability, although baseline data appear to start to climb before intervention onset.

Simon's teacher-rated engagement and impact have highly variable and inconsistent baselines, severely limiting interpretation reliability. Baseline and intervention scores show a large overlap and both phases show high variability for both measures. However, the first 5 intervention datapoints for both teacher-rated measures show low variability. This might be explained by the intervention, although the highly unstable baseline limits reliability of this.

5.4 Possible Salient Findings Across Cases

Although cases have ideographic variables such as nature of attention difficulties, intervention implementation, and the ecological setting, an overall understanding is pursued of possible generalised effects of the common aspects of the intervention, on the engagement of children with attention difficulties in academic learning. This is tentatively outlined below.

5.4.1 Changes to Mean Scores

Mean comparison alone is non-experimental; it does not account for the onset of change within the experimental phase, or the trends, which in many cases either rise at baseline, or fall at intervention, or both. However, mean comparisons are outlined to identify the presence and magnitude of any change overall, without being affected by data variability.

There were 25 possible baseline-intervention score comparisons overall, amongst all individual measures used with all cases. The scores decreasing and increasing in mean level by one or more score unit are outlined in Tables 5.28 and 5.29. The shift in the means can be expressed as a percentage difference (Harbst et al., 1991), and is given for each.

Three out of 25 overall possible baseline-intervention comparisons showed a mean score decrease from baseline to interaction, by one or more score units, indicating engagement ratings decreased for these particular measures across 3 cases.

Table 5.28: Measures Decreasing in Mean Level by One or More Score Unit

Measure	**Mean Shift Decrease**
Callum's teacher-rated engagement frequency from Mrs Harrington	68.5%
Oscar's self-rated engagement	14.3%
Christopher's teacher-rated engagement frequency	40.4%

Fifteen out of 25 overall possible baseline-intervention comparisons showed a mean score increase from baseline to intervention, by one or more score units, indicating engagement ratings increased for these particular measures across all 7 cases.

Table 5.29: Measures Increasing in Mean Level by One or More Score Unit

Measure	**Mean Shift Increase**
Bailey's teacher-rated engagement frequency	53%
Callum's teacher-rated engagement frequency from Mrs Crawford	42%
Oscar's teacher-rated engagement frequency from Mrs Crawford	33%,
Oscar's teacher-rated engagement impact from Mrs Crawford	71%
Oscar's teacher-rated engagement frequency from Mrs Harrington (although, based on just two intervention datapoints - highly unreliable).	463%
Oscar's teacher-rated engagement impact from Mrs Harrington (although, based on just two intervention datapoints - highly unreliable).	50%
Gregor's teacher-rated engagement frequency	50%
Gregor's teacher-rated engagement impact	11%
Christopher's self-rated engagement	19%

Giovanni's self-rated engagement	89%
Giovanni's teacher-rated engagement frequency	113%
Giovanni's teacher-rated engagement impact	88%
Simon's self-rated engagement	33%
Simon's teacher-rated engagement frequency	18%
Simon's teacher-rated engagement impact	26.2%.

5.4.2 Effects on Variability

Seventeen of the 25 measure comparisons show a decrease in standard deviations of scores from baseline to intervention, by one or more score unit. This could indicate the intervention has a decreasing or 'stabilising' effect on the variability of scores, although subtle.

For Simon's and Gregor's data overall, the highest baseline scores reoccur in intervention phase, yet the lowest baseline scores do not. This possible stabilising effect is seen across several other measures including all of Bailey's and Callum's measures, and self-ratings for Oscar, Christopher and Giovanni.

Fourteen of these comparisons are for measures which showed a mean engagement score increase from baseline to intervention by one or more score unit, potentially suggesting these cases showed an engagement score increase at intervention as well as variability decrease.

5.4.3 Immediacy of Effects

In only 4 out of the 25 measure comparisons, the first intervention score was higher than any at baseline. This was for one of Callum's teacher ratings, and three of Oscar's. Most other measures showing potential subtle intervention score increases showed a clearly delayed possible effect, usually with the first intervention phase datapoint being lower than or similar to the last baseline datapoint. Immediate effects do not seem to be found across cases.

5.5 Feasibility Feedback

During intervention phases, each non-pilot teacher was asked to feedback about the intervention feasibility and implementation to allow understanding of how it was being transferred from researcher-practitioner intentions to teacher implementation. This feedback was not central to the teachers' participations and to avoid inadvertently adding pressure this was presented as a casual set of questions via email.

Most teachers responded to most questions. Table 5.30 below outlines the responses and where questions were not answered, an 'x' is indicated. Cameron's teacher's comments are included; although she did not provide experimental data, it is known that she implemented the intervention.

Table 5.30: Teacher Responses to Implementation Questions

	How Feasible to Implement (0-10, 10 being the highest)	**How Consistently Implemented** (0-10, 10 being the highest)	**No. of Strategies Used Most Frequently**	**No. of Strategies Not Used**
Mrs Murrayfield (Cameron)	X	X	11 out of 20	5 out of 20
Mrs Crawford (Callum)	7	6-7	7 out of 17	4 out of 17 (Some of these are used but infrequently)
Mrs Harrington (Callum)	X	X	X	X
Mrs Crawford (Oscar)	X	X	6 out of 18	4 out of 18
Mrs Harrington (Oscar)	5	5	8 out of 18	5 out of 18

	How Feasible to Implement (0-10, 10 being the highest)	**How Consistently Implemented** (0-10, 10 being the highest)	**No. of Strategies Used Most Frequently**	**No. of Strategies Not Used**
Mrs Monkhouse (Gregor)	X	6-7	5 out of 12	7 out of 12 (Two are a work in progress. Teacher saving 5 for when more familiar with other strategies).
Christopher (Mrs Jarvis)	7	4	13 out of 16	2 out of 16
Mrs Miller (Giovanni)	7	5	All	None
Mrs Brown (Simon)	7.5	8	All	None

The findings show the intervention fidelity may have been moderate in general and varied across cases. One teacher reported just over half of the strategies were unused and all other responding teachers reported using over half of the strategies. Consistency of implementation (within-teacher) seems low to moderate; responding teachers' scores range from 4 to 8 out of 10. Intervention feasibility appears to be moderate; scores range from 5 to 7.5.

5.6 Thematic Analysis of Feedback Comments at Follow-Up

All non-pilot teachers' qualitative comments were recorded (typed) at review using semi-structured interview questions, to answer the third research question:

Research Question C: How practical, useful and effective do teachers report finding the action plan resulting from the ICE framework, if at all?

The raw interview data from the six teacher respondents was thematically analysed to find out what teachers' views were about the usefulness, effectiveness and practicality of the intervention.

Artefacts from the informal interview raw notes were highlighted where relevant to the intervention's effectiveness, usefulness and practicality. Artefacts were grouped or 'chunked' into codes iteratively (Robson & McCartan, 2016; see appendix 12 for this process) by consolidation of similar artefacts. Some codes were made up of individual artefacts, most were made up of groups. The 47 codes were named once settled upon.

Codes were read and understood overall for familiarity, before being iteratively organised into similar clusters along the dimensions relating to teacher views about the intervention's effectiveness, usefulness and practicality.

No overlap occurred between codes; the themes that were reached seemed discrete, although two themes (9 and 14) were carried forward straight from individual codes because they stood out as separate from the others (the individual codes making up these two themes were comprised of multiple artefacts).

Table 5.31a illustrates how the codes made up the first theme, as an example. The themes settled upon are outlined in Table 5.31 with the number of codes they are comprised of.

Table 5.31a: An Illustration of How Codes Comprised Themes

Theme 1	**Comprising Codes**
1. Importance of practitioner's collaborative and comprehensive assessment for meaningful strategies	1. Personalised, collaborative process in intervention setup. 2. Strategies seem to have a firm basis. 3. It would be more effective if the intervention setup included more of a comprehensive understanding of the child's engagement across activities and lessons.

Table 5.31: Themes of Teacher Views of Intervention Usefulness, Effectiveness Practicality

Themes	**Number of Comprising Codes**
1. Importance of practitioner's collaborative and comprehensive assessment for meaningful strategies	3
2. Importance of strategies being bespoke to individual child	2
3. Benefits to parents, teachers and other children	3
4. Variation in effectiveness within and between strategies	2
5. Limitations in effectiveness due to children's peripheral difficulties	5
6. Practical when there is familiarity of strategies and implementation, for a systematic or manageable approach	5
7. Whole action plan is useful and easy to use	4
8. Many strategies already taking place, but greater awareness, understanding and refining resulting from intervention is effective	1
9. Positive impacts on general learning outcomes	4
10. Positive impacts on active engagement	5
11. Positive impacts on on-task engagement	3
12. Effectiveness of approaches are mainly specifically relevant in ICE Framework	11
13. Effectiveness of strategies when specific examples are given	1
14. Variety and choice in the action plan makes it a useful and varied tool	2

Fourteen themes were identified and appeared reasonably clear, with few contradictions. Themes 2, 4, 6, 8, and 13 indicate the conditions of and limitations to what is felt to be effective, useful and/or practical. These themes are made up of teachers' views of aspects of the intervention which they felt were important; mainly those which were present and viewed positively, some which were viewed as an issue still to overcome. For example, theme 6 says the intervention is practical to use but depends on teacher familiarity with strategies and implementation, which then enables a systematic or manageable approach. Some artefacts making this up were: a) Mrs Miller communicated the strategies to other adults and used them on an iterative basis which she felt was helpful, yet b) Mrs Crawford felt a main challenge was putting the strategies into practice in a busy classroom, suggesting implementing them 'two-by-two' for more refined understanding and manageability.

Themes 1, 3, 7, 9, 10, 11, 12 and 14 indicate the intervention's positive effects, utility and/or practicality. These themes comprise teachers' views of intervention aspects that were entirely positive and present. For example, theme 14 says the variety in the action plan makes it a useful tool. Example artefacts are that Mrs Johnson and Mrs Miller both felt the range of strategies was helpful for when they are 'stuck' and not sure how else to try and engage the child.

Theme 5 says children's peripheral or enduring difficulties can be a barrier to the intervention's effectiveness. Example artefacts are a) Mrs Crawford says Callum needs time to process instructions which can be a challenge outside the influence of the strategies, and b) Mrs Johnson says Christopher's need for consistency can be a challenge to establish when there are a variety of effective strategies to use.

5.7 Results Summary

Overall, the quantitative SCED data appears inconclusive, with some potential indication the intervention may help mediate children's lowest engagement in some cases. The intervention seems to have been implemented with varying fidelity across cases, with a need for a longer implementation period overall. The qualitative findings appear to show the intervention is viewed by teachers as a useful tool for engaging

children with attention difficulties in classroom learning, especially when they are in need of additional strategies, with a clear need to ensure the intervention is set up and applied in a systematic way.

The possible meanings, explanations, and implications of both SCED and qualitative results are explored and concluded in the next chapter.

Chapter 6: Discussion

6.1 Introduction

This chapter aims to explore, evaluate and understand the findings of this exploratory research. Individual SCED case findings are explored and discussed initially with contextual factors and limitations, including individual teacher comments from review interviews (which also contribute to thematic analysis discussion later). Then possible salient findings across cases is briefly discussed. Following this is a discussion about the thematic analysis findings of teachers' views. The wider strengths and limitations of the research are then discussed, leading to implications for future research and practice.

6.2 Individual Case Findings

In line with the ideographic nature of SCEDs, findings are discussed individually, with contextual, ecological information, for replicability and internal validity. Possible contextual explanations of findings are offered first, then exploration of intervention effectiveness, for each case. Information is included from feasibility feedback, review feedback, and exploration of intervention strategies with critique of the literature underpinning them.

For Bailey, the intervention effectiveness discussion is limited due to this case's pilot status; his teacher did not take part in a review interview and was not asked the feasibility questions; these were devised following the pilot.

6.2.1 Bailey

6.2.1.1 Possible Ecological Explanations of Findings

Bailey's teacher-rated engagement frequency may have improved very slightly with intervention, but not engagement impact. The rise in engagement impact score at the last datapoint could potentially suggest emerging intervention effects as time passes and teacher's increasing familiarity with the intervention strategies, although this is based on just one datapoint, making this highly speculative.

The possible improvement in Bailey's engagement frequency compared to impact could indicate intervention strategies contribute to more frequent on-task or engaged behaviour yet the impact on Bailey's learning outcomes remaining more of a persistent challenge. It is unclear whether this could be due to Bailey's attention difficulties or factors extraneous to attention. If closely related to attention difficulties, this could be a clear limit to the intervention's impact on meaningful learning.

Bailey's drop in self-rated engagement at intervention onset could tentatively be explained by his response to the unfamiliarity of the teacher's use of the strategies which could have initially felt distracting to begin with. Bailey's teacher's report that his engagement depends heavily on the lesson topic would likely have been a confounding variable affecting his engagement, in addition to any intervention effects.

6.2.1.2 Intervention Effectiveness

The ICE element underpinning most strategies in Bailey's action plan was element 2; 'eliciting active learning.' This related to the off-task behaviour and difficulty filtering outside distraction originally reported and found in the research-practitioner's assessment. Central to the intervention were questioning techniques such as those used by Stevens et al. (2000) to provide competing novelty and stimulation to enhance attention on target information (Zentall, 1993). Whilst these techniques are based on peer-reviewed literature, these may not have translated directly to the intervention. Some strategies focused on eliciting Bailey's active participation in making sense of instructions, yet other strategies had a range of other purposes and focuses. This possibly diluted the effects of the strategies that were most focused on the ICE

Framework elements most relevant to Bailey's key needs. The action plan may have also been more accessible and impactful if the importance of eliciting active learning was outlined or summarised as a key consideration on the action plan, to give it a general focus for the teacher.

6.2.2 Callum

6.2.2.1 Possible Ecological Explanations of Findings

The unstable and sometimes climbing baselines, and few data points, mean very limited confidence in the experimental findings. Callum's self-ratings are plotted for Mrs Harrington's and Mrs Crawford's lessons combined, so can only illustrate the response to the intervention overall. Despite slightly unstable baseline and climbing trend for this, possible positive intervention effects are suggested with the rise in ceiling scores at intervention. Perhaps the intervention maintained these high scores and encouraged more stable engagement. The lower score towards the end of the intervention phase could potentially be explained by this taking place just before October half term; tiredness could have negatively impacted Callum's engagement towards the end.

For Callum's teacher-rated engagement frequency from Mrs Crawford, the brief climb in scores at the start of intervention phase, beyond the highest baseline score, could be a product of already climbing scores, or impacted by the intervention. The decreasing scores following this could be explained by the intervention or external factors. Callum had intermittent TA support and his engagement could depend largely on this, but it is not known what support he had in relation to each datapoint. Another contextual limitation to the baseline data for both of Mrs Crawford's ratings is that the first datapoint was taken during a test; not a typical lesson.

The similar pattern in Callum's teacher-rated engagement impact (also from Mrs Crawford) supports engagement frequency and impact as similar constructs, although there seems to be a lack of obvious intervention effect. The impact rating showed less potential intervention effect than frequency, which could indicate the impact of engaged behaviours on learning remains more of a persistent challenge.

Callum's teacher-rated engagement frequency and impact from Mrs Harrington looks different to that of Mrs Crawford, which can be explained by teacher' ratings taking place in their respective lessons. The difference could also highlight the ideographic nature of the intervention implementation and measures. As would be expected, the intervention strategies seem to be implemented differently between teachers.

The reduced level between baseline and intervention from Mrs Harrington's ratings could also indicate the imminent half term negatively impacting Callum's engagement towards the end of the experiment. However, the lower scores at intervention onset could suggest an adverse effect of the intervention on engagement. The teacher did not report any, so it is therefore likely that any adverse effects were inconsequential in practice.

If the engagement level reduction is explained by the intervention, perhaps the strategies' novelty was initially distracting, or the strategies conflicted with the teacher's existing familiar and effective pre-intervention engagement strategies. At review interview, Mrs Harrington did not share such impressions but did share that implementing the strategies felt more effective when she was able to build on and refine what works (a point included in the thematic analysis). Due to very few datapoints, it is unknown whether scores would have risen again as the intervention strategies' application became more routine and refined.

Callum's frequent removal from the main classroom to work with a TA meant planned ratings could not always take place, impacting reliability. An impact on internal validity was that at review, Mrs Harrington felt Callum's difficulties were wider than attention difficulties and he has 'more going on' (included in thematic analysis), relating to his sensory feedback-seeking. This likely links to attention difficulties (Shimizu et al., 2014) yet Callum seemed more able to engage in his learning when this need was met, indicating for children like Callum, meeting this need is more effective than interaction and communication strategies.

6.2.2.2 Intervention Effectiveness

The strategies may have had a distracting effect on Callum to begin with, at least whilst his teacher refined her application, which could take rather longer than the experimental phase. Relatedly, in response to Stevens et al.'s (2000) interactive instructional strategy for training and refining teachers' reciprocal and collaborative skills in communicating with children about tasks, teachers recommended longer implementation and support periods. The teachers in that study already had months, not weeks, to learn and refine these skills, which supports the need for a longer timeframe for the intervention to become effective. Qualitative interpersonal skills and strategies appear to take time to establish, develop, and even measure or assess.

Based on consultation and observation, the researcher-practitioner formulated Callum's difficulties as anxiety-related; his mother, teacher and the research-practitioner agreed he needed empathy when his emotional state rises in relation to learning expectations. Related to this, the ICE element underpinning most strategies was element 18; 'child's worldview', and another was 9; 'task empathy'; leading to some strategies focused on acknowledging and containing his feelings. However, in retrospect, the importance of prioritising this at times of anxiety wasn't set out. Emotional containment would be a priority to address during anxiety escalation according to Breakwell's (1997) assault cycle, because at times of 'fight or flight' escalation, higher-order thinking (engaging with learning tasks) is far more challenging. In retrospect, the intervention may have been more effective with key considerations such as these, clearly outlined.

Related to Callum's sensory feedback-seeking, perhaps Bandura's (1986) concept of engaging children beyond direct sensory experience into more symbolic cognitive engagement is more important for children whose attention is distracted by superficial sensory input. Perhaps for children like Callum who seem to need it to settle to learn, interaction and communication for engaging them is less effective than simply meeting sensory input needs.

6.2.3 Oscar

6.2.3.1 Possible Explanations of Findings

Oscar's consultation was also attended just by Mrs Crawford and the observation was based on Mrs Harrington's lesson; neither teacher was involved in both, so the understanding of Oscar's needs and collaborating to build effective strategies was less focused than intended and perhaps therefore less effective.

Oscar's possible intervention effects are consistent with both teachers' views that the intervention was more effective for Oscar than Callum, and Oscar's parents' report of successful use of the strategies (included in thematic analysis). The lack of obvious change for Oscar's own self-ratings might be explained by his difficulty understanding 'engagement.'

At intervention onset, Oscar's teacher-rated frequency score decrease from Mrs Crawford might be explained by novelty or low familiarity of the intervention strategies having a distracting or even adverse effect initially. Mrs Crawford's review comments that she would like to use the strategies regularly so they become 'second nature' (included in thematic analysis) imply the conscious effort she needed to implement them initially during intervention phase, therefore possibly limiting effectiveness at onset.

Another potential confound to measuring engagement interfering with possible negative or positive intervention effects, is both teachers' reports that Oscar and Callum's engagement depended heavily on types of tasks in lessons.

6.2.3.2 Intervention Effectiveness

Oscar's plan was underpinned most frequently by element 8; 'cognition and emotion awareness'; a largely intangible principle; what this looks like would depend on a variety of factors: early signs of disengaged behaviours, teacher anticipation of what these communicate about the child's thoughts and feelings, and the impact they feel this is having on engagement. Consultation with the teacher and parents was vital for basing strategies on teacher and parent expertise of the child (e.g. Gutkin, 1999).

At consultation, Oscar's engagement was unsurprisingly reported to be dependent on aspects of tasks such as how competitive tasks were, and verbal and written comprehension demand (Jiang & Farquharson, 2018). Oscar's engagement impact teacher ratings' high variability might indicate the intervention does not withstand all negative impacts on engagement. What worked for Oscar may not be reliable across all contexts, which supports a strong need to apply the strategies dynamically with sensitivity to the demands of the task and the child's access to it (e.g. Tzuriel, 2014); an implementation style which would arguably take time and practice to establish.

Although Oscar's intervention has dynamic and collaborative foundations, some strategies translated more directly from ICE elements and were not phrased with contingencies. These were underpinned by ICE elements such as element 16 in non-verbal communication; 'supplementary gestures.' These were found to be effective by Wang, et al. (2004) but specifically in visual puzzle tasks; effectiveness which arguably is not as translatable to a wide range of learning tasks. Perhaps these strategies needed to be specifically for aspects of tasks which require good visual processing or recall, and contingent upon specific signals of Oscar's waning engagement.

6.2.4 Gregor

6.2.4.1 Possible Explanations of Findings

Gregor's pattern of decreasing engagement variability becomes somewhat established before intervention onset in all three measures, so it is not possible to further interpret to what extent the intervention played a part. Intervention data collection during the lead-up to Christmas could have meant confounding negative or positive influences to engagement, such as tiredness or novelty for example.

A possible unexpected effect could be Gregor's improved attendance at intervention phase on rated days (days he was with the teacher, receiving the intervention); indicated by a decrease in missing datapoints due to absence. This was not a deliberately measured variable and cannot be interpreted with reliability but might be a potentially positive intervention effect.

The three consecutive ceiling scores at baseline for engagement impact, with absences either side (similar for frequency) could indicate confounding influences in the environment. For example, absence is likely to be met with different teaching, such as novel learning content or more teacher attention, which may positively impact engagement.

For Gregor's first highest self-rated scores at baseline, the teacher wrote that Gregor received an incentive from home (earning back the right to coveted electrical items) for desired behaviour, which she felt positively impacted his engagement. This may also explain these three consecutive high scores.

Gregor's two parental homes and the related impacts on his compliance and engagement possibly resulted in confounding factors affecting engagement ratings across both phases, limiting reliability.

6.2.4.2 Intervention Effectiveness

Despite Gregor's inconclusive data, at review Mrs Miller said she felt the strategies had been very helpful and effective despite low familiarity, not yet having tried them all (included in thematic analysis). Incomplete intervention delivery and low familiarity might have meant substantially low intervention fidelity and supports that the timescales were not long enough for the intervention to become established.

The strategies in Gregor's action plan were underpinned by 16 of the 19 ICE elements, with many elements underpinning more than one strategy; the plan carried some complexity and depth. A strategy Mrs Miller found most helpful was underpinned by four elements (combining timely empathy to adversity, with affirmative and encouraging instructions, and Gregor actively re-processing these). This is highly targeted and personalised; a complexity it seems takes time for the teacher to digest and learn to apply with fluency, also reflecting the Stevens et al. (2000) findings that teachers felt longer implementation times were needed for implementing new interpersonal 'attunement' strategies.

Mrs Miller's review interview comments that she felt it was particularly helpful to have a bank of strategies to refer to when she is stuck and continually prompting Gregor, reflects the problem of children with attention difficulties consuming more of teachers' time and effort (Kos et al., 2006) than typically engaged children, supporting the benefit of a structured way to influence Gregor's attention.

6.2.5 Christopher

6.2.5.1 Possible Explanations of Findings

The difference between Christopher's self-rating and teacher-ratings highlights the difference between child and teacher views. Speculatively, Christopher's increase in self-rated engagement could be explained by factors relating to his subjective experience of the applied strategies. For example, he could have experienced increased interest or positive regard for the TA in response to her use of intervention strategies.

Christopher's TA noted that Christopher's engagement and on-task behaviour was highly influenced by whether there was technology featured in the lesson or used as a reward, which is likely to have been an external confound. Specific instances of this are not recorded in relation to datapoints, making interpretation of this speculative.

6.2.5.2 Intervention Effectiveness

The intervention for Christopher was implemented on a one-to-one basis by Mrs Johnson, his TA, during one-to-one lessons with her, outside the classroom. At review, Mrs Johnson said she found the strategies very useful as a resource of new and personalised ideas, similarly to Mrs Miller (included in thematic analysis).

The strategies in Christopher's action plan were underpinned most frequently by element 4; 'scaffolding contributions.' This was a key consideration underpinning some strategies reported by Mrs Johnson to be useful, such as asking short questions requiring minimal response, to elicit active learning whilst maintaining momentum during input. However, scaffolding Christopher's contributions by giving him 5 minutes'

'talking time' on one chosen focus topic at the start of lesson did not influence his intense distraction. This was intended to acknowledge Christopher's off-topic focus to maintain reciprocity, similarly to Gibbs (2018), and help Christopher choose what to focus on; a key process in focusing attention (Haywood & Lidz, 2007). However, Mrs Johnson found Christopher became somewhat fixated on the conversation, still struggling to shift his attention following the five minutes. This calls into question the effectiveness of joining the child's interests when the child is fixated and overstimulated by their off-topic interests. Perhaps Gibbs' (2018) finding that answering children's off-topic questions helps to maintain learning focus, depends on it allowing the delivery flow to continue, such as answering one question and moving on. Relatedly, Christopher having his off-topic desires acknowledged by allowing him to share and 'park' them for discussion later, was also reported to be ineffective. Christopher was, again, sometimes too fixated on this to shift his attention back to the task.

It seems joining the child's interests can be engaging, but not useful for re-engaging them with a new target when they struggle to shift their attention. The subtleties in the interpersonal skills being used in applying these strategies would have been interesting to observe. It is not possible to say how this was implemented, and whether alterations to the strategy such as timing, or the use of another strategy following it, would have been effective.

6.2.6 Giovanni

6.2.6.1 Possible Explanations of Findings

Giovanni's slight increase in scores at intervention as time goes on, could be explained by increasing teacher familiarity using the intervention, as might be expected.

No confounding factors are known to have influenced Giovanni's learning engagement during the gap between phases apart from the Christmas holidays. The change of pace and environment could have impacted Giovanni's engagement indirectly, whether positively or negatively.

Giovanni's teacher said Giovanni's passiveness is enduring and hard to influence. She felt some strategies were effective, others less so, and it is difficult to know what his engagement is like in response to strategies due to his passive nature (points included in thematic analysis). Giovanni's passiveness may explain the high variability of his teacher-rated intervention scores, which would be likely to vary depending on whether he has expressed his engagement, which he is reported to do infrequently and inconsistently.

6.2.6.2 Intervention Effectiveness

Giovanni's passive nature makes receptiveness of his current emotions and cognitions extremely difficult. Receptiveness could be considered a key need, and corresponds to ICE element 8, which only underpinned one strategy. The intervention might have been more effective with more focus on detecting and using signs of Giovanni's engagement. Perhaps deeper discussion of the subtle signs Giovanni shows when engaged, and typical antecedents to this in setting up the intervention, would have been beneficial. This retrospective identification of intervention setup and implementation challenges highlights its novelty and exploratory nature.

The ICE element underpinning most strategies was 2: 'eliciting active learning'; consistent with the need to mediate Giovanni's passive nature by making his engagement deliberate and intentional, therefore active (e.g. Mishra, 2002). This was effective in the intervention by Cooper et al. (2014) for gaining reciprocity and reducing children's attention problems. However, key differences are the Cooper et al. (2014) intervention was implemented by children's mothers, children were much younger, and the activity was reading together; naturally dependent on interaction and communication. Although the literature and theory support the effectiveness of eliciting active learning, perhaps the effectiveness is dependent on factors such as the nature of the task.

Despite the importance of gaining active responses from Giovanni, ICE element 3 'active choices' did not underpin any strategies in his plan. Including this element could

have made the intervention even more targeted to this need; another reflection point highlighting the novelty of the intervention implementation and setup.

Mrs Miller reported she found it useful to initially 'grab' Giovanni's attention by using his name (not in the intervention action plan). Geng (2011) found simple strategies such as calling the child's name far less effective on their own than with non-verbal qualities in speech. Effectiveness of simple strategies such as this would arguably depend on the subtle interpersonal qualities being applied alongside it. Mrs Miller reported finding melodic speech qualities somewhat effective and asking questions when Giovanni disengages (which were strategies in the intervention action plan). Without observation information it is unclear exactly how strategies were being used; qualities, timing and combinations, and therefore to what extent specific aspects of the intervention or approaches additional to it, were specifically responsible for possible engagement improvement.

Related to Giovanni's need for active learning, Mrs Miller found it effective to gain Giovanni's active input by 'putting him on the spot' to answer questions when passive, which relates to a strategy in the plan. However, the fidelity is unclear, for example the strategy was to ask open questions such as 'what's coming next?' as soon as Giovanni shows signs of disengaging (e.g. putting his pen down). When and how such strategies are implemented could be pivotal to effectiveness, and not possible to understand further without direct observation.

Mrs Miller reported she noticed Giovanni's increased recall of some of his learning and being able to 'grab' his attention more effectively, supporting some intervention benefits. However, his work output was reported largely unaffected, indicating the limitation to the direct impact on wider learning outcomes (these teacher reflections are included in thematic analysis).

At observation, Giovanni was sat on a table with access to TA support next to him. Although she was not assigned to him, Giovanni had regular access to her support. In reality, the intervention strategies may have been much more effective if she had also

been present for the consultation and given (or trained to use) the action plan strategies too.

6.2.7 Simon

6.2.7.1 Possible Explanations of Findings

For Simon, fewer low scores at intervention phase could potentially be explained by the intervention strategies mitigating times when he might normally show very low engagement. However, Mrs Brown mentioned at review that the learning content during intervention phase was easier to relate to and had 'real world' application to make learning relevant for Simon, which may have been a confounding positive impact on his engagement at intervention phase.

6.2.7.2 Intervention Effectiveness

Despite the possible confounding variable of more tangible learning at intervention phase, this relates to the ICE Framework. An element underpinning most strategies in Simon's plan was element 8; 'Cognition and emotion awareness.' The strategies underpinned by this could have enhanced teacher awareness of Simon's interest and engagement in tangible learning, allowing her to further enhance it and mediate it. It is not possible to separate possible effects of the tangible learning itself, or the strategies helping enhance it.

At review, Mrs Brown felt all strategies are effective when used at optimal times and were based on her existing successful practices (included in thematic analysis). This is consistent with the research-practitioner's observation of Simon's lesson; almost all observations noted were good practices already taking place, rather than needs or missed opportunities. Mrs Brown seemed highly attuned to Simon's needs, and his zone of proximal development (Vygotsky, 1978) in relation to his learning and engagement. This illustrates the need to utilise existing teacher skill and interpersonal qualities on engagement, in intervention setup. The solution-focused observations support effectiveness of the intervention content, yet also suggest for children whose teachers already have strong interpersonal rapport with them, the intervention serves more of a validating purpose than overtly inducing change.

6.3 Summary of SCED Findings

Some magnitude of positive change to engagement is indicated by the 15 teacher and child engagement ratings across all cases which show a mean increase of one score unit or more from baseline to intervention, compared to the 3 showing decreases. This could indicate weak to moderate positive intervention effects overall but is a non-experimental comparison.

The 3 engagement rating measures which decreased by one score unit or more are spread across 3 cases which showed increases in other engagement rating measures. This indicates engagement is a complex and possibly ambiguous construct to measure; findings can depend on who is asked and how.

The low incidences of immediate effects at intervention onset indicate that there is a delay to even slight effectiveness. This would appear to make intuitive sense, given the intervention was exploratory; new to the research-practitioner and the teachers, with short intervention phases. This could mean limited the opportunity to capture possible effects because teacher familiarity and confidence in applying the intervention strategies would be likely to develop with further practice.

Reduced variability from baseline to intervention seems a possible intervention effect in some cases, particularly a reduction in the lowest baseline scores at intervention phase. This might suggest the intervention strategies help mediate the least engaged behaviours more than adding new engaged behaviours for example. Although speculative, this is similar to Stevens et al. (2000) who found significant reduction in off-task behaviour in relation to their 'attunement' intervention, but insignificant for increasing on-task behaviour.

There appear more cases of small increases in engagement frequency than impact. If true, this could suggest engagement can be elicited more frequently with the intervention, but the impact of this on wider learning is harder to influence or maintain. It seems intuitive that establishing enduring impacts of engagement on learning would

be more challenging. Effortless and productive engagement such as true meaningful engaged 'flow' described by Csikszentmihalyi & Nakamura (2005) would arguably have wider-reaching impacts on learning. Although, this is arguably much harder to set up or 'manufacture,' which has not been an aim of the intervention applied in this research.

The SCED research questions pertain to teacher and child views only. Based on the overall inconclusiveness, perhaps measuring engagement beyond participant views would have elicited more conclusive results. Table 5.32 below summarises the answers to the SCED research questions.

Table 5.32 Answers to Research Questions A and B with Summary of Findings

Research Question	**Summary of Findings**
D) Does teacher-report of child academic learning engagement frequency and impact in class increase when an action plan is implemented by the teacher, resulting from the Interaction and Communication for Engagement (ICE) framework?	Inconclusive; the hypothesis that teachers will rate the children's engagement as more frequent and more impactful cannot be accepted, nor confidently rejected. Without clear baselines, any possible experimental effects are inconclusive due to unreliability. Mean levels of engagement scores increase very slightly in the intervention phase in some measures across some cases, although not always substantially. Variability appears decreased in some measures, although this was not a directly hypothesised effect.
E) Does child self-reported academic learning engagement in class increase when an action plan is implemented by the	Inconclusive; the hypothesis that children will rate their own engagement more highly cannot be accepted, nor confidently rejected. Without clear baselines, any possible experimental effects are inconclusive due to unreliability. Mean

teacher, resulting from the ICE framework?	levels of engagement scores increase very slightly in the intervention phase for some cases, although not always substantially. Variability appears decreased in some measures, although this was not a directly hypothesised effect.

6.4 Thematic Analysis Findings

Overall, there seemed to be mainly rich qualitative support for the intervention's effectiveness and usefulness. Of specific interest and relevance to the ICE framework, theme 12 is made up of the most amount of codes in one theme (11 codes), which are each specific approaches, directly relevant to ICE elements, valued by the responding teachers. They were identified independently of discussion around the ICE Framework, as this was not explicitly referred to, shown, or discussed in the review interviews. This shows strong valid and organic support for the ICE framework utility and resulting strategies.

Themes 9, 10 and 11 illustrate the intervention's positive impacts on engagement quantity and quality, and more general learning outcomes, indicating teachers feel it can have a range of positive effects on engagement specifically and learning more generally. This contrasts with some individual SCED findings that impacts on learning might be more challenging for the intervention to influence compared to frequency of engaged behaviours. Perhaps this discrepancy is due to contrasting data collection methods.

Themes 4 and 5 illustrate limitations to the intervention's effectiveness reliability, utility and/or practicality. Theme 4 indicates teachers felt strategies within the action plans varied in effectiveness, with a need to work through applying them iteratively. However, theme 14 indicates this variety is welcome and useful. This discrepancy might be interpreted as teachers valuing choice and variety most when it feels manageable and systematic. Making the intervention manageable and systematic would arguably take time, effort and planning. Kos et al.'s (2006) claim that teachers often feel more time, effort and planning is necessary to teach children with attention

difficulties, could mean teacher stakeholders view the required time, effort and planning needed to implement this intervention effectively, negatively.

Theme 5 indicates child difficulties that might be additional to attention difficulties are viewed as a limitation to what the intervention can influence. This is expected, given many cases had additional difficulties such as ASD or speech and language difficulties. This indicates a wider limitation, as arguably many children's attention difficulties are likely to have a variety of interacting factors, which might mean a range of additional but related difficulties.

Theme 8 indicates teachers already use many strategies in the intervention, but refining and validating them, and having them in an organised action plan was seen as useful and effective. The intervention may be useful as a solution-focused tool for building on existing positive teacher practices, and teacher confidence with influencing the engagement of children with attention difficulties, using interaction and communication.

Mrs Johnson and Mrs Brown gave some follow-up responses via email due to review time constraints. This limits data reliability as email responses might have been expressed differently than if they were shared in person, due to the natural differences in these forms of communication.

As previously mentioned, the thematic analysis is limited in reliability as data were subject to the researcher's interpretation twice; during interview note-taking, and thematic analysis itself. Also, social desirability bias was a risk, although attempts were made to mitigate this risk.

The thematic analysis research question pertained to teacher views, which seemed to yield rich, encouraging and practical information about the intervention in practice, from those implementing it; it seems a productive question to have asked. Based on the thematic analysis, Table 20 below summarises the answer to research question C:

Table 5.33: Answer to Research Question C with Summary of Findings

F) How practical, useful and effective do teachers report finding the action plan resulting from the ICE framework, if at all?	Teachers appeared to find the intervention effective and useful overall, viewing it as effective for improving general engagement, on-task behaviour and some general learning outcomes. Teachers independently reported approaches and principles strongly related to many ICE elements were responsible for positive effects. Teachers seemed to view the intervention as somewhat practical but felt more of a structured implementation system would improve practicality. Teachers seemed to feel many effective strategies were things they were doing already but found the intervention useful for validating and refining existing good practice.

6.5 Intervention Effectiveness Overall

The strategies in the action plans seem to relate to sound theory and research but must be understood and applied specifically for the individual child, and with an understanding of which tasks and situations they will be most effective during. The use of specific interaction and communication strategies seems to have been generally appreciated by teachers as effective in engaging children with attention difficulties, especially once refined and understood.

Hayward & Lidz's (2007) distinction of internal and external attention processes appear simple enough, as the ICE action plan strategies themselves generally aim to 'externally' influence children's attention, for engaging them in learning. However, the complexity of interpersonal exchanges would arguably affect and depend on more

internal attention processes, such as the child's motivation and sensory information filtering. The internal/external dichotomy might be too simplistic to fully inform this intervention due to the complex interacting factors. As supported by teachers' reports of strategies varying in effectiveness, and valuing an iterative process, strategies must be viewed as dynamic and evolving, and their success may be dependent upon unobservable factors.

6.5.1 Intervention Feasibility

When asked which strategies they used most consistently, all teachers named over 25% of the strategies in each action plan, which was over 50% for three teachers. However, some of these strategies were those the teachers felt they already used. Some strategies appear to have been implemented consistently and frequently, but a remaining high proportion were not. This further suggests that perhaps the teachers needed more time to use and become familiar with some strategies, particularly new or unfamiliar ones, and refine the plan; discarding ineffective ones.

The intervention feasibility feedback reflects the findings of the thematic analysis; that the intervention was useful overall, some strategies more than others, and that there were some barriers to fully implementing the intervention, particularly implementing the strategies systematically.

It is possible the non-responses to some feasibility questions are due to social desirability bias; perhaps some teachers had negative feedback they were unwilling to share. However, seems unlikely as the responses were via email, possibly limiting perception of confrontation. Also, critiquing comments and ratings were welcomed. Perhaps teachers missed some questions; feasibility information was sought in a general and informal email to check wellbeing and progress.

Most responding teachers said there were a selection of strategies not used. This was mainly due to the short length of time of implementation compared to the strategies in the plan being numerous; there seemed to be a need for more time to try the strategies out systematically and become familiar with them. A small amount of strategies were

reported by some teachers to be unused due to them not being practically achievable to implement, or being beyond the child's current capability to respond to. This suggests factors hindering intervention effectiveness could be when strategies are not closely tailored to the child's strengths and needs and the practicality of the setting.

6.5.2 Integrity of the ICE Framework and Action Plan

The integrity of the ICE Framework seems supported by the fact that most elements were applicable across all cases in intervention setup, and by the thematic analysis finding that teachers naturally and explicitly valued many of the ICE Framework's underpinning approaches and principles, post-intervention.

The observation and consultation information used to build strategies was key to intervention setup and to ensure it was tailored to the child and their setting. The thematic analysis indicates this is valued in principle, and limitations such as strategies being numerous and challenging to apply systematically, appear to be procedural.

Due to the exploratory nature of this research, the intervention development is viewed as an iterative process. Some framework amendments are suggested based on the researcher's reflections since implementation for these cases. These are outlined below, and updated versions of the ICE Framework and Action Plan can be seen in appendix 13.

The thematic analysis finding that an implementation barrier was the variety in the action plan perhaps indicates a lack of central focus for systematically applying strategies. The ICE Action Plan could be improved by containing a summary section outlining the most frequently occurring ICE element(s) and possible key broad themes.

Each case has a small number of unused ICE elements, due to the personalised nature of the intervention, which varied across cases. However, the elements applied least overall were 14 and 15; 'gaze aversion' and 'directive gestures.' These seemed niche and specific, and not accounting for other non-verbal considerations, such as proximity, which was found to be a key need for some children, particularly Giovanni

based on his observation. Another consideration was that teacher speech tone may affect engagement and although implicit in many elements (such as positive tones for positive regard), it seems a substantially important non-verbal factor supporting other aspects of interaction and communication.

Based on these reflections, ICE element 14 ‘gaze aversion’ is amended to include proximity and renamed ‘gaze and proximity’, and ICE elements 15 and 16 are collapsed into one element; ‘supporting gestures and tones’, with supplementary and directive gestures delineated in the description.

6.5.3 Importance of Observation and Consultation

Some teachers’ review comments specifically emphasise importance of observation, and researcher reflections include that observation enabled strategies to be built on existing good practice and existing needs. Capturing and understanding the subtleties in interactions and communications between the child and their teacher felt a core part of the assessment for setting up the intervention, by triangulating evidence-based ICE Framework elements with specific observations.

Teachers valued the personalised nature of the strategies. For example, Mrs Johnson and Mrs Crawford both commented that their targeted nature made them effective and useful, and they were based on key information from the people who know the child best. This indicates the importance of collaborative consultation with teachers and parents. Teachers and parents are the experts on the child’s behaviour patterns and the system’s expectations; they experience this every day in an ecologically valid context, and positive school factors for children with ADHD include all stakeholders working together (Burcham et al., 1992). This supports the need to consult with teachers and parents to collaboratively tailor strategies, with a sensitive, holistic and specifically psychological insight. At the heart of effective consultation is harmony between process knowledge (including interpersonal skills), and psychology-based domain-specific knowledge; where the former is a firm basis for establishing rapport before applying domain-specific knowledge (West & Idol, 1987). Observation and consultation are essential vehicles for this intervention’s setup and implementation.

6.6 Research Strengths and Limitations

The SCEDs were basic AB designs, with data collection taking place in schools, away from the researcher. Whilst enhancing social and ecological validity, the risk of low fidelity to the measures is higher than if the researcher had been more involved in the measures. Key methodological considerations are outlined below, carrying limitations as to what conclusions can be drawn from this research and would need to be mitigated in future research. Some strengths are also indicated.

6.6.1 Baseline and Experimental Control

Datapoints for both baseline and experimental phases were very few in at least 3 cases. Data were variable and inconsistent overall, lacking clear trend. These issues severely limit reliability and confidence in interpretations.

A substantial threat to experimental control was the varied aspects of the lessons the ratings took place in. This appears to have possibly directly impacted some engagement, confounding engagement ratings in relation to the intervention. Although the ratings took place in a particular subject lesson in each case, the variation within that one subject still seemed wide.

6.6.2 Internal Validity

Based on the complexity of the busy classroom and the varied teaching and learning taking place alongside intervention implementation, the chains of causation or correlation can be long and complex (Gulliford, 2015) limiting confidence in possible intervention effects. The engagement measures seemed feasible and accessible for teachers to implement, although complexity of possible confounding environmental variables could mean measures were not sensitive enough to intervention effects or focused enough on them alone.

Construct validity of the dependent variable academic engagement seems to carry ambiguity for both teacher-rated measures and childrens'. Teachers' ratings might have suffered some individual variation in how they were conducted or construed. Despite the Carptenter et al. (2005) engagement indicators being central to the ratings,

the ratings of these are likely to have been based on observable behaviours, such as compliance or work output, to differing degrees depending on the individual teacher interpretation. Engagement impact and frequency are clearly subject to some interpretation.

Children's understandings of their academic engagement in their learning (beyond enjoyment of lesson content) was also important for the validity of self-rating measures. Some children were reported to find this difficult to grasp, including Callum who thought of it as 'enjoyment.' In reality the children's engagement ratings are unlikely to be measuring the child's view of their level of academic engagement. It is likely these ratings capture generally how contented they may have felt in the lessons, especially as the rating scale included a 'happy face' at one end, and a 'sad face at the other'. In hindsight this may have added an emotional dimension to the rating.

The difficulty with children's understanding of engagement indicates that this can be a complex concept for children to understand and reflect on. It also indicates the overall intangible and dynamic quality of 'engagement' as a construct, illustrated by Hounslow's (2016) observation of the lack of exclusivity between the Carpenter et al. (2015) 7 engagement indicators.

Engagement can also of course be shown, or lacking, for more reasons than attention strengths or difficulties. For example, where extrinsic reward might impact motivation, such as Gregor's reported home incentive for desired behaviour during baseline phase. Although confounding impacts on engaged behaviours were attempted to be identified, limitations to this include lack of observation or regular school contact to identify possible additional influences on engagement.

6.6.3 Intervention fidelity

The intervention was new and exploratory, and teachers' intervention use is only understood via their own reflections and feedback, not via the researcher's observation of the action plan strategies in use. Observation would be likely to illuminate an understanding of implementation fidelity further. Also, more encouraging

intervention effects might be expected with increased teacher implementation fluency, and increased researcher-practitioner fluency.

For Callum's and Oscar's intervention setup, the consultation was attended by just Mrs Crawford and observation was based on just Mrs Harrington's lesson. This was due to staffing constraints, although not ideal. An intervention premise is the close focus on interaction and communication between the child and a consistent adult. Neither of the teachers were involved in both observation or consultation which is likely to have made understanding these particular children's needs and effective strategies less focused and targeted than intended, therefore less effective, although it may reflect 'real-world' practice.

6.6.4 Child Self-Ratings Versus Teacher Ratings

Although a different scoring system was used for child and teacher ratings, the overall relative patterns can be compared. Callum's, Gregor's, Giovanni's and Simon's data seem to show similar relative patterns to their teachers'. The data from these four cases could be viewed as having greater objectivity around how 'engagement' was construed, supported by the apparent relative agreement between teacher and child ratings overall.

The possible engagement increase in Christopher's self-rating data appears at odds with the teacher's engagement frequency rating. This illustrates individual people's views of 'engagement' can be very subjective and are ideographic in nature. Some children and their teachers share similar views of the child's engagement, yet there is variation in how similar their views appear to be. This perhaps depends on a wide range of factors such as whether child and teacher have reflective discussion about the child's engagement, the child's awareness that they are engaged in learning, and the child's ability to self-reflect.

Also, as mentioned, the subjectivity of what 'engagement' might mean to children is a substantial limitation to the validity of the children's ratings.

6.6.5 Social validity

SCED research should prioritise naturalistic real-world interventions (Ganz & Ayres, 2018). The intervention's real-world application in this research carries high social validity due to implementation and measurements taking place directly in their naturalistic settings, with naturalistic teacher relationships. The children were also typical children an EP might become involved with, as they were recruited from schools already working with the EPS. Findings are directly relevant to and meaningful for the type of setting they were applied in; mainstream primary schools. However, all cases in this study took place in rural English settings, with generally low ethnic diversity, and all cases were male. Therefore, relevance of findings would be most reliably relevant to similar settings and participants.

6.6.6 Intervention Strengths and Limitations Findings from Thematic Analysis

The thematic analysis indicates teacher appreciation and value of the intervention, and perceptions that interaction and communication directly relevant to the ICE Framework, positively influence engagement.

Teachers seemed to value recognition of what they are already doing effectively, as well as new strategies to try when they feel 'stuck' or unable to move beyond continual prompting. Teachers can feel teaching children with attention difficulties is particularly challenging (e.g. Kos et al. 2006) and often cope via informal trial-and-error approaches (Lawrence et al., 2017) which may mean low teacher confidence, or higher stress (e.g. Greene et al., 2002) in their ability to effectively work with children showing attention difficulties, and apply effective strategies. Therefore, the intervention could be a useful tool for helping build teachers' confidence influencing the learning engagement of children with attention difficulties, using new and refined accessible interaction and communication strategies.

By comparison, such positive effects are not reflected strongly or consistently in the SCED data, which, as mentioned, might be due to insensitive or poorly targeted measures. The thematic analysis carries some weight in qualitatively representing teacher views, and from a practice-based evidence point of view, the positive effects

reported by teachers seem encouraging enough to warrant further application and understanding of the intervention.

However, as mentioned, data was subject to researcher interpretations on two levels; deciding what to record during interview, and during thematic analysis. This is a clear limitation, meaning results could be biased towards the researcher's assumptions and interpretations. Attempts were made to mitigate researcher expectation and interpretation bias by ensuring research question C was central to the interview questions and to all analysis stages. The researcher aimed to remain reflexively aware of the potential influences of her own views and attempted to consider alternative interpretations of the data throughout the process.

6.7 Implications for Future Research

Due to the inconclusive nature of the SCED results, future research would be useful. Based on the possibility that intervention effects could be more encouraging for mitigating the most disengaged behaviours, questions might ask what the effects are on these. Based on the discrepancy between some children's and teachers' views, questions might ask what effects on engagement are observed, rather than participants' views.

To rule out confounds specific to the lesson activity, future ratings could be based directly on when strategies are used, and the intervention applied, in one specific task or situation.

Based on the exploratory nature of the current research it would be informative to refine an understanding of possible intervention effects, and to gain detailed understanding of how it might look in practice, using observation. Observations might also be key to understanding the nuance in the interpersonal aspects of the intervention, and the intervention fidelity.

Future research should allow more time for teachers to implement and gain familiarity with the action plan strategies. A systematic, contingent and iterative approach to

implementation could be used, similar to a Response to Intervention (RTI) approach, as suggested by Reid & Maag (1997) for assessing and refining interventions for children with ADHD.

As Gulliford (2015) outlines, SCED methodology is useful for determining effectiveness of an intervention for cases with unique profiles of difficulties. The diverse needs of the children in this study, despite all showing attention difficulties, illustrates the likely complexity and therefore uniqueness of the profiles of children with attention difficulties. Therefore, SCED methodology remains an appropriate way to aim to establish experimental effects.

6.8 Implications for Future Practice

If the ICE Framework and Action Plan were implemented as an intervention by EPs, with observation and consultation for setting it up, the practitioner and beneficiaries would need to be aware that the ICE Framework principles cannot directly translate into written strategies for instant application. The process is highly dynamic and collaborative and must lead to targeted 'working' strategies for continual use on an iterative basis.

There appear to be case-specific issues more likely to be beyond the effectiveness of interaction and communication approaches for improving engagement of children showing attention difficulties. For example, where children like Callum might show a need for sensory input for being able to settle to learn. Rigorously assessing the child's specific attention difficulties and specific needs, and clearly identifying the limits to what the intervention is likely to influence, would be crucial in implementing this intervention.

The findings in this research suggest impact on learning could be harder to influence than simply the frequency of engaged behaviours. Perhaps more engagement doesn't directly mean more 'learning' which is another key consideration when thinking about the purposes of implementing the intervention and the expectations of its effects.

Based on researcher reflections, coherence and structure may help the intervention action plan to be effective. Key concepts would need to be explicit in the action plan; the most frequent ICE elements and themes need to be clear on the action plan for the teacher to have a clear understanding of the central and key aspects characterising many of the strategies, and how they might be prioritised.

As well as where existing good practice can be validated and refined, the intervention may be most useful and important for teachers who do not know the child well or do not yet have established positive interpersonal routines and rapport with them. This could also be particularly important for TA working more individually with a child showing attention difficulties. The intervention might be effective for facilitating and refining the interaction and communication which characterises the child-adult relationship, for children that staff struggle to influence and engage.

6.9 Unique Contribution and Conclusion

This research aimed to devise and implement an interaction and communication framework for enhancing the engagement of children with attention difficulties, in academic classroom learning. The SCED research showed inconclusive effects overall, with some slight improvements in mean scores of some measures in some cases. The absence of direct observational data means analysis into intervention fidelity is not possible, although the feasibility data indicate that this would have been moderate but inconsistent across cases, as might be unsurprising given a short timeframe of implementation and the exploratory nature.

The ICE Framework itself was found to show integrity based on the organic qualitative teacher feedback. The bespoke implementation and the intervention overall were found to be viewed as useful and effective by teachers, with need for a more systematic approach to implementing the action plan strategies. A greater understanding of how more planning in applying the intervention systematically might be viewed by teachers could also be beneficial.

The SCED data suggests that, if effective, the intervention may be most helpful in mitigating disengagement, and therefore most effective in cases where children with attention difficulties show a distinct disengagement in their learning. Teacher feedback also indicates the intervention is viewed as most effective and useful where teachers feel 'stuck,' indicating its utility where teachers are struggling with how to address the child's disengagement.

As expected, slight emerging intervention effectiveness that might be suggested overall seem to be limited to mediating disengagement and influencing children's engaged behavioural indicators, rather than influencing more internal states such as true motivation and attention 'flow.' Although this research did not aim to influence these latter concepts, the distinction is important for acknowledging the limits of the intervention in influencing children's 'engagement.'

The intervention implementation in this research, and the tests of its effectiveness were new and exploratory, and at the time of writing, no such intervention existed for use in schools. More conclusive and encouraging results might be expected with increased implementation fluency on the part of the researcher-practitioner as well as the teacher. Different results might also be expected with the suggested methods for future research, for establishing a more robust experimental and detailed understanding of whether there are positive effects on the academic learning engagement of children with attention difficulties in class.

References

*Primary studies included in the systematic literature review.

Ahmann, E. (2014). Encouraging positive behavior in 'challenging' children: The Nurtured Heart Approach. *Pediatric Nursing, 40*(1), 38-42.

Argyris, C. (1990). *Overcoming organizational defenses: Facilitating organizational learning.* Allyn & Bacon: Needham.

APA (2013). *DSM 5. Diagnostic and statistical manual of mental disorders (5th ed.).* https://doi.org/10.1176/appi.books.9780890425596.744053

Axelson, R., & Flick, A. (2010). Defining Student Engagement. *Change: The Magazine of Higher Learning, 43*(1), 38-43.

Baker, J. A., Clark, T. P., Maier, K. S. & Viger, S. (2008). The Differential Influence of Instructional Context on the Academic Engagement of Students with Behavior Problems. *Teaching and Teacher Education 24*(7), 1876-883. Web.

Bandler, R., & Grinder, J. (1976). *The Structure of Magic: A Book About Language and Therapy*. *Family Process* (Vol. 15). https://doi.org/10.1111/j.1545-5300.1976.265_1.x

Bandura, A. (1986). *Social foundations of thought and action : A social cognitive theory* (Prentice-Hall series in social learning theory). Englewood Cliffs ; London: Prentice-Hall.

Barfield, P. A., (2018). Life satisfaction in children with attention deficit hyperactivity disorder: looking beyond proxy reports. *Journal of Child and Adolescent Psychiatric Nursing*, 31(4). https://doi-org.ezproxy.nottingham.ac.uk/10.1111/jcap.12218

Barfield, P. A., & Driessnack, M. (2018). Children draw-and-tell what makes their life really good. *Journal of Pediatric Specialists*, 23, e12210. https://doiorg.ezproxy.nottingham.ac.uk/10.1111/jspn.12210.

Barkley, R. A. (1997). Behavioral Inhibition, Sustained Attention, and Executive Functions: Constructing a Unifying Theory of ADHD. *Psychological Bulletin 121*(1), 65-94. Web.

Beaver, R. (2011). *Educational Psychology Casework: A Practice Guide.* London: Jessica Kingsley.

Blatchford, P., Webster, R., & Russell, A., (2013) Challenging and changing how schools use teaching assistants: findings from the Effective Deployment of Teaching Assistants project, *School Leadership & Management*, 33 (1), 78-96.

Breakwell, G. M. (1997). *Coping with Aggressive Behaviour*. (Personal and Professional Development). Leicester, U. K.: BPS Blackwell.

Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative Research in Psychology*, *3*(2), 77–101. https://doi.org/10.1191/1478088706qp063oa

British Psychological Society (BPS) (1996). *Attention Deficit Hyperactivity Disorder: A psychological response to an evolving concept.* British Psychological Society: Leicester

British Psychological Society (BPS) (2000). *Attention Deficit Hyperactivity Disorder: Guidelines and principles for successful multi-agency working.*

British Psychological Society (BPS) (2014). *Code of Human Research Ethics, 2nd Edition.* British Psychological Society: Leicester

Bruce, B., Thernlund, G., & Nettelbladt, U. (2006). ADHD and language impairment: A study of the parent questionnaire FTF (Five to Fifteen). *European Child & Adolescent Psychiatry, 15*(1), 52–60. doi: 10.1007/s00787-006-0508-9.

Brunton, G., Oliver, S. & Thomas, J. (2015). *Applying framework synthesis to understand complexity in systematic reviews: A systematic review of methods.* Presented at: 23rd Cochrane Colloquium, Vienna Austria.

Campbell, J. (2004). Statistical Comparison of Four Effect Sizes for Single-Subject Designs. *Behavior Modification, 28*(2), 234-246.

Carey, J., Churches, R., Hutchinson, G., Jones, J. & Tosey, P. (2009). *Neuro-linguistic programming and learning: teacher case studies on the impact of NLP in education,* Reading: CfBT Education Trust. 1–113.

Carpenter, B., Egerton, J., Cockbill, B. Bloom, T., Fotheringham, J., Rawson, H, & Thistlethwaite, J. (2015). *Engaging Learners with Complex Learning Difficulties and Disabilities: A resource book for teachers and teaching assistants*. Routledge.

Churches, R., & West-burnham, J. (2008). Leading learning through relationships : the implications of Neuro-linguistic programming for personalisation and the

children ' s agenda in England Welcome to CfBT Education Trust. *Online Submission (ERIC Database)*.

Climie, E. A., & Mastoras, S. M. (2015). ADHD in Schools: Adopting a Strengths-Based Perspective. *Canadian Psychology*, *56*(3), 295–300. https://doi.org/10.1037/cap0000030

Climie E. A., Saklofske D. H., Schwean V. L., Mastoras S. M. (2013). Emotional intelligence and social skills in children with ADHD: Knowing versus doing. Paper presented at the Society of Research in Child Development Conference, Seattle, WA.

Cline, T. (2015). Effective Communication in School. In T. Cline, A. Gulliford, & S. Birch (Eds.), *Educational Psychology: Topics in Applied Psychology: Second Edition* (pp. 136-154).

Cohen, J. (1968). Weighted kappa: Nominal scale agreement provision for scaled disagreement or partial credit. *Psychological Bulletin, 70*(4), 213-220.

Cook, T., & Campbell, D. (1979). *Quasi-experimentation : Design & analysis issues for field settings*. Chicago: Rand McNally College Publishing.

Cooper, P. J., Vally, Z., Cooper, H., Radford, T., Sharples, A., Tomlinson, M., & Murray, L. (2014). Promoting Mother-Infant Book Sharing and Infant Attention and Language Development in an Impoverished South African Population: A Pilot Study. *Early Childhood Education Journal*, *42*(2), 143–152. https://doi.org/10.1007/s10643-013-0591-8

Cowie, B., Harrison, C., Willis, J. (2018). Supporting teacher responsiveness in assessment for learning through disciplined noticing. *The Curriculum Journal*. https://doi.org/10.1080/09585176.2018.1481442

Csikszentmihalyi, M. & Nakamura, J (2005). The Concept of Flow. in C.R. Snyder & S.J. Lopez (Eds.) Handbook of Positive Psychology. New York: Oxford University Press, pp 89-105, 2002

Dawson, P. & Guare, R. (2010). *Executive Skills in Children and Adolescents [electronic Resource] : A Practical Guide to Assessment and Intervention / Peg Dawson, Richard Guare.* 2nd ed. New York ; London. Guilford Practical Intervention in the Schools Ser. Web.

Day, T. & Tosey, P. (2011). Beyond SMART? A new framework for goal setting. *The*

Curriculum Journal,22(4), 515-534, DOI: 10.1080/09585176.2011.627213

Department of Education. (2015). SEND code of practice: 0 to 25 years. Retrieved from gov.uk.

De Shazer, S. & Berg, I. (1997). 'What Works?' Remarks on Research Aspects of Solution-Focused Brief Therapy. *Journal of Family Therapy.* 19. 121-124.

DETE. (1999). Attention difficulties, poor impulse control, overactivity or ADHD: Teaching and managing children and school students. Adelaide, SA.

Deutsch, R. M. & Mohammed, M. G. (2010). *Cognitive Abilities Profile, Administration and Scoring Manual.* Canterbury: Realpress.

Dockerell, J., Ricketts, J. & Lindsay, G. (2012). *Understanding Speech, Language and Communication Needs: Profiles of Need and Provision* (Ref: DFE-RR247). London: DfE.

*Ducharme, J.M. & Harris, K. E. (2005). Errorless embedding for children with on-task and conduct difficulties: rapport-based, success-focused intervention in the classroom. *Behaviour Therapy,* 36(3), 213-222.

DuPaul, G. J., Ervin, R. A., Hook, C. L. & McGoey, K. E. (1998). Peer tutoring for children with attention deficit hyperactivity disorder: effects on classroom behavior and academic performance. *Journal of Applied Behavior Analysis 31*(4), 579-92. Web.

DuPaul, G. J., Jitendra, A. K., Volpe, R. J., Tresco, K. E., Lutz, J. G, Vile J., Rosemary E. & Manella, M. C. (2006). Consultation-Based Academic Interventions for Children with ADHD: Effects on Reading and Mathematics Achievement. *Journal of Abnormal Child Psychology,* 34(5), 633-646.

DuPaul, G. J., Weyandt, L. L., & Janusis, G. M. (2011). Adhd in the classroom: Effective intervention strategies. *Theory into Practice*, *50*(1), 35–42. https://doi.org/10.1080/00405841.2011.534935

Egan, G. (2010). *The skilled helper: a problem-management and opportunity-development approach to helping.* 9th Ed. Calif. Brooks/Cole.

Feuerstein, R., Klein, P. S. & Tannenbaum, A. J. (eds). (1991). *Mediated Learning Experience (MLE): Theoretical, Psychosocial and Learning Implications.* London: ICELP/Freund Publishing.

Fredricks, J. A., Blumenfeld, P. C., & Paris, A. H. (2004). School Engagement:

Potential of the Concept, State of the Evidence. *Review of Educational Research*, *74*(1), 59–109.

Ganz, J., & Ayres, K. (2018). Methodological standards in single-case experimental design: Raising the bar. *Research in Developmental Disabilities, 79*, 3-9.

Geddes, H. (2006). *Attachment in the* Classroom The *Links between Children's Early Experience, Emotional Well-being and Performance in School / Heather Geddes.* London, Print.

Geng, G. (2011). Investigation of Teachers' Verbal and Non-verbal Strategies for Managing Attention Deficit Hyperactivity Disorder (ADHD) Students' Behaviours within a Classroom. Environment*. Australian Journal of Teacher Education,* 36(7), 17-30.

Gibbs, K. (2018). Australian Adolescent Boys with Attention Deficit/hyperactivity Disorder (AD/HD): Teacher and Teaching Factors That Assess the Efficacy of Reducing Unwanted Behaviours within the Classroom Environment." *Australian Journal of Learning Difficulties,* 23(1), 53-65.

Goodhew, S. C., & Kidd, E. (2016). The conceptual cueing database: Rated items for the study of the interaction between language and attention. *Behavior Research Methods*, *48*(3), 1004–1007. https://doi.org/10.3758/s13428-015-0625-9

Gough, D. (2007). Weight of evidence: a framework for the appraisal of the quality and relevance of evidence In J. Furlong, A. Oancea (Eds.) *Applied and Practice-based Research. Special Edition of Research Papers in Education*, 22(2), 213-228.

Greene, R., Beszterczey, S., Katzenstein, T., Park, K., & Goring, J. (2002). Are Students with ADHD More Stressful to Teach?: Patterns of Teacher Stress in an Elementary School Sample. *Journal of Emotional and Behavioral Disorders, 10*(2), 79-89.

Gulliford, A. (2015). Educational Psychology. In T. Cline, A. Gulliford, & S. Birch (Eds.), *Educational Psychology: Topics in Applied Psychology: Second Edition* (pp. 1–331). https://doi.org/10.4324/9781315719962

Harbst, K., Ottenbacher, K. & Harris, S. (1991). Research Report. Interrater Reliability of Therapists' Judgments of Graphed Data. *Physical Therapy,* 71(2), 32-40.

Harker, M. E., Dean, S., & Monsen, J. J., (2017). Solution-oriented educational psychology practice. In Kelly, Woolfson & Boyle (2017) *Frameworks for practice in educational psychology.* London: Jessica Kingsley.

Haywood, C. H., & Lidz, C. S. (2007). *Dynamic Assessment in Practice.* Cambridge: Cambridge University Press.

Heyvaert, M., Wendt, Van Den Noortgate, W., & Onghena, P. (2015). Randomization and Data-Analysis Items in Quality Standards for Single-Case Experimental Studies. *The Journal of Special Education* 49(3), 146-56. Web.

Higgins, J. P. T., & Green, S. (2011). Cochrane Handbook for Systematic Reviews of Interventions Version 5.1.0 [updated March 2011]. In *The Cochrane Collaboration* (p. Table 7.7.a: Formulae for combining groups).

Holdaway, A. S., & Becker, S. P. (2018). Sluggish cognitive tempo and student–teacher relationship quality: Short-term longitudinal and concurrent associations. *School Psychology Quarterly, 33*(4), 537-546.

Horner, R. H., Carr, E. G., Halle, J., Mcgee, G., Odom, S., & Wolery, M. (2005). The use of single-subject research to identify evidence-based practice in special education. *Exceptional Children*. https://doi.org/10.1177/001440290507100203

Hounslow, R. (2016). Review of Engaging learners with complex learning difficulties and disabilities: A resource book for teachers and teaching assistants. *Educational Psychology in Practice*, *32*(1), 100–101. https://doi.org/http://dx.doi.org/10.1080/02667363.2015.1104865

Hughes, L. (2009). Engaging students with ADHD in mainstream education: lessons from children, parents and teachers. *International Journal of Emotional Education*, *1*(1), 108–117.

Imeraj, L., Antrop, I., Sonuga-Barke, E., Deboutte, D., Deschepper, E., Bal, S., & Roeyers, H. (2013). The impact of instructional context on classroom on-task behavior: A matched comparison of children with ADHD and non-ADHD classmates. *Journal of School Psychology*, *51*(4), 487–498. https://doi.org/10.1016/j.jsp.2013.05.004

Jiang, H. & Farquharson, K. (2018). Are Working Memory and Behavioral Attention Equally Important for Both Reading and Listening Comprehension? A Developmental Comparison. *Reading and Writing, 31*(7): 1449-477. Web.

Jiang, H., Johnstone, S., Sun, L., & Zhang, D. (2018). Effect of Neurocognitive Training for Children With ADHD at Improving Academic Engagement in Two Learning Settings. *Journal of Attention Disorders,* 1087054718799931.

Kahneman, D. (2012). *Thinking, fast and slow*. London: Penguin.

Lawrence, K., Estrada, R., & Mccormick, J. (2017). Teachers' Experiences With and Perceptions of Students With Attention Deficit/hyperactivity Disorder. Journal of Pediatric Nursing, 36, 141-148.

Kazdin, A. E. (1982). Single-case research designs: Methods for clinical and applied settings. New York: Oxford University Press.

Kelly, G. (1955). *The psychology of personal constructs / by George A. Kelly.* New York.

Kos, J., Richdale, A., & Hay, D. (2006). Children with attention deficit hyperactivity disorder and their teachers: A review of the literature. *International Journal of Disability, Development and Education*, *53*(2), 147–160. https://doi.org/10.1080/10349120600716125

Kratochwill, T. R., Hitchcock, J. H., Horner, R. H., Levin, J. R., Odom, S. L., Rindskopf, D. M., & Shadish, W. R. (2013). Single-Case Intervention Research Design Standards. Remedial and Special Education, 34(1), 26–38. https://doi.org/10.1177/0741932512452794

Kudliskis, V. (2013). Neuro-linguistic programming and altered states: encouraging preparation for learning in the classroom for students with special educational needs. *British Journal of Special Education* 40(2), 86-95.

Kudliskis, V. (2014). Teaching assistants, neuro-linguistic programming (NLP) and special educational needs: “reframing” the learning experience for students with mild SEN. *Pastoral Care in Education*, *32*(4), 251–263. https://doi.org/10.1080/02643944.2014.960533

Lincoln, V.S. & Guba, E.G. (2000). Paradigmatic controversies, contradictions, and emerging confluences. In N.K Densin & V.S Lincoln (Eds). *Handbook of qualitative research* (2nd ed, pp. 163-188). Thousand Oaks, CA: Sage.

Mcbrien, J. & Weightman, J. (1980). The effect of room management procedures on the engagement of profoundly retarded children. *The British Journal of Mental Subnormality*, *26*(50), 38-46. Doi: 10.1179/Bjms.1980.26.50.006

McHugh M. L. (2012). Interrater reliability: the kappa statistic. *Biochemia medica*, *22*(3), 276–282.

McQueen, R., & Knussen, C. (2006). *Introduction to research methods and statistics in psychology*. Harlow: Pearson/Prentice Hall.

Mason, J. (2002). *Researching Your Own Practice: The Discipline of Noticing.*London: Rouledge Falmer.

Mead, H, K. Beauchaine, K. P., & Shannon, K. E. (2010). Neurobiological Adaptations to Violence across Development. *Development and Psychopathology, 22*(1), 1-22. Web.

Mertens, D. M. (2005). *Research and Evaluation in Education and Psychology: Integrating diversity with quantitative, qualitative, and mixed methods* (2nd ed.). London: Sage Publications Inc.

Miranda, A., Presentación, M. J., & Soriano, M. (2002). Effectiveness of a School-Based Multicomponent Program for the Treatment of Children with ADHD. *Journal of Learning Disabilities 35*(6) 547-63. Web.

Mishra, R. K. (2015). *Interaction between attention and language systems in humans: A cognitive science perspective*. *Interaction Between Attention and Language Systems in Humans: A Cognitive Science Perspective*. https://doi.org/10.1007/978-81-322-2592-8

Marzano, R. J., Pickering, D., & Pollock, J. E. (2001). Classroom instruction that works: Research-based strategies for increasing student achievement. Alexandria, VA: ASCD.

Moher, D., Liberati, A., Tetzlaff, J., & Altman, D. G. (2009). Preferred reporting items for systematic reviews and meta-analyses: the PRISMA statement. *BMJ*, *339*(jul21 1), b2535–b2535. https://doi.org/10.1136/bmj.b2535

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

Parker, R., Vannest, K., & Davis, J. (2011). Effect Size in Single-Case Research: A Review of Nine Nonoverlap Techniques. *Behavior Modification, 35*(4), 303-322.

Pashler, H., Johnston, J. C., & Ruthruff, E. (2001). Attention and performance. *Annual Review of Psychology*, *52*(1), 629.

https://doi.org/10.1146/annurev.psych.52.1.629

Pfiffner, L., Barkley, R. A., DuPaul, G. J. (2006). Treatment of ADHD in school settings. In R. Barkley (Ed.), *Attention deficit hyperactivity disorder: A handbook fordiagnosis and treatment(3rd edition).* New York: Guilford.

Phelps, F. G., Doherty-Sneddon, G., & Warnock, H. (2010). Helping children think: Gaze aversion and teaching. *British Journal of Developmental Psychology, 24*(3), 577-588.

Plavnick, J. B., & Ferreri, S. J. (2013). Single-Case Experimental Designs in Educational Research: A Methodology for Causal Analyses in Teaching and Learning. *Educational Psychology Review*, *25*(4), 549–569. https://doi.org/10.1007/s10648-013-9230-6

Poehner, M. E. (2011). Dynamic Assessment: Fairness through the prism of mediation. *Assessment in Education: Principles, Policy and Practice*, *18*(2), 99–112. https://doi.org/10.1080/0969594X.2011.67090

Reid, R., Maag, J. (1997). Attention Deficit Hyperactivity Disorder: over here and over there. *Educational and Child Psychology*, *14*(1), 10–20.

Rief, S. F. (2016). *How to Reach and Teach Children and Teens with ADD/ADHD.* (3rd edition). San Fransisco: Wiley

Robson, C. & McCartan, K. (2016). Real world research. *Fourth Edition. Blackwell Publishing. Malden*, 1–608. https://doi.org/10.1016/j.jclinepi.2010.08.001

Rogers, M., Bélanger-Lejars, V., Toste, J. R., & Heath, N. L. (2015). Mismatched: ADHD symptomatology and the teacher–student relationship, *Emotional and Behavioural Difficulties, 20*:4, 333-348, DOI: 10.1080/13632752.2014.972039

Rudasill, K. M., Gallagher, K. C., & White, J. M. (2010). Temperamental attention and activity, classroom emotional support, and academic achievement in third grade. *Journal of School Psychology*, *48*(2), 113–134. https://doi.org/10.1016/j.jsp.2009.11.002

Saunders, B., & Chambers, S. M. (1996). A review of the literature on attention-deficit hyperactivity disorder children: Peer interactions and collaborative learning. *Psychology in the Schools*, *33*(4), 333–340. https://doi.org/10.1002/(SICI)1520-6807(199610)33:4<333::AID-PITS8>3.0.CO;2-N

Shimizu, V, T., Bueno, O. F. A., & Miranda, M. C. (2014). "Sensory Processing Abilities of Children with ADHD." *Brazilian Journal of Physical Therapy, 18*(4), 343-352. Web.

Spanjers, D. M., Burns, M. K., & Wagner, A. R. (2008). Systematic Direct Observation of Time on Task as a Measure of Student Engagement. *Assessment for Effective Intervention*, *33*(2), 120–126. https://doi.org/10.1177/1534508407311407

*Stahr, B., Cushing, D., Lane, K., & Fox, J. (2006). Efficacy of a Function-Based Intervention in Decreasing Off-Task Behavior Exhibited by a Student With ADHD. *Journal of Positive Behavior Interventions*, *8*(4), 201–211. https://doi.org/10.1177/10983007060080040301

*Steiner, N. J., Sheldrick, R. C., Frenette, E. C., Rene, K. M. & Perrin, E. C. (2014) Classroom Behavior of Participants with ADHD Compared with Peers: Influence of Teaching Format and Grade Level, *Journal of Applied School Psychology,* 30:3, 209-222, DOI: 10.1080/15377903.2014.896297

Stevens, L., Van Werkhoven, W., Stokking, K., Castelijns, J. & Jager, A. (2000) Interactive Instruction to Prevent Attention Problems in Class. *Learning Environments Research, 3*(3): 265-86. Web.

Styles, E. A. (2006). *The psychology of attention: Second edition*. *The Psychology of Attention: Second Edition*. https://doi.org/10.4324/9780203968215

Swanson, J. M., McBurnett, K., Wigal, T., Pfiffner, L. J., Lerner, M. A., Williams, L., ... & Clevenger, W. (1993). Effect of stimulant medication on children with attention deficit disorder: a "review of reviews". *Exceptional children*, *60*(2), 154-162.

Thomas, G. (2002). Discussion Paper--Are Eggs the Right Size for Egg Cups Because of Good Planning by Hens? Where is Reading Research Going? *Educational Psychology in Practice*, *18*(2), 157–166. https://doi.org/10.1080/02667360220144575

Tymms, P., & Merrell, C. (2011). ADHD and academic attainment: Is there an advantage in impulsivity? *Learning and Individual Differences*, *21*(6), 753–758. https://doi.org/10.1016/j.lindif.2011.07.014

Tzuriel, D. (2014). Reuven Feuerstein: A giant in cognitive psychology. *Journal of Cognitive Education and Psychology*, *13*(3), 289–291.

https://doi.org/10.1891/1945-8959.13.3.289

Valsiner, J. (2000). *Culture and Human Development: An Introduction.* London: SAGE.

*Vesely, P., & Gryder, N. (2009). Word of the Day Improves and Redirects Student Attention While Supporting Vocabulary Development. *Intervention in School and Clinic, 44*(5), 282-287.

Vile Junod, R., Dupaul, G., Jitendra, A., Volpe, R., & Cleary, K. (2006). Classroom observations of students with and without ADHD: Differences across types of engagement. *Journal of School Psychology, 44*(2), 87-104.

Vygotsky, L. S. (1978). *Mind in Society: The Development of Higher Psychological Processes*. *Full-Text. (N.D.).* https://doi.org/10.1007/978-3-540-92784-6

Weiss, M., Baer, D., Allan, S., Saran, K., & Schibuk, H. (2011). The Screens Culture: Impact on ADHD. *ADHD Attention Deficit and Hyperactivity Disorders, 3*(4), 327-34. Web.

Wang, Z., Bergin, C., & Bergin, D. A. (2014). Measuring engagement in fourth to twelfth grade classrooms: The classroom engagement inventory. *School Psychology Quarterly*, *29*(4), 517–535. https://doi.org/10.1037/spq0000050

*Wang, X. L., Bernas, R., & Eberhard, P. (2004). Engaging ADHD students in tasks with hand gestures: A pedagogical possibility for teachers. *Educational Studies*, *30*(3), 217–229. https://doi.org/10.1080/0305569042000224189

West, J.F. & Idol, L. (1987). School consultation part I: An interdisciplinary perspective on theory, models and research. *Journal of Learning Disabilities.* 20. 388-408.

Yeomans, J. (2008). Dynamic Assessment practice: some suggestions for ensuring follow up. *Educational Psychology in Practice*, *24*(2), 105–114. https://doi.org/10.1080/02667360802076107

Zentall, S. (1993). Research on the Educational Implications of Attention Deficit Hyperactivity Disorder. *Exceptional Children, 60*(2), 143-153.

Appendices

Appendix 1: Gough's (2007) Weight of Evidence for Systematic Literature Review Studies

Gough's (2007) Weight of Evidence
Studies were coded qualitatively as 'High', 'Medium' & 'Low' based on the below categorisation. All studies were found to be of medium weighting, therefore the weighting of their contribution to the study was treated as equal overall, and individual aspects of the question as high, medium or low as illustrated by the combination of individual criteria results for the studies.

25-50% tick list score – Low
50-75% tick list score – Medium
75-100% tick list score – High

Weight of Evidence A Criteria (Overall integrity, coherence and methodological quality irrespective of this review question)	**Study 1** (Wang Bernas & Eberhard, 2004)	**Study 2** (Steiner et al., 2014)	**Study 3** (Ducharme & Harris, 2005)	**Study 4** (Stahr et al., 2006)	**Study 5** (Vesely & Gryder, 2009)
Design					
• Not a pilot study	✓	✓	✓	✓	✓
• Data is experimentally controlled	✓	✓	✓	✓	X
• Independent variables and dependent variables are clearly defined and explained.	✓	✓	✓	✓	✓
Setting and Context					
• Intervention structure is clear and replicable	✓	X	✓	✓	✓
• Study is based in an English-speaking country using untranslated English measurement tools.	✓	✓	✓	✓	✓
Participants					
• Age and gender clearly reported	✓	✓	✓	✓	X
• Ethnic status clearly reported	✓	✓	X	✓	✓
• Demographics indicating socio-economic status reported	X	✓	✓	X	X
• Recruitment strategies/context reported	✓	X	✓	X	X
Data Collection and Analysis					
• Data collection tools acceptably reliable - demonstrated statistically	✓	✓	✓	✓	X
• Data collection tools are published/professionally recognised	✓	✓	X	X	X
• Data routinely collected from more than one informant	X	X	X	X	X

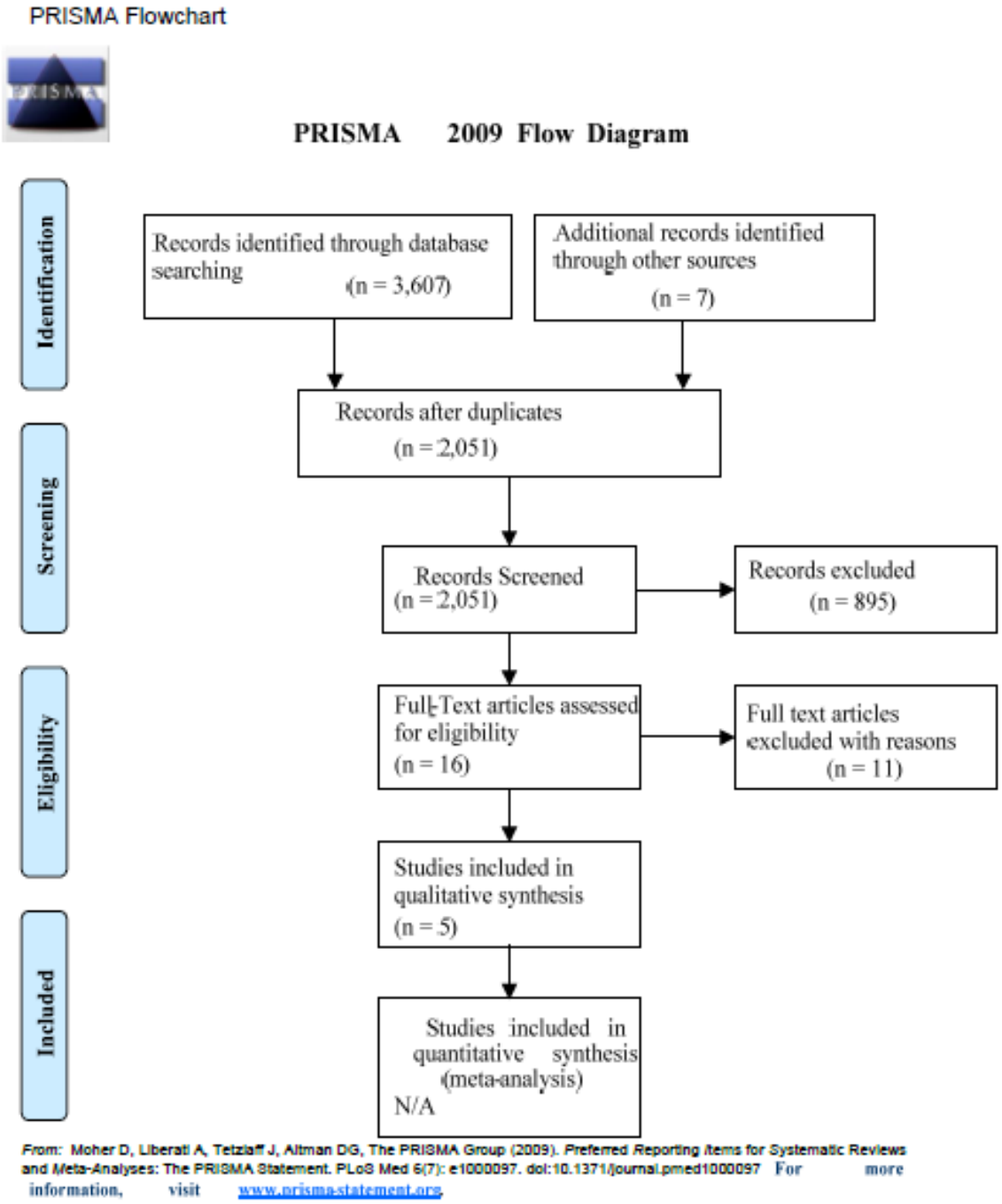
• Data collection tools valid to study's aims	✓	✓	✓	✓	X
• Drop-outs and withdrawals (or lack of) is reported	X	X	X	N/A	X
• Effect size reported (if relevant)	X	X	N/A	N/A	X
Intervention Integrity					
• Consistent and clear parameters of intervention	✓	X	✓	✓	✓
• Consistency/fidelity of treatment monitored (e.g. regular meetings to share information)	X	N/A	✓	✓	X
• Intervention has clear links to sound theory	✓	✓	✓	✓	✓
• Intervention participants and controls are reported not to have received other interventions during the study	X	X	X	✓	X
• Over 80% of participants intended for receiving the intervention, are known to have completed the intervention	X	X	✓	N/A	X
• Key intervention content is established and unbiased – i.e. published	✓	X	✓	X	X
• Numbers of missed sessions/data is reported (even if none)	X	X	X	X	X
Confounds					
• Pre-testing does not appear to contribute to changes (e.g. via practice effects or experience)	X	N/A	✓	✓	X
• Activity of controls, comparisons, or pre-test activity do not appear to confound changes.	X	✓	X	✓	✓
• Intervention effects are known not to have been able to diffuse to control/comparison measures	✓	N/A	N/A	X	✓
• Extrinsic rewards were not used to induce or enhance engagement in the intervention	✓	✓	✓	X	✓

• Participants are known not to have changed any medication, during the entire study	X	X	✓	✓	X
TOTAL SCORE	16/27 59% Medium	13/24 54% Medium	18/25 72% Medium	16/24 66% Medium	10/27 37% Low
Weight of Evidence B Criteria (Methodological relevance and fitness of purpose to answering the review's question)	Study 1	Study 2	Study 3	Study 4	Study 5
Design					
• The independent variable was interaction and communication between the child and the teaching adult.	✓	✓	✓	✓	✓
• The setting was the child(ren)'s naturalistic classroom.	X	✓	X	✓	✓
• The independent variable was delivered to benefit the child in naturalistic academic classroom learning activities.	X	✓	X	✓	✓
• The independent variable was consistently delivered in activities which required a high processing or cognitive load.	✓	✓	✓	✓	✓
Intervention					
• Intervention is not reported to include support which was additional to interaction and communication strategies/approaches (e.g. prior social skills training for children outside of the lesson)	✓	✓	✓	X	✓
• The interaction and communication used, is reported in enough detail to ensure replicability of the strategy/approach.	✓	X	✓	✓	✓
• It is clear which parts of the intervention/independent variable are responsible for any effects.	✓	X	✓	X	✓
Outcome Measures					

• Dependent variable measures are structured and carry rigour, and are not anecdotal in nature.	✓	✓	✓	✓	X
• At least one dependent variable measure is specifically around child(ren)'s task or learning engagement, or on-task functional attention	✓	✓	✓	✓	✓
• At least one dependent variable measure is based on observation of engagement/task-performance	✓	✓	✓	✓	X
• At least one measure takes place in school, in relation to real classroom-based behaviour.	X	✓	X	✓	✓
Intervention					
• The study investigates effects of an interaction and communication-based independent variable, on an engagement-based (or on/off task-related) dependent variable.	✓	X	✓	✓	✓
Sample					
• All participants have attention difficulties.	✓	✓	X	✓	X
• Participants are primary school-aged.	✓	✓	✓	✓	✓
• Any additional and potentially confounding difficulties separate to attention difficulties are clearly reported.	✓	✓	✓	✓	X
• Participants are known not be receiving medication for ADHD.	X	X	✓	X	X
• Sample with attention difficulties is known to include both sexes	X	✓	X	X	X
TOTAL SCORE	12/17 70% Medium	13/17 76% High	13/17 76% High	13/17 76% High	11/17 64% Medium
Weight of Evidence C Criteria (Relevance and centrality of study focus to the review question)	Study 1	Study 2	Study 3	Study 4	Study 5
Intervention					

• The intervention/independent variable was solely interaction and communication-based.	✓	X	✓	X	X
• The specific aspects of interaction and communication are identifiable.	✓	X	✓	✓	✓
• The specific aspects of interaction and communication are central to the study's own research findings.	✓	X	✓	X	✓
Outcome Measures					
• Primary focus was on children's on-task engagement or attentive behaviours	✓	✓	✓	✓	X
• The outcome was measured in academic tasks requiring sustained processing of complex verbal or other representative information. (e.g. not visual puzzles, or gaming programmes with immediate feedback/reward)	X	✓	✓	✓	✓
• The dependent variable measures investigate engagement or attention in depth (e.g. beyond observable 'on-task' behaviours or recall).	✓	✓	X	X	X
Participants					
• The variable corresponding to 'attention difficulties' is specifically defined as an attentional challenge or difficulty, symptoms typical of ADHD, or an ADHD diagnosis, by more than one reporting adult or based on more than one setting.	✓	✓	✓	X	X
TOTAL SCORE	6/7 85% High	4/7 57% Medium	6/7 85% High	3/7 42% Low	3/7 42% Low
Weight of Evidence D *(Combined scores)*	Study 1	Study 2	Study 3	Study 4	Study 5
TOTAL SCORE OVERALL	34/51 66% Medium	30/48 62% Medium	37/49 75% High	32/48 66% Medium	24/51 47% Low

Appendix 2: PRISMA Flowchart for Systematic Literature Review Studies; Moher et al. (2009)



Appendix 3: Search Terms Used for Systematic Literature Review

Population Keywords		**Outcome-Type Keywords**		**Intervention-type Keywords**		**Study/Research Keywords**		**Setting Keywords**
ADHD *OR* Attention deficit-hyperactiv(e)(ity) disorder *OR* Attention(al) difficult(y)(ies) *OR* Attention(al) problems	AND	Engagement *OR* On-task *OR* Off-task	AND	Communicat(ive)(ion) *OR* Interact(ive)(ion) *OR* Non-Verbal *OR* Language *OR* Speech	AND	Intervention *OR* Approach(es) *OR* Strateg(y)(ies) *OR* Technique(s)	AND	Education(al) *OR* School (based) *OR* Classroom (based) *OR* Teach(er)(ing) *OR* Learn(ing)
Databases used for searches: Web of Science Science Direct Google Scholar ERIC SCOPUS SAGE University of Nottingham Library Search Database 'Nusearch'								

Appendix 4: Initial School and Parent Recruitment Letters, Consent Forms and Briefing Information

School Recruitment Letter

Dear Headteacher,

I hope this letter finds you well. I am a Trainee Educational Psychologist for Lincolnshire County Council, undertaking my doctoral research at the University of Nottingham. I am interested in working with your school to apply a solution-oriented framework I have developed through my initial exploratory research into what teacher-child communication and interaction promotes the academic learning engagement of children showing attention difficulties.

This semi-experimental research would require the participation of a child in key stage 2, to have their academic classwork engagement monitored daily for around 6-8 weeks. Initially this is monitored without intervention, to establish a baseline. Then the intervention phase begins when the framework is implemented though consultation with the class teacher and parent, and an agreed action plan is put in place (continuing to monitor the child's engagement). A progress-check meeting would also take place halfway through the intervention phase, and some teacher comments collected via a follow-up meeting or phone call. It is anticipated that the child's engagement would be measured via a simple daily teacher-rating scale.

Children taking part must already be of concern to the school in terms of focusing their attention in school. Participation would also be subject to parental consent, agreement from the children themselves, and consent from their class teachers. The child's involvement would be checked further for suitability through discussion with the SENDCo and parent.

I would be keen to share my findings with you whether the framework is shown to be effective or not. I anticipate that any results will offer some useful additional understanding about engaging children who have attention difficulties.

I am in receipt of ethical clearance from the University to carry out this research. This means it has met all of the standards of ethical scrutiny and you would be welcome to find out more about this process and any of the ethical considerations made.

I am aware of the demands on teaching staff and senior leadership. Along with the teacher taking part in the consultation session, and subsequently implementing the action plan, this research would require the class teacher or teaching assistant to record the child's engagement. This will, however, be a quick and simple procedure. All consent forms and debriefing information will be provided.

If you are interested, the next step is for you to contact me to discuss the potential suitability of an anonymous child you have in mind. Following this, you can discuss this opportunity with the parents with a provided parent information letter. Parental consent

for EP involvement would then be gained so I can discuss potential suitability with the parent. Following this, if the child is felt to match the criteria and the teacher agrees to take part, a consent form for this research would be sent for the parent and the child's teacher to give their informed written consent to take part. The child would also need to verbally give their assent.

We can of course speak about this research in more detail should you have any questions. Thank you for your time and attention, we hope to hear from you soon.

Kind Regards

Lise Griffiths
Trainee Educational Psychologist

Supervised at Lincolnshire County Council by Dr Gemma Slack (Senior Educational Psychologist)

Supervised at Nottingham University by Dr Sarah Atkinson (Academic and Professional Tutor and Specialist Senior Educational Psychologist)

Parent Recruitment Letter, Consent Form and Briefing

Dear Mrs/Mrs (…)

I am a Trainee Educational Psychologist for Lincolnshire County Council, carrying out my doctoral research with the University of Nottingham. You may be aware of your child's school's interest in participating in my research. This letter should reach you following your discussion with the school, and this information should further explain what is involved.

The research aims to find out the effectiveness of an intervention which attempts to help teachers to engage children with attention difficulties in their learning. The intervention is a 'framework' which will be part of a consultation with the child's teacher and parent, to formulate an action plan for how the teacher can help engage the child.

A series of case studies on participating children's difficulties and possible progress, would help me find out if the framework leads to teacher actions that help children engage in academic lessons. Children's engagement will be measured daily at the end of these lessons, using a quick teacher tally chart and questionnaire. Measures begin before the intervention, so we can establish what the child's engagement was like to begin with. Then following the consultation and resulting action plan, the same engagement measures continue for approximately 4 weeks, to measure success. A progress check would take place halfway through, and a follow-up teacher discussion around 2 weeks after the last measure.

Any effects of the research activities are intended and anticipated to be positive. Should participating children wish to, they can be debriefed to reassure them about the research purpose or helping them understand their difficulties if they have questions arising from participation.

Taking part is entirely yours and your child's choices. Upon consenting, children will be assessed to ensure their difficulties are suitable for the research purposes, via the researcher's discussions with the school about your child's difficulties (not diagnostic in any way). Where children's difficulties do not match the research focus, their participation will not progress, as the intervention would not necessarily be suitable. Further debriefing information relating to the assessment will be available, if required.

If you have any additional questions, please contact me using the details in this letter, or you can contact your child's school.

If we do not hear from you we will assume you **do not** agree for your child to take part. If you **do** agree for your child to take part, please remember to sign and return the below slip and sending it back in the stamped addressed envelope to the school, by X date.

Thank you very much for your time and interest.

Kind Regards

Lise Griffiths
Trainee Educational Psychologist

Supervised at Lincolnshire County Council by Dr Gemma Slack (Senior Educational Psychologist)

Supervised at Nottingham University by Dr Sarah Atkinson (Academic and Professional Tutor and Specialist Senior Educational Psychologist)

Parental Consent for Child's Research Participation

I, ……. Parent or legal guardian of …… give my consent for my child to take part in the research detailed above.

My child also gives his/her verbal assent to take part.

I fully understand that involvement in this research is not diagnostic of any disorders or named difficulties in any way.

I fully understand what the research involves, and that debriefing procedures are in place should I or my child like to access them.

I fully understand that I/my child can withdraw our involvement at any time and that if we do, the data collected that relates to my child will not be included in the research write-up.

Signature:

Date:

Briefing and Contact Information:

Please keep this information.

The consultation and resulting action plan will be centred around what works to engage your child in his/her learning. This is based on the evidence from existing research and literature and based on observation of your child. The action plan reached will be a collaborative effort between the trainee educational psychologist, teacher or support staff, and yourself.

The measurements of your child's engagement are for formative, helpful and encouraging purposes, from a non-judgemental point of view and with no negative consequences as a direct result of them. This is not the same as being on report or being monitored for other purposes. It is important that the child understands this.

If you or your child experience any concerns or have any questions arising from participation in the research activities overall, the researcher is available to have a debriefing discussion with you or your child, at the time of involvement, or afterwards.

The researcher can be contact using the below information:

Lise Griffiths (Trainee Educational Psychologist)

Supervised at Lincolnshire County Council by Dr Gemma Slack (Senior Educational Psychologist)

Supervised at Nottingham University by Dr Sarah Atkinson (Academic and Professional Tutor and Specialist Senior Educational Psychologist)

Lincolnshire County Council (Sleaford Office)
07824695323 (work mobile)
Lise.griffiths@lincolnshire.gov.uk

Teacher Information, Consent Form, and Briefing

Research Participation: Teacher

Thank you for your interest in this research. Following discussion with the researcher and school's SENDCo, please read the information below about what teacher participation in this research would involve. Debriefing procedures are available and include consultation and discussion about any concerns or questions you have, which arise from participation in this research. This can be accessed at the time of your participation, or by contacting the researcher afterwards.

If you consent to take part, please sign the below slip, for the researcher to collect.

Consultation:

- 1 hour solution-oriented collaborative consultation with parent and researcher (trainee educational psychologist) with a focus on the framework and how it can be applied with the child
- An agreed action plan for implementation in lessons, resulting from consultation.

Daily Engagement Measures:

- 4-5 minute tally and questionnaire on child's engagement in specified lesson (academic) at the end of that lesson

Progress Check:

- One observation of the lesson and of action plan in practice
- Consultative interaction with teacher following if required (via telephone or in person)

Follow-up conversation via telephone or in person:

- 20 minutes
- A focus on what strategies have been successful, or unsuccessful, and how the teacher attributes any success or lack of
- A focus on transferability of any learning or new strategies, for the child (and for the teacher)

I, ……, class teacher of ……, consent to take part in the research detailed in the letter addressed to the school, with my participation as detailed above.

I fully understand what the research involves, and that debriefing procedures are in place should I or the child like to access them.

I fully understand that I can withdraw our involvement at any time and that if I do, the data collected that relates to myself will not be included in the research write-up.

Signature:

Date:

Briefing and Contact Information:

If you or the child experience any concerns or have any questions arising from participation in the research activities, the researcher is available to have a debriefing discussion with you or your child, at the time of involvement, or afterwards.

The researcher can be contact using the below information:

Lise Griffiths
Trainee Educational Psychologist

Supervised at Lincolnshire County Council by Dr Gemma Slack (Senior Educational Psychologist)

Supervised at Nottingham University by Dr Sarah Atkinson (Academic and Professional Tutor and Specialist Senior Educational Psychologist)

Lincolnshire County Council (Sleaford Office)
07824695323 (work mobile)
Lise.griffiths@lincolnshire.gov.uk

Appendix 5: Questions and Considerations Guiding Screening of Child Participants for Suitability

The following considerations are based on DSM-IV Criteria. They are of course for non-diagnostic purposes but based on ADHD diagnostic features for defining behaviour related to 'attention difficulties' for inclusion in this study.

Hyperactivity

1. How physically active is the child? (e.g. jigging and kicking legs out, swinging on chair repeatedly, running and 'bouncing off the walls')
2. When is the child physically active?
3. Where is the child physically active?
4. How much does this impact their learning and carrying out daily tasks?

Impulsivity

1. How much does the child act seemingly without thinking or planning ahead? (e.g. behaviours that are dangerous or offensive like playing with something hot or sharp, or picking at a display, but didn't seem to be planned or calculated)
2. When does the child show less thinking/planning ahead?
3. Where does the child show less thinking/planning ahead?
4. How much does this impact their learning and carrying out daily tasks?

Inattentiveness

1. How much does the child seem to daydream or struggle to sustain their attention on tasks involving higher thinking skills? (e.g. frequent turning around, looking around, fiddling or general distractedness when writing, adding, observational drawing - not when colouring, or fiddling with a fidget toy).
2. When does the child show more daydreaming or difficulty sustaining their attention?
3. Where does the child show more daydreaming or difficulty sustaining their attention?
4. How much does this impact their learning and carrying out daily tasks?

For inattention alone, OR hyperactivity AND impulsivity, the responses must be akin to:

- Very often
- Across activities and times of day
- Across home and school settings
- Very impacting

If needed, to supplement the above information or understand it further, also explore 'attention difficulties' along the below dimensions, for a dynamic understanding:

- Child's ability to regulate their attention
- Child's ability to sustain their attention
- Child's ability to shift their attention

Appendix 6: SCED Teacher Rating Measure

Teacher's Ratings of Child's Learning Engagement:

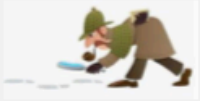
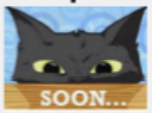
- Please complete **ratings 3 times a week** for each of the **engagement indicators**, directly after each 'academic' lesson.
- Next to the rating please also put the **date** of the rating, and **rater's initials.**
- It should be the same person rating the child's engagement each time. The 'academic' lesson should be the same lesson.
- Please rate the child in relation to their own typical engagement (i.e. without comparison to age-related peers).

How to Rate

A) **Frequency** of each engaged indicator. (0-3) 0 = did not occur, 1 = occurred seldomly, 2 = occurred often, 3 = almost constantly occurred. Please put N/A where engagement indicators did not apply (i.e. if the task did not lend itself to a specific indicator).

B) **Impact on learning** of each engaged indicator. (i.e. the significance of the effect the engaged behaviours had on the child's learning/progress). (0-3) 0 = no impact (also for engaged indicators that did not occur), 1 = low, 2 = medium, 3 = high.

What the Engagement Indicators Might Look Like

Initiation	Responsiveness & Awareness	Curiosity	Investigation	Discovery	Anticipation	Persistence
 Starts off their own interaction or involvement in task/activity	 Responds to and aware of others' needs, requests or offers, in relation to task/activity. Aware of availability of relevant resources	 Asks questions about or experiments with items, concepts or ideas related to task/activity	 Seeks further information about, items/concepts/ideas, related to the task/activity. Makes links between these.	 Uncovering information by themselves. Awareness of what information they found for themselves, related to task/activity	 Shows eagerness or enthusiasm to find out answers or learn new information related to task/activity	 Maintains effort in task/activity despite difficulties/barriers

BASELINE Ratings (A: Frequency of Engagement Indicators)

Date	Initiation 	Responsiveness/ Awareness 	Curiosity 	Investigation 	Discovery 	Anticipation 	Persistence 
Day 1: Date	Initials / Rating	Initials / Rating	Initials / Rating	Initials / Rating	Initials / Rating	Initials / Rating	Initials / Rating
Day 2: Date	Initials / Rating	Initials / Rating	Initials / Rating	Initials / Rating	Initials / Rating	Initials / Rating	Initials / Rating
Day 3: Date	Initials / Rating	Initials / Rating	Initials / Rating	Initials / Rating	Initials / Rating	Initials / Rating	Initials / Rating
Day 4: Date	Initials / Rating	Initials / Rating	Initials / Rating	Initials / Rating	Initials / Rating	Initials / Rating	Initials / Rating
Day 5: Date	Initials / Rating	Initials / Rating	Initials / Rating	Initials / Rating	Initials / Rating	Initials / Rating	Initials / Rating
Day 6: Date	Initials / Rating	Initials / Rating	Initials / Rating	Initials / Rating	Initials / Rating	Initials / Rating	Initials / Rating
Day 7: Date	Initials / Rating	Initials / Rating	Initials / Rating	Initials / Rating	Initials / Rating	Initials / Rating	Initials / Rating
Day 8: Date	Initials / Rating	Initials / Rating	Initials / Rating	Initials / Rating	Initials / Rating	Initials / Rating	Initials / Rating
Day 9: Date	Initials / Rating	Initials / Rating	Initials / Rating	Initials / Rating	Initials / Rating	Initials / Rating	Initials / Rating
Day 10: Date	Initials / Rating	Initials / Rating	Initials / Rating	Initials / Rating	Initials / Rating	Initials / Rating	Initials / Rating
'Missing data' dates (i.e. school trips / absences).							

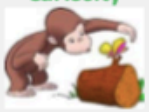
BASELINE RATINGS (B: Impact of Engagement Indicators)

Date	Initiation 	Responsiveness/ Awareness 	Curiosity 	Investigation 	Discovery 	Anticipation 	Persistence 
Day 1: Date	Initials / Rating	Initials / Rating	Initials / Rating	Initials / Rating	Initials / Rating	Initials / Rating	Initials / Rating
Day 2: Date	Initials / Rating	Initials / Rating	Initials / Rating	Initials / Rating	Initials / Rating	Initials / Rating	Initials / Rating
Day 3: Date	Initials / Rating	Initials / Rating	Initials / Rating	Initials / Rating	Initials / Rating	Initials / Rating	Initials / Rating
Day 4: Date	Initials / Rating	Initials / Rating	Initials / Rating	Initials / Rating	Initials / Rating	Initials / Rating	Initials / Rating
Day 5: Date	Initials / Rating	Initials / Rating	Initials / Rating	Initials / Rating	Initials / Rating	Initials / Rating	Initials / Rating
Day 6: Date	Initials / Rating	Initials / Rating	Initials / Rating	Initials / Rating	Initials / Rating	Initials / Rating	Initials / Rating
Day 7: Date	Initials / Rating	Initials / Rating	Initials / Rating	Initials / Rating	Initials / Rating	Initials / Rating	Initials / Rating
Day 8: Date	Initials / Rating	Initials / Rating	Initials / Rating	Initials / Rating	Initials / Rating	Initials / Rating	Initials / Rating
Day 9: Date	Initials / Rating	Initials / Rating	Initials / Rating	Initials / Rating	Initials / Rating	Initials / Rating	Initials / Rating
Day 10: Date	Initials / Rating	Initials / Rating	Initials / Rating	Initials / Rating	Initials / Rating	Initials / Rating	Initials / Rating
'Missing data' dates (i.e. school trips / absences).							

INTERVENTION Ratings (A: Frequency of Engagement Indicators)

Date	Initiation 	Responsiveness/ Awareness 	Curiosity 	Investigation 	Discovery 	Anticipation 	Persistence 
Day 1: Date	Initials / Rating	Initials / Rating	Initials / Rating	Initials / Rating	Initials / Rating	Initials / Rating	Initials / Rating
Day 2: Date	Initials / Rating	Initials / Rating	Initials / Rating	Initials / Rating	Initials / Rating	Initials / Rating	Initials / Rating
Day 3: Date	Initials / Rating	Initials / Rating	Initials / Rating	Initials / Rating	Initials / Rating	Initials / Rating	Initials / Rating
Day 4: Date	Initials / Rating	Initials / Rating	Initials / Rating	Initials / Rating	Initials / Rating	Initials / Rating	Initials / Rating
Day 5: Date	Initials / Rating	Initials / Rating	Initials / Rating	Initials / Rating	Initials / Rating	Initials / Rating	Initials / Rating
Day 6: Date	Initials / Rating	Initials / Rating	Initials / Rating	Initials / Rating	Initials / Rating	Initials / Rating	Initials / Rating
Day 7: Date	Initials / Rating	Initials / Rating	Initials / Rating	Initials / Rating	Initials / Rating	Initials / Rating	Initials / Rating
Day 8: Date	Initials / Rating	Initials / Rating	Initials / Rating	Initials / Rating	Initials / Rating	Initials / Rating	Initials / Rating
Day 9: Date	Initials / Rating	Initials / Rating	Initials / Rating	Initials / Rating	Initials / Rating	Initials / Rating	Initials / Rating
Day 10: Date	Initials / Rating	Initials / Rating	Initials / Rating	Initials / Rating	Initials / Rating	Initials / Rating	Initials / Rating
'Missing data' dates (i.e. school trips / absences).							

INTERVENTION Ratings (B: Impact of Engagement Indicators)

Date	Initiation 	Responsiveness/ Awareness 	Curiosity 	Investigation 	Discovery 	Anticipation 	Persistence 
Day 1: Date	Initials / Rating	Initials / Rating	Initials / Rating	Initials / Rating	Initials / Rating	Initials / Rating	Initials / Rating
Day 2: Date	Initials / Rating	Initials / Rating	Initials / Rating	Initials / Rating	Initials / Rating	Initials / Rating	Initials / Rating
Day 3: Date	Initials / Rating	Initials / Rating	Initials / Rating	Initials / Rating	Initials / Rating	Initials / Rating	Initials / Rating
Day 4: Date	Initials / Rating	Initials / Rating	Initials / Rating	Initials / Rating	Initials / Rating	Initials / Rating	Initials / Rating
Day 5: Date	Initials / Rating	Initials / Rating	Initials / Rating	Initials / Rating	Initials / Rating	Initials / Rating	Initials / Rating
Day 6: Date	Initials / Rating	Initials / Rating	Initials / Rating	Initials / Rating	Initials / Rating	Initials / Rating	Initials / Rating
Day 7: Date	Initials / Rating	Initials / Rating	Initials / Rating	Initials / Rating	Initials / Rating	Initials / Rating	Initials / Rating
Day 8: Date	Initials / Rating	Initials / Rating	Initials / Rating	Initials / Rating	Initials / Rating	Initials / Rating	Initials / Rating
Day 9: Date	Initials / Rating	Initials / Rating	Initials / Rating	Initials / Rating	Initials / Rating	Initials / Rating	Initials / Rating
Day 10: Date	Initials / Rating	Initials / Rating	Initials / Rating	Initials / Rating	Initials / Rating	Initials / Rating	Initials / Rating
'Missing data' dates (i.e. school trips / absences).							

Appendix 7: SCED Child Self-Rating Measure










Child's Self Engagement Rating: BASELINE (3 x per week, please include dates)

Please make a mark to show how often you think you were 'engaged' in your learning in class?	
Date: *In today's lesson, I was engaged in my learning, this much:*	☹ |----|----|----|----|----|----|----|----|----|----|----| ☺
Date: *In today's lesson, I was engaged in my learning, this much:*	☹ |----|----|----|----|----|----|----|----|----|----|----| ☺
Date: *In today's lesson, I was engaged in my learning, this much:*	☹ |----|----|----|----|----|----|----|----|----|----|----| ☺
Date: *In today's lesson, I was engaged in my learning, this much:*	☹ |----|----|----|----|----|----|----|----|----|----|----| ☺
Date: *In today's lesson, I was engaged in my learning, this much:*	☹ |----|----|----|----|----|----|----|----|----|----|----| ☺
Date: *In today's lesson, I was engaged in my learning, this much:*	☹ |----|----|----|----|----|----|----|----|----|----|----| ☺

Appendix: 8 Semi-Structured Interview Questions

- What are your overall impressions of the effectiveness of using interaction and communication principles to engage children with attention difficulties in classroom learning?
- What are your overall impressions of the effectiveness of the strategies in the action plan?
- To what extent do you feel the intervention has impacted on the child's learning engagement?
- How can you tell there has been a change (if any)?
- What do you feel is specifically responsible for changes/effects (If any)? This could be as a result of our initial consultation, a specific strategy in use, or something additional to the intervention.
- How do you think the intervention might be made more useful, more impactful or more practical?

Appendix 9: Example ICE Action Plan (Oscar)

Interaction and Communication for Engagement (ICE) – Action Plan		
This plan has been written for the child based on observation of the child in class, and consultation with parent and teacher. All strategies build on existing successes and strengths, and the child's individual needs. Strategies may also be used at home if they are felt to be of benefit (e.g. for homework). Please refer to the subsequent pages if further clarification on the framework and its elements is needed. The concept 'Engagement' is based on the Carpenter et al. (2015) '7 Engagement Indicators' – *Initiation, Persistence, Investigation, Curious, Discovering, Responsiveness/Awareness, Anticipation.*		
Specific Strategies using Elements from the Framework		
Ideal Outcome	**Strategies**	**Related Framework Elements**
XXXXX to start tasks promptly, e.g. within 30 seconds of instructions or reminders.	1.1 Give instructions in short affirmative phrases, with reassuring repetition of key words, in gentle approving tones. (Repetitions immediate, rather than in reaction to disengagement). E.g. 'Do a column addition, to *check*. It's good to *check*.' 1.2 Get XXXXX ready for listening and attending to verbal class-wide instructions by directing him to listen out for 1-2 key/buzz words at the start of the lesson, that directly relate to the overall task purpose (e.g. 'group' and 'split' when talking about dividing). Combine with hand gestures when delivering key words (if the words lend themselves to this). 1.3 Frame challenging tasks and instructions as collaborative endeavour, using partnership statements such as 'let's try this one together.'	9, 10, 11, 13 10, 16 1, 12

	1.4 Acknowledge XXXXX's off-task interests before leading him back to the task with a competing piece of sensory information, E.g. 'Yes, that pencil case in colourful isn't it! (visual). Ok, so we are *looking* at these *green counters* on the *board*' (visual).	13, 18
XXXXX to maintain focus on the overall purpose of the learning/task, and pace himself throughout the activity, with mediation. (XXXXX's jumping ahead or unpredictable contributions to be influenced early without the same behaviours recurring or escalating within the same input/task).	2.1 Subtle universal ways to contain XXXXX's engagement (e.g. 'wait' and 'shh') are less effective when his engagement is disorganised and escalated, or when he is over-keen to contribute / jump ahead. Acknowledge and praise his need for completion / success - e.g. 'I can see you're really keen to get started which is great!' Then if still disorganised, engage him with a question to focus him on the most pertinent aspect of the task. 2.2 Validate and explore his feelings about tasks when challenged, using questions to focus his thinking. E.g. 'It's hard' … 'Ok, you're feeling stuck? What in particular is in your way?' (avoid 'why' - this can be too vague and overwhelming). 2.3 When keen to rush tasks, frame tasks explicitly as having multiple 'finishing lines', 'success checkpoints' or 'progress markers.' Outline to him what these are within the task then focus him on the first one. (Make it clear how many there are overall, so he is not surprised). 2.4 In one-to-one teacher instruction, use settling 'low and slow' qualities in speech to influence his pace of engagement. Pair this with emphasising key words related to the specific aspect of the task he needs to engage with. 2.5 Emphasise quality not quantity, by framing desired task output in ways that are unrelated to 'finishing.' E.g. the 'uniqueness' 'originality' 'careful planning' or 'effectiveness' of the work produced, and label this in his work as he is producing it. Use consistent words and phrases that are accessible to him. 2.6 Frame mistakes as exciting problems to solve, using light humour and rapport.	2, 3, 18 2, 4, 8, 9 8, 9, 12, 18 8, 10, 13, 19 7, 12 12, 17

XXXXX to be focused, listening and quiet during class-wide instructions, and contributing in planned and contained ways.	3.1 Use frequent and regular class-wide questions in place of instructions, to promote active thinking and processing.	2, 3
	3.2 In class discussion and instruction, ask frequent and regular questions that XXXXX can access. This will promote active engagement by scaffolding and maintaining his listening engagement. This could even be a brief 'hands-up if X or hands up if Y' approach to test understanding and re-process instructions.	1, 5, 7, 8
	3.3 Support instructions and information with clear hand miming gestures when possible, and when it is known that he is looking at you.	8, 16
	3.4 Use descriptive language to elicit XXXXX's interest when he appears disengaged (e.g. looking away and fiddling). Then immediately after his reactive gaze, engage him directly in the learning content by asking a question (to him or to the class).	2, 13
	3.5 Punctuate and maintain XXXXX's engagement by asking him short questions about the purpose of the task, e.g. 'why would I add these amounts together, what would it tell me?'	1, 2, 4, 7, 8
	3.6 Ask XXXXX to repeat the instruction or an aspect of it. This could be done as an affirmative teacher instruction with a word missing at the end for him to fill in, e.g. 'so we need to add them up to calculate the total…?'	5 17
	3.7 Offer specific praise and recognition with an emphasis on emotional warmth and positive regard, to mediate and sustain XXXXX's motivation in engaging with the task.	

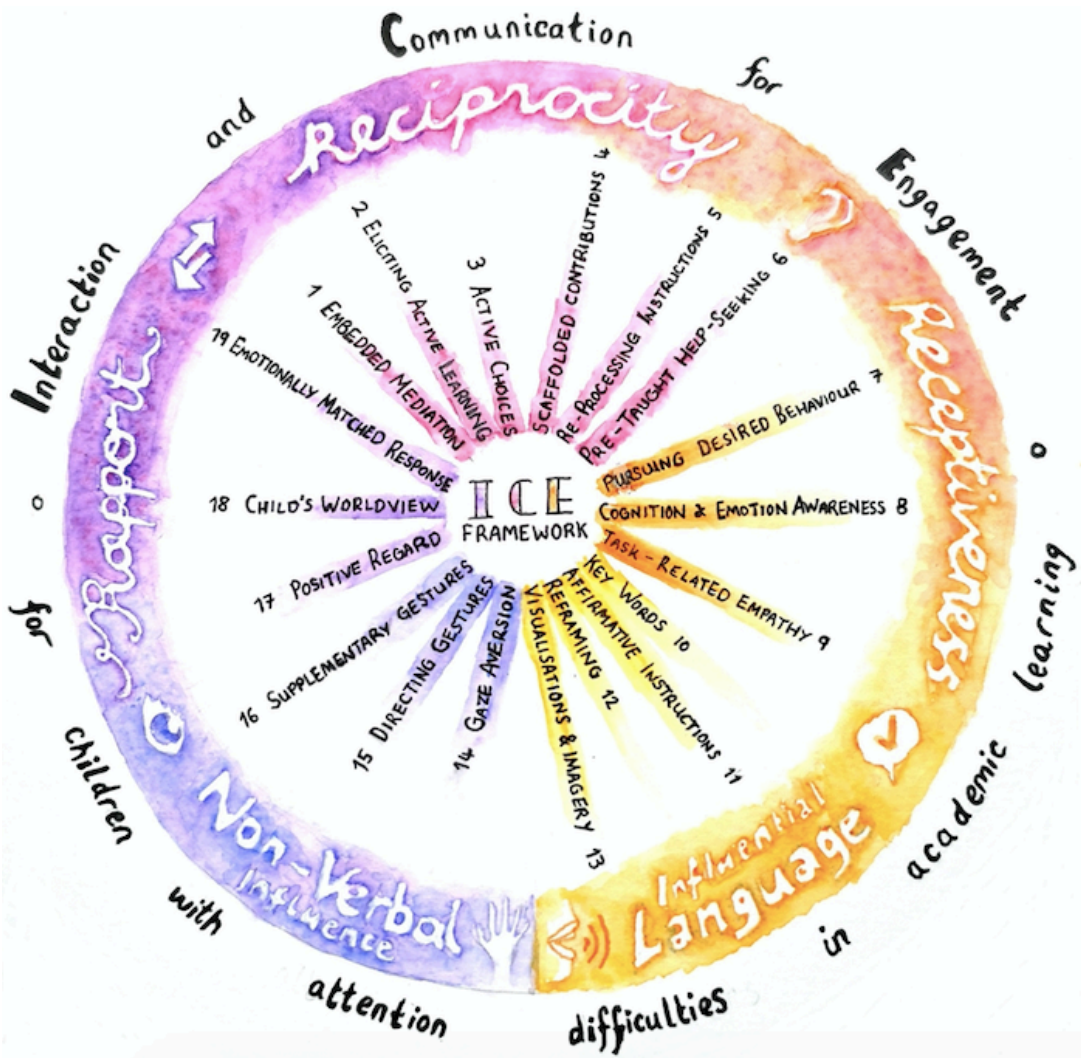
XXXXX to ask for help promptly in tasks he is unsure of, and subsequently attempt tasks (or plan his approach) once help or further questions are given.	4.1 Pre-teach (pre-organise with XXXXX) specific ways to seek help confidently and discuss ways he will receive a teacher response that he has been noticed and help is on the way.	6, 7

Interaction and Communication for Engagement (ICE) Framework

20. 'Embedded Mediation'	Successful learning with adult mediation, leading up to (or bridging to) individual learning, and returning before child disengages.
21. 'Eliciting Active Learning'	Adult asking questions at cognitive and motivational level of child, and eliciting regular feedback/contribution during learning, especially during listening or whole-class instruction.
22. 'Active Choices'	Adult eliciting child's active choices in how they go about or understand tasks, to promote independence and goal-focus through reciprocal discussions and decisions.
23. 'Scaffolded Contributions'	Scaffolding explicitly contained ways to actively share and contribute task-related and/or meta-cognitive information.
24. 'Re-Processing Instructions'	Child repeating instructions back to adult.
25. 'Pre-Taught Help-Seeking'	Strategies pre-agreed with child for giving feedback about their understanding or asking for help, with immediate teacher response.

26. 'Pursuing Desired Behaviour'	Early preventative detection and planned ignoring of low-level disengaged behaviour, whilst pursuing desired engagement as soon as it emerges.
27. 'Cognition and Emotion Awareness'	Adult building an immediate dynamic awareness of child's cognition, motivation and emotion, for allowing co-regulation of engagement.
28. 'Task-Related Empathy'	Building shared awareness of what child might be feeling, and need to communicate, in relation to their engagement in the activity.
29. 'Key Words'	Use of key words in adult speech, that child has been directed to listen for
30. 'Affirmative Instructions'	Affirmative rules and instructions before wrongdoing/escalation.
31. 'Reframing'	Using language key to child's experience, to re-frame activities in desired positive ways.
32. 'Visualisations and Imagery'	Sensory-rich visualisations and imagery to draw attention to aspects of the activity. Can include emotionally-rich visualisations, and qualities in speech to match.
33. 'Gaze Aversion'	Awareness of adult's presence in visual field, or gaze, having an engaging or distracting impact.
34. 'Directing Gestures'	Indicative gestures to directing attention to objects and necessary actions
35. 'Supplementary Gestures'	Indicative or representational gestures to make adult instruction meanings more complete.

36. 'Positive Regard'	Adult responses to child's disengaged behaviour, characterised by unconditional positive regard
37. 'Child's Worldview'	Awareness of child's worldview and current attention. Using this to influence or link to desired engaged behaviour.
38. 'Emotionally Matched Response'	Immediate, personalised adult responses to child's behaviour, contingent on child's emotional state, and initially mirroring/pacing child.


Communication for Engagement and Receptiveness to Interaction and Rapport for Reciprocity
Non-Verbal Influence
Influential Language
children with attention difficulties in academic learning
ICE FRAMEWORK
1 Embedded Mediation
2 Eliciting Active Learning
3 Active Choices
4 Scaffolded Contributions
5 Re-Processing Instructions
6 Pre-Taught Help-Seeking
7 Pursuing Desired Behaviour
8 Cognition & Emotion Awareness
9 Task-Related Empathy
10 Key Words
11 Affirmative Instructions
12 Reframing
13 Visualisations & Imagery
14 Gaze Aversion
15 Directing Gestures
16 Supplementary Gestures
17 Positive Regard
18 Child's Worldview
19 Emotionally Matched Response

Interaction and Communication for Engagement (ICE): Assessment Structure

Classroom Observation Schedule

1. Record observations of successful existing ICE techniques (row 1), and 'missed opportunities' for additional ones (row 2).
2. Following the observation, indicate relevant framework elements by number, next to observations.
3. Group and name these observations (and relevant framework elements) as overall key themes (in the box below).

	Initiation	Responsiveness/ Awareness	Curiosity	Investigation	Discovery	Anticipation	Persistence
Successful Framework Elements Observed (element numbers and related notes)							

Potential Need for Framework Elements (element numbers and related notes)							

Bulleted Summary of Key Strategies (for feeding back in the consultation meeting)

Consultation with Parent and Teacher:

Introducing the Aims and the ICE Framework (10 mins)

- Introduce ICE framework as a tool for:
    - Prompting focused observation, discussion and collaboration to generate practical ideas.
    - **Enhancing** effectiveness of interaction and communication that engages the child, **using evidence-based principles** by capturing and building **personalised strategies.**
    - **Refining and planning** interaction and communication between teacher and child, (not necessarily doing more).
- Introduce Carpenter et al (2015) 'engagement' definition (7 indicators) as a basis for learning engagement hoped for overall.

Consultation Structure (30 mins)

- Establish **overall concerns,** including other peripheral but related challenges. Ask about **indicators of child's engagement, including emotional and cognitive indicators.**
- Share potential strategy themes found in observation. Solution-focused praise for what currently works well. Discuss existing problems and solutions. Record additional or changed **strategy themes and framework elements.**
- Reach **shared understanding** of overall situation.
- Agree child **outcomes and briefly discuss ideas for strategies**.
- Questions, and solution-oriented summary and feedback for process.
- Agree review date.

Writing the ICE Action Plan

Writing the Plan (20 mins)

- Turn the **themes into specific actions** for the plan, and what these will look like in practice and tangible examples (e.g. set phrases). Relate each strategy (or groups of strategies) to a specific outcome.
- Strategies should be based on discussion with the teacher about classroom and learning practicalities and typical behaviours.
- Strategies and outcomes must be specific, practical and achievable.

Appendix 11: Ethical Approval Letter and GDPR Privacy Notice

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SJ/tp

Ref: S1163

Tuesday 2nd April 2019

Dear Lise and Sarah,

Ethics Committee Review

Thank you for submitting an account of your proposed research **"An investigation into the Effectiveness of an Interaction and Communication Framework for Promoting Children with Attention Difficulties' Learning Engagement in Class: A Mixed-Methods Study".**

That proposal has now been reviewed and we are pleased to tell you it has met with the Committee's approval.

However:
Please note the following comments from our reviewers;

Reviewer One:

- Approved as is

Reviewer Two:

- The application appears to be very rigorous and have considered ethical aspects of the study extensively. One aspect that is missing however is GDPR and this needs to be considered and incorporated into information provided to participants.

Final responsibility for ethical conduct of your research rests with you or your supervisor. The Codes of Practice setting out these responsibilities have been published by the British Psychological Society and the University Research Ethics Committee. If you have any concerns whatever during the conduct of your research then you should consult those Codes of Practice. The Committee should be informed immediately should any participant complaints or adverse events arise during the study.

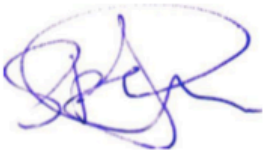
Independently of the Ethics Committee procedures, supervisors also have responsibilities for the risk assessment of projects as detailed in the safety pages of the University web site. Ethics Committee approval does not alter, replace, or remove those responsibilities, nor does it certify that they have been met.

Yours sincerely

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Professor Stephen Jackson
Chair, Ethics Committee

GDPR: Research Participant Privacy Notice

An investigation into the Effectiveness of an Interaction and Communication Framework for Promoting Children with Attention Difficulties' Learning Engagement in Class: A Mixed-Methods Study.

Ethics Approval Number: S1163

Researcher: Lise Griffiths

Contact Details: lise.griffiths@lincolnshire.gov.uk / 07824695323

Supervisor: Sarah Atkinson (s.atkinson@nottingham.ac.uk) 0115 8467923

Privacy information for Research Participants

For information about the University's obligations with respect to your data, who you can get in touch with and your rights as a data subject, please visit: www.nottingham.ac.uk/utilities/privacy/privacy.aspx.

Why we collect your personal data

Your personal data is being collected as part of a research project. The researcher is part of a doctorate programme in Applied Educational Psychology, at the University of Nottingham. The purpose of the research is to test the impact of an intervention* for children with attention difficulties, on their learning engagement.

Data collected will be:

- Classroom observations and teacher rating data, to establish the child's learning engagement before and during the intervention
- The child's action plan, for clarity on how the intervention was implemented
- The child's year group, age, sex, ethnic status, and special educational needs, for an understanding of the context the intervention was delivered in

*The intervention is an interaction and communication framework for building a related action plan.

Legal basis for processing your personal data under GDPR

The legal basis for processing your personal data on this occasion is in line with GDPR Article 6(1e) processing is necessary for the performance of a task carried out in the public interest. We hope this research will help with meeting the needs of vulnerable pupils, and help education settings, parents and other professionals learn and develop appropriate ways in which to support such pupils.

Where the University receives your personal data from

Some personal data about you will be collected as part of the research, which will be kept confidential. This data will come either from yourself, as the research participant, or from school records.

Special category personal data

We will be collecting some 'special category personal data', in line with GDPR Article 9(2a). We will collect, with your consent, data regarding your racial or ethnic origin.

How long we keep your data

The University may store your data for up to 25 years and for a period of no less than 7 years after the research project finishes. The researchers who gathered or processed the data may also store the data indefinitely and reuse it in future research. Any data stored will be anonymised, meaning that participants will not be identifiable. Any data that might identify a participant will be left out of transcriptions. All participants will be given a 'pseudonym' (a fake name) in the research to protect their identity.

Who we share your data with

Extracts of your data may be disclosed in published works that are posted online for use by the scientific community. Your data may also be stored indefinitely on external data repositories (e.g., the UK Data Archive) and be further processed for archiving purposes in the public interest, or for historical, scientific or statistical purposes. It may also move with the researcher who collected your data to another institution in the future.

Appendix 12: Thematic Analysis Process and Photographs

Initial Items / artefacts from all six teacher respondents

- [The effectiveness] is about finding that engaging way with children
- [what works] varies for different children
- Hard to know what strategy to choose when he doesn't express his feelings
- Showed some basic recall [in response to intervention]
- Work output [was unaffected]
- Saying Giovanni's name either to engage him or put him on the spot so he has to think [is effective]
- Sing-song voice sometimes works to get a grin and grab his attention
- Sing-song voice can be distracting or amusing
- Engagement depends of baggage such as friendship issues
- [The intervention and the measures] focus you more on what you could try and it asks you questions you wouldn't have thought about, like curiosity.
- The engaging use of voice and repetition
- The use of name
- Picking up on when he does show interest and not letting that go [is what is effective]!
- [A change is evident when] he is animated and chatty, less passive
- I don't know [what is particularly effective for Giovanni]
- He's beyond some universal strategies for [the intervention] to affect work output
- [it would be more effective if] there was a closer look at the lessons and the learning… how the specific learning relates to low engagement and if there is something that works in particular.
- Useful
- Easy to use
- Some strategies work really well
- It's good for other children too
- Effective strategies really help Gregor stay focused for longer
- [Effective strategies] help Gregor fidget less, stand up less, and sit still more
- [Effective strategies] help Gregor achieve more
- [Effective strategies] help Gregor ask more on-task-related questions
- Awareness of early signs of distractedness and disengagement [is responsible for effects]
- I had the awareness of early signs of distractedness and disengagement anyway but [I am now] more consciously aware of it.
- [The intervention] has been good for me and Christopher
- I can look at the plan and see what I feel will work best and if there is no impact I can try another strategy
- [The intervention] has its successes due to how the plan was made up through observation, knowledge and input from people who know Christopher.
- The plan is very useful for Christopher now

- The length of [the intervention action plan] means there is always something to try is another [strategy] has stopped working.
- [it is good that there are numerous strategies to try] although consistency works well for Christopher.
- Acknowledging and parking his preoccupations doesn't work yet. Christopher is further distracted by it or doesn't want to come back to the them when it is time.
- Humour can engage Christopher [but] it can also take him off track and he uses it as a signal to talk.
- I'm still getting to know the strategies
- I do some of the strategies already but it's knowing I'm doing them [that makes it consistent]
- With it being December and the routine changing, and Christopher being tired [the strategies] have all been helpful.
- All strategies are effective in the right time.
- If used at the wrong time [the strategies] are insufficient
- It is key to understand the child and know when to use certain strategies
- Many [of the strategies] were already in place
- If [all the strategies] were implemented at the same time it would have a negative effect as it would be too much in one go
- Since many [strategies] were already in place it has worked for Simon
- [the strategies impact learning engagement because] Simon can go through stages of engagement and I know when to catch him early
- Non-verbal signals like thumbs up and thumbs down [are specifically responsible for any effects]
- Pre-given questions before input [are specifically responsible for any effects]
- Targeting questions to Simon's interest and understanding [are specifically responsible for any effects]
- Knowing when Simon is withdrawn and modifying the approaches [are specifically responsible for any effects]
- [it would be more useful/practical/impactful to] observe the child more…see the child in different situations or lessons…to notice the difference in interest.
- Really helpful tool for trialling specific strategies
- [Really helpful] when I'm stuck and feel like all I've got left is nagging
- Some strategies have gone in his ILP
- Strategies are helpful in moving forward with downturn in behaviour
- [An impact on learning engagement is] more focus
- [An impact on learning engagement is] fewer distracted behaviours such as doodling, daydreaming and talking
- [An impact on learning engagement is] more task-engagement time
- Strategies are helping other children too
- [I can tell there has been a change if] he re-engages with an activity or work
- [I can tell there has been a change if] he stops undesired behaviours
- Questions work well for reflection
- Ways of showing empathy work well
- [it would be more useful/practical/impactful to] [try the strategies] two-by-two, and use properly, and see the effects.

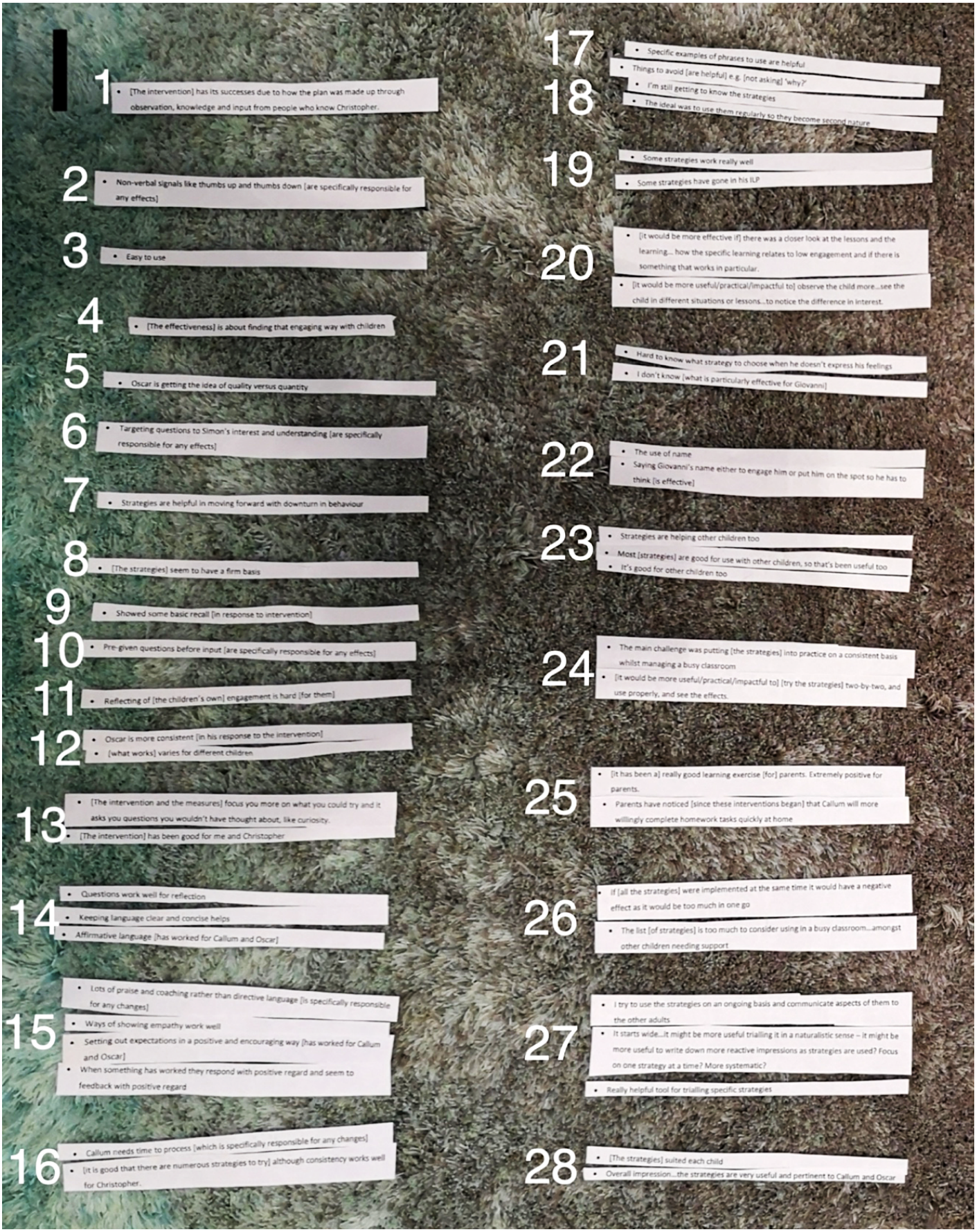
- All strategies are very effective
- [I am] doing a lot of these strategies but it helps to build and refine what works
- [it has been a] really good learning exercise [for] parents. Extremely positive for parents.
- Reflecting of [the children's own] engagement is hard [for them]
- Callum has other things going on so strategies are not always working
- Oscar is more consistent [in his response to the intervention]
- When something has worked they respond with positive regard and seem to feedback with positive regard
- It starts wide…it might be more useful trialling it in a naturalistic sense – it might be more useful to write down more reactive impressions as strategies are used? Focus on one strategy at a time? More systematic?
- I do these things already but seeing them written down is new and helps our understanding
- Specific examples of phrases to use are helpful
- Things to avoid [are helpful] e.g. [not asking] 'why?'
- Overall impression…the strategies are very useful and pertinent to Callum and Oscar
- [The strategies] seem to have a firm basis
- [The strategies] suited each child
- I try to use the strategies on an ongoing basis and communicate aspects of them to the other adults
- The main challenge was putting [the strategies] into practice on a consistent basis whilst managing a busy classroom
- The ideal was to use them regularly so they become second nature
- Most [strategies] are good for use with other children, so that's been useful too
- Overall, engagement has improved to some extent with their maths (and other lessons)…they have realised that when [the strategies] are used they can achieve success and that has given them a little more confidence in working, in bursts, on their own.
- Affirmative language [has worked for Callum and Oscar]
- Setting achievable 'mini targets' [has worked for Callum and Oscar]
- Setting out expectations in a positive and encouraging way [has worked for Callum and Oscar]
- The emotional state of Callum in particular…had quite an impact on his readiness to learn
- Callum has completed more maths tasks on his own since these interventions began
- Parents have noticed [since these interventions began] that Callum will more willingly complete homework tasks quickly at home
- Oscar still needs one-to-one help if maths tasks involve reading
- Oscar will still rush tasks to get finished quickly
- [Changes we see or experience are] more obvious active listening
- [Changes we see or experience are] offering answers to the class
- [Changes we see or experience are] keen to join in with discussions
- [Changes we see or experience are] less fiddling, wandering and distracting others
- [Changes we see or experience are] more obvious paying attention such as facing the board or following instructions or awareness of what he has been asked to do

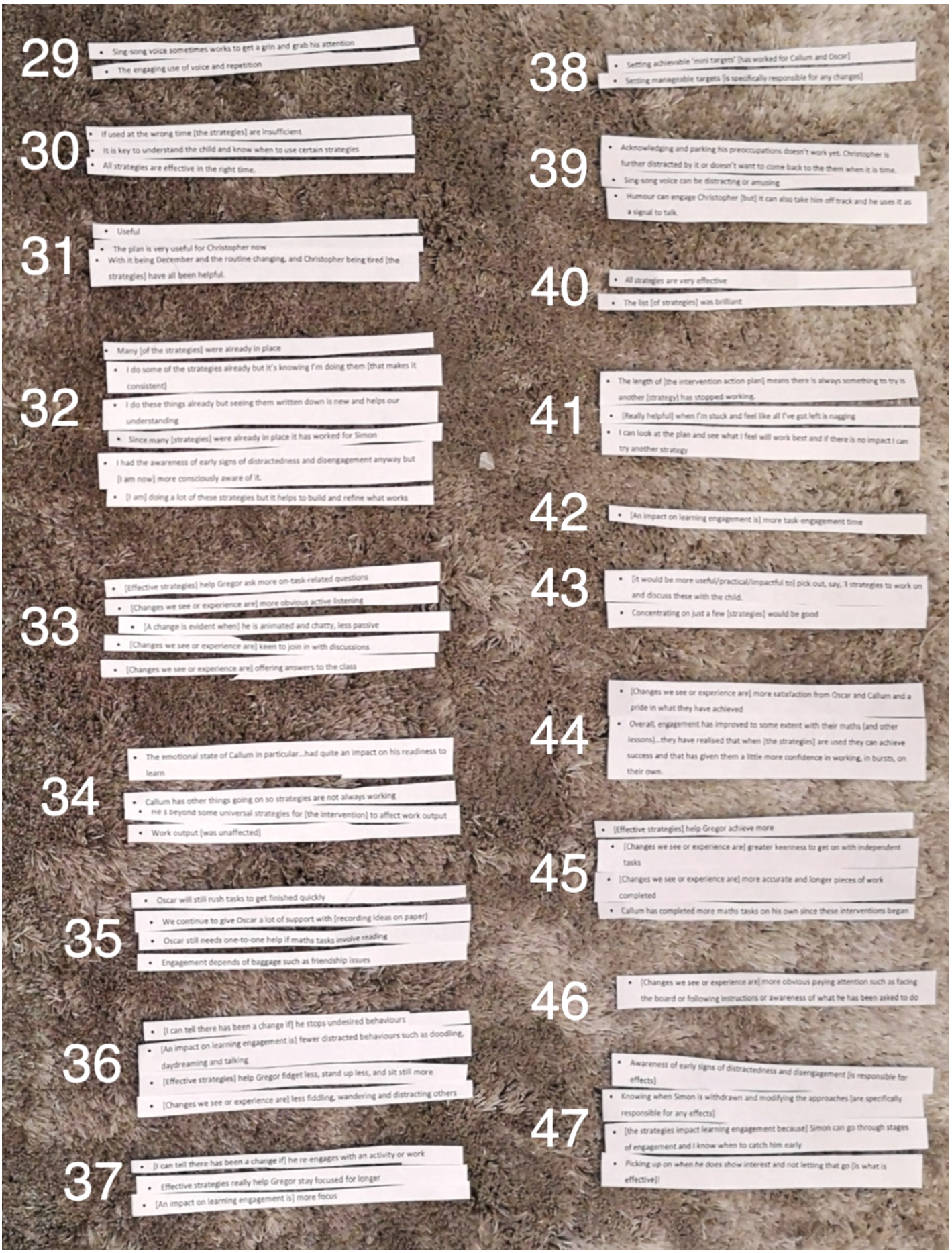
- [Changes we see or experience are] greater keenness to get on with independent tasks
- [Changes we see or experience are] more accurate and longer pieces of work completed
- [Changes we see or experience are] more satisfaction from Oscar and Callum and a pride in what they have achieved
- Setting manageable targets [is specifically responsible for any changes]
- Lots of praise and coaching rather than directive language [is specifically responsible for any changes]
- Keeping language clear and concise helps
- Callum needs time to process [which is specifically responsible for any changes]
- Oscar is getting the idea of quality versus quantity
- We continue to give Oscar a lot of support with [recording ideas on paper]
- [it would be more useful/practical/impactful to] pick out, say, 3 strategies to work on and discuss these with the child.
- The list [of strategies] was brilliant
- The list [of strategies] is too much to consider using in a busy classroom…amongst other children needing support
- Concentrating on just a few [strategies] would be good

Grouping into Initial Codes

This was done by consolidation of similar artefacts and summarising (even codes made up of individual artefacts were re-phrased to summarise the point). Artefacts were read and understood with the researcher gaining familiarity with them overall. They were grouped iteratively and codes were named once they were settled upon. Figure 1 below shows the groups of artefacts into codes. Some codes are made up of singular individual artefacts which seemed more isolated.

Figure 1: Artefacts Grouped into Codes


1
[The intervention] has its successes due to how the plan was made up through observation, knowledge and input from people who know Christopher.
2
Non-verbal signals like thumbs up and thumbs down [are specifically responsible for any effects]
3
Easy to use
4
[The effectiveness] is about finding that engaging way with children
5
Oscar is getting the idea of quality versus quantity
6
Targeting questions to Simon's interest and understanding [are specifically responsible for any effects]
7
Strategies are helpful in moving forward with downturn in behaviour
8
[The strategies] seem to have a firm basis
9
Showed some basic recall [in response to intervention]
10
Pre-given questions before input [are specifically responsible for any effects]
11
Reflecting of [the children's own] engagement is hard [for them]
12
Oscar is more consistent [in his response to the intervention]
[what works] varies for different children
13
[The intervention and the measures] focus you more on what you could try and it asks you questions you wouldn't have thought about, like curiosity.
[The intervention] has been good for me and Christopher
14
Questions work well for reflection
Keeping language clear and concise helps
Affirmative language [has worked for Callum and Oscar]
15
Lots of praise and coaching rather than directive language [is specifically responsible for any changes]
Ways of showing empathy work well
Setting out expectations in a positive and encouraging way [has worked for Callum and Oscar]
When something has worked they respond with positive regard and seem to feedback with positive regard
16
Callum needs time to process [which is specifically responsible for any changes]
[it is good that there are numerous strategies to try] although consistency works well for Christopher.
17
Specific examples of phrases to use are helpful
Things to avoid [are helpful] e.g. [not asking] 'why?'
18
I'm still getting to know the strategies
The ideal was to use them regularly so they become second nature
19
Some strategies work really well
Some strategies have gone in his ILP
20
[it would be more effective if] there was a closer look at the lessons and the learning... how the specific learning relates to low engagement and if there is something that works in particular.
[it would be more useful/practical/impactful to] observe the child more...see the child in different situations or lessons...to notice the difference in interest.
21
Hard to know what strategy to choose when he doesn't express his feelings
I don't know [what is particularly effective for Giovanni]
22
The use of name
Saying Giovanni's name either to engage him or put him on the spot so he has to think [is effective]
23
Strategies are helping other children too
Most [strategies] are good for use with other children, so that's been useful too
It's good for other children too
24
The main challenge was putting [the strategies] into practice on a consistent basis whilst managing a busy classroom
[it would be more useful/practical/impactful to] [try the strategies] two-by-two, and use properly, and see the effects.
25
[it has been a] really good learning exercise [for] parents. Extremely positive for parents.
Parents have noticed [since these interventions began] that Callum will more willingly complete homework tasks quickly at home
26
if [all the strategies] were implemented at the same time it would have a negative effect as it would be too much in one go
The list [of strategies] is too much to consider using in a busy classroom...amongst other children needing support
27
I try to use the strategies on an ongoing basis and communicate aspects of them to the other adults
It starts wide...it might be more useful trialling it in a naturalistic sense – it might be more useful to write down more reactive impressions as strategies are used? Focus on one strategy at a time? More systematic?
Really helpful tool for trialling specific strategies
28
[The strategies] suited each child
Overall impression...the strategies are very useful and pertinent to Callum and Oscar


29
Sing-song voice sometimes works to get a grin and grab his attention
The engaging use of voice and repetition
30
If used at the wrong time [the strategies] are insufficient
It is key to understand the child and know when to use certain strategies
All strategies are effective in the right time.
31
Useful
The plan is very useful for Christopher now
With it being December and the routine changing, and Christopher being tired [the strategies] have all been helpful.
32
Many [of the strategies] were already in place
I do some of the strategies already but it's knowing I'm doing them [that makes it consistent]
I do these things already but seeing them written down is new and helps our understanding
Since many [strategies] were already in place it has worked for Simon
I had the awareness of early signs of distractedness and disengagement anyway but [I am now] more consciously aware of it.
[I am] doing a lot of these strategies but it helps to build and refine what works
33
[Effective strategies] help Gregor ask more on-task-related questions
[Changes we see or experience are] more obvious active listening
[A change is evident when] he is animated and chatty, less passive
[Changes we see or experience are] keen to join in with discussions
[Changes we see or experience are] offering answers to the class
34
The emotional state of Callum in particular...had quite an impact on his readiness to learn
Callum has other things going on so strategies are not always working
He s beyond some universal strategies for [the intervention] to affect work output
Work output [was unaffected]
35
Oscar will still rush tasks to get finished quickly
We continue to give Oscar a lot of support with [recording ideas on paper]
Oscar still needs one-to-one help if maths tasks involve reading
Engagement depends of baggage such as friendship issues
36
[I can tell there has been a change if] he stops undesired behaviours
[An impact on learning engagement is] fewer distracted behaviours such as doodling, daydreaming and talking
[Effective strategies] help Gregor fidget less, stand up less, and sit still more
[Changes we see or experience are] less fiddling, wandering and distracting others
37
[I can tell there has been a change if] he re-engages with an activity or work
Effective strategies really help Gregor stay focused for longer
[An impact on learning engagement is] more focus
38
Setting achievable 'mini targets' [has worked for Callum and Oscar]
Setting manageable targets [is specifically responsible for any changes]
39
Acknowledging and parking his preoccupations doesn't work yet. Christopher is further distracted by it or doesn't want to come back to the them when it is time.
Sing-song voice can be distracting or amusing
Humour can engage Christopher [but] it can also take him off track and he uses it as a signal to talk.
40
All strategies are very effective
The list [of strategies] was brilliant
41
The length of [the intervention action plan] means there is always something to try is another [strategy] has stopped working.
[Really helpful] when I'm stuck and feel like all I've got left is nagging
I can look at the plan and see what I feel will work best and if there is no impact I can try another strategy
42
[An impact on learning engagement is] more task-engagement time
43
[It would be more useful/practical/impactful to] pick out, say, 3 strategies to work on and discuss these with the child.
Concentrating on just a few [strategies] would be good
44
[Changes we see or experience are] more satisfaction from Oscar and Callum and a pride in what they have achieved
Overall, engagement has improved to some extent with their maths (and other lessons)...they have realised that when [the strategies] are used they can achieve success and that has given them a little more confidence in working, in bursts, on their own.
45
[Effective strategies] help Gregor achieve more
[Changes we see or experience are] greater keenness to get on with independent tasks
[Changes we see or experience are] more accurate and longer pieces of work completed
Callum has completed more maths tasks on his own since these interventions began
46
[Changes we see or experience are] more obvious paying attention such as facing the board or following instructions or awareness of what he has been asked to do
47
Awareness of early signs of distractedness and disengagement [is responsible for effects]
Knowing when Simon is withdrawn and modifying the approaches [are specifically responsible for any effects]
[the strategies impact learning engagement because] Simon can go through stages of engagement and I know when to catch him early
Picking up on when he does show interest and not letting that go [is what is effective]!

Code names in no particular order:

1. Personalised, collaborative process in intervention setup
2. Non-verbal signals effective
3. Action plan easy to use
4. Important to 'find that engaging way with children'
5. Child getting the idea of quality vs quantity; an ongoing issue
6. Effectiveness of targeting questions to child's interest and understanding
7. Strategies helpful in moving forward when behaviour deteriorates
8. Strategies seem to have a firm basis
9. Some improvement in recall
10. Effectiveness of pre-given questions before input
11. Children's difficulty reflecting on own engagement
12. Individual variation in children's needs and responses
13. Benefits for teacher's practice
14. Effective use of language
15. Effectiveness of positive regard and rapport
16. Importance and impacts of individual and specific needs
17. Specific examples of strategies in practice are helpful
18. The need for familiarity with the strategies
19. Some strategies are particularly effective
20. It would be more effective if the intervention setup included more of a comprehensive understanding of the child's engagement, across activities and lessons
21. Difficult to know what is working especially if child is inexpressive or passive
22. Using the child's name can engage the child's attention at an optimal time
23. The benefits for other children in the class
24. Difficult to implement many strategies in a busy classroom and detect effects
25. Useful and positive for parents
26. The entire list of strategies is too much to consider implementing comprehensively in a busy classroom
27. Helpful and practically useful if trialling specific strategies in manageable amounts
28. Strategies usefully tailored to individual child
29. Effectiveness of vocal qualities and repetition
30. Effectiveness and importance of using the strategies at the right and most optimal time
31. The strategies are generally useful and helpful
32. Many strategies already taking place, but greater awareness, understanding and refining is effective
33. When strategies are effective increased engagement behaviours are more active and relevant contributions to learning
34. The limitations of the strategies' impacts when the child's needs are too intense to be influenced by them
35. The continuing or persisting difficulties outside of interaction and communication that influence the child's engagement

36. When strategies are effective increased engagement behaviours are fewer distracted behaviours such as off-task doodling, daydreaming and fidgeting
37. When strategies are effective increased engagement behaviours are re-engaging with learning or focusing for longer
38. Setting small or manageable targets is effective
39. Some strategies can be distracting
40. The entire strategy list/action plan is effective as a whole
41. The variety of strategies in the action plan makes it a useful and varied tool
42. When strategies are effective increased engagement behaviours are more time engaged with the task
43. More practical if strategies are applied in small amounts systematically
44. When strategies are effective, children show increased confidence, independence and pride
45. When strategies are effective increased engagement behaviours are increased independence and greater academic achievements
46. When strategies are effective increased engagement behaviours are more obvious signs of paying attention e.g. following instructions
47. Effectiveness of awareness of the child's levels of engagement and ensuring strategies and approaches are tailored to it.

Grouping Codes into Themes by Finding Common Connections (themes can share codes).

As with artefacts being grouped into codes, codes were read and understood with the researcher gaining familiarity with them overall, before being grouped into themes (see Table below). The codes were iteratively organised into similar clusters along the dimensions relating to research question C; what is 'useful', 'practical' and 'effective' about the intervention. This included the inverse of these descriptors; limitations to them.

Codes	Themes
1, 8, 20	Importance of practitioner's collaborative and comprehensive assessment for meaningful strategies
12, 28	Importance of strategies being bespoke to individual child
13, 23, 25	Benefits to parents, teachers and other children
19, 39	Variation in effectiveness between strategies
11, 16, 21, 34, 35	Limitations in effectiveness from children's peripheral difficulties
18, 24, 26, 27, 43	Practical when applied systematically with familiarity
3, 18, 31, 40	Whole action plan is useful and easy to use
32	Many strategies already taking place, but greater awareness, understanding and refining resulting from intervention is effective (this code became a theme on its own)
5, 9, 44, 45	Positive impacts on general learning outcomes
33, 36, 37, 42, 46	Positive impacts on active engagement
36, 37, 42	Positive impacts on on-task engagement
2, 4, 6, 10, 14 15, 22, 29, 30, 38, 47	Effectiveness of approaches are mainly specifically relevant in ICE Framework (only one strategy mentioned wasn't – code '38')
17	Effectiveness of strategies when specific examples are given (this code became a theme on its own)
7, 41	Variety in the action plan makes it a useful and varied tool

Appendix 13: Updated ICE Framework & Blank Action Plan

Interaction and Communication for Engagement (ICE) – Action Plan

This plan has been written for the child based on observation of the child in class, and consultation with parent and teacher. All strategies build on existing successes and strengths, and the child's individual needs. Strategies may also be used at home if they are felt to be of benefit. Please refer to the subsequent pages if further clarification on the framework and its elements is needed.

The concept 'Engagement' is based on the Carpenter et al. (2015) '7 Engagement Indicators' –
Initiation, Persistence, Investigation, Curious, Discovering, Responsiveness/Awareness, Anticipation.

Specific Strategies using Elements from the Framework

Ideal Outcome	Strategies	Related Framework Elements

Key Elements (Most Frequently Occurring)	Key Broad Themes, If Any

Interaction and Communication for Engagement (ICE) Framework

Element Name	Element Description	Broad Theme
39. 'Embedded Mediation'	Successful learning with adult mediation, leading up to (or bridging to) individual learning, and returning before child disengages.	Reciprocity
40. 'Eliciting Active Learning'	Adult asking questions at cognitive and motivational level of child, and eliciting regular feedback/contribution during learning, especially during listening or whole-class instruction.	Reciprocity
41. 'Active Choices'	Adult eliciting child's active choices in how they go about or understand tasks, to promote independence and goal-focus through reciprocal discussions and decisions.	Reciprocity
42. 'Scaffolded Contributions'	Scaffolding explicitly contained ways to actively share and contribute task-related and/or meta-cognitive information.	Reciprocity
43. 'Re-Processing Instructions'	Child repeating instructions back to adult.	Reciprocity
44. 'Pre-Taught Help-Seeking'	Strategies pre-agreed with child for giving feedback about their understanding or asking for help, with immediate teacher response.	Reciprocity

45. 'Pursuing Desired Behaviour'	Early preventative detection and planned ignoring of low-level disengaged behaviour, whilst pursuing desired engagement as soon as it emerges.	Receptiveness
46. 'Cognition and Emotion Awareness'	Adult building an immediate dynamic awareness of child's cognition, motivation and emotion, for allowing co-regulation of engagement.	Receptiveness
47. 'Task-Related Empathy'	Building shared awareness of what child might be feeling, and need to communicate, in relation to their engagement in the activity.	Receptiveness
48. 'Key Words'	Use of key words in adult speech, that child has been directed to listen for	Influential Language
49. 'Affirmative Instructions'	Affirmative rules and instructions before wrongdoing/escalation.	Influential Language
50. 'Reframing'	Using language key to child's experience, to re-frame activities in desired positive ways.	Influential Language
51. 'Visualisations and Imagery'	Sensory-rich visualisations and imagery to draw attention to aspects of the activity. Can include emotionally-rich visualisations, and qualities in speech to match.	Influential Language
52. 'Gaze and Proximity'	Use of adult's proximity, presence in visual field, or gaze, for having an engaging impact or avoiding a distracting impact.	Non-Verbal Influence

53. 'Supportive Gestures and Tones'	Indicative gestures or tones to directing attention to objects and necessary actions, or supplementing and representing to make meanings and understandings more complete.	Non-Verbal Influence
54. 'Positive Regard'	Adult asking questions at cognitive and motivational level of child, and eliciting regular feedback/contribution during learning, especially during listening or whole-class instruction.	Rapport
55. 'Child's Worldview'	Adult eliciting child's active choices in how they go about or understand tasks, to promote independence and goal-focus through reciprocal discussions and decisions.	Rapport
56. 'Emotionally Matched Response'	Scaffolding explicitly contained ways to actively share and contribute task-related and/or meta-cognitive information.	Rapport