



DEVELOPING HIGHER-ORDER READING SKILLS IN MAINSTREAM PRIMARY SCHOOLS:  
A METACOGNITIVE APPROACH

School of Psychological Sciences and Health

A thesis presented in part-fulfilment of the requirements for the degree of Doctor of  
Educational Psychology

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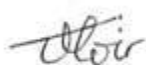
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## Acronyms

ADHD	Attention Deficit Hyperactive Disorder
ASPEP	Association of Scottish Principal Educational Psychologists
BPS	British Psychological Society
CfE	Curriculum for Excellence
CI	Construction Integration
CIT	Critical Incident Technique
CLPL	Continuous Lifelong Professional Learning
CORI	Concept-Oriented Reading Instruction
CSR	Collaborative Strategic Reading
CT	Classroom teacher
DA	Dynamic Assessment
DCT	Dual Coding Theory
ERC	Expository Reading Comprehension Observation
EP	Educational Psychologist
EPS	Educational Psychology Services
GIRFEC	Getting it Right for Every Child
H&W	Health and Wellbeing
HT	Head Teacher
ISL	Informed Strategies for Learning
IY	Incredible Years
LA	Local Authority
LDT	Lexical decision tasks
LLI	Language learning impairment
LSA	Latent Semantic Analysis
MLE	Mediated Learning Experience
MRQ	Motivation for Reading Questionnaire

MSD	Minimal Significant Difference
MSCI	Multiple Strategy Comprehension Instruction
NAC	North Ayrshire Council
NGRT	New Group Reading Test
PALS	Peer-Assisted Learning Strategies
PLA	Professional Learning Academy
PATHS	Promoting Alternative Thinking Strategies
RC	Reading Comprehension
RCV	Reading Comprehension and Vocabulary Observational Measure
RT	Reciprocal Teaching
SCM	Spatial Coding Model
SD	Standard Deviation
SEM	Standard Error of Measurement
SHORS	Strathclyde Higher Order Reading Skills
SIMD	Scottish Index of Multiple Deprivation
SMT	Senior Management Team
SRSU	Self-reported questionnaire on strategy use
SSAL	Scottish Survey of Adult Literacy
SVC	Simple View of Comprehension
SVR	Simple View of Reading
TAI	Think-Aloud Instruction
TSI	Transactional Strategies Instruction
WIAT-II <sup>UK</sup>	Wechsler Individual Achievement Test – Second Edition (UK Standardisation)
WM	Working memory
WSE	Word Superiority Effect
YARC	York Assessment of Reading for Comprehension
ZPD	Zone of Proximal development

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## Title of the investigation

Developing higher-order reading skills in mainstream primary schools: a metacognitive approach.

## Abstract

Research indicates that multiple strategy comprehension instruction (MSCI) programmes in general yield greater effect sizes than single strategy approaches. Potential candidate MSCI interventions were evaluated on the basis of effect size of outcome, feasibility and acceptability, and universality. This identified the Strathclyde Higher-Order Reading Skills (SHORS) Programme as a promising intervention yet to be evaluated in the UK in a controlled study. Following a pilot study, a mixed-model quasi-experimental study was carried out with condition (intervention versus control group) and reading comprehension ability (higher versus average versus lower tertiles) as between-group independent variables and time-point (pre- versus post-intervention) as a within-subject independent variable. The WIAT-II<sup>UK</sup> reading comprehension subtest was the primary outcome measure. Seventy-four pupils in five Primary 5 classes (aged 9-10) in four primary schools were recruited as participants from within a Scottish local authority. Training and implementation of the SHORS intervention followed the procedure of McCartney, Boyle & Ellis (2015) study, with delivery of 4 sessions of 45 minutes per week for 8 weeks.

Comparison of pre and post reading comprehension scores showed a statistically significant intervention effect (Cohen's  $d = 0.81$ ), which exceeded the minimally significant difference of  $d = 0.67$  taking precision of measurement and measurement error into account (Weir, 2005). Participants in the higher, average and lower tertiles of pre-intervention reading comprehension scores all benefited equally, indicating that

the SHORS may be regarded as a ‘universal’ intervention. Secondary quantitative and qualitative data confirm that the intervention is easy to implement, feasible within a Scottish setting and acceptable to school staff.

The study extends the reading intervention literature regarding learner, teacher and learning environment, implementation, metacognitive knowledge and reading habits.

Implications for policy and practice are discussed.

“We recognise without question that a strong, successful country requires strong and secure literacy skills for every citizen. We know that literacy is fundamentally about every citizen having the means to understand our world and to improve and shape our lives and communities for the better. Literacy skills are fundamental requirements for learning, and are essential for work and life.”

Michael Russell MSP, Cabinet Secretary for Lifelong Learning (Government, 2010a)

## Chapter 1

### 1.1 The importance of reading

Reading is fundamental to function effectively within society (Adams, 1994). Without reading skills day-to-day activities (e.g. reading medicine bottles, warning signs and maps) that many people take for granted, may become a source of frustration, anger and fear. Many jobs consider reading as a vital skill. Therefore a person without good reading skills will be disadvantaged in many areas of modern life, potentially having a detrimental impact upon school attendance, school attainment and employment status (Scottish Government, 2010a; Slavin, 1998). Furthermore the Scottish Survey of Adult Literacy (SSAL) (St. Clair, Maclachlan, & Tett, 2009) found that one of the key factors linked to lower literacy capabilities is poverty, with adults living in 15% of the most deprived areas in Scotland more likely to have literacy capabilities at the lower end of the scale (Sosu & Ellis, 2014). Similarly US research (Kutner, Greenberg, Jin, Boyle, Hsu, & Dunleavy, 2007) found those with poorer literacy skills tend to earn less, work in more routine occupations, be unemployed or economically inactive, live in more deprived areas, face health challenges and have lower educational levels than others with better literacy skills. Indeed, there are consistent relationships between key social factors and literacy scores (Greenberg, Dunleavy, & Kutner, 2008; Hartas, 2011; Hatcher et al., 2006; Kutner et al., 2007). Furthermore, reading comprehension abilities have been linked with inattention and Attention Deficit Hyperactive Disorder (ADHD) (Cain & Bignell, 2014). Enhancing reading skills has a positive impact upon society at large and is therefore a worthy goal of the Scottish and Local Governments. Reading is the gateway to accessing education and

supports skill acquisition across contexts (Paris, Lipson, & Wixson, 1983). Yet how it is taught varies significantly across classrooms (Rowan, Camburn, & Correnti, 2004).

Good reading skills in children and young people may be defined as age appropriate, rapid and encapsulating automatic word recognition, correct pronunciation and clarity in the comprehension of text (Cain, 2010). Yet this is a complex process as reading is reliant upon a range of motor cognitive and perceptual skills from low level visual perception to higher order systems to generate meaning (Adams, 1994).

The more we read the better informed we are; therefore, readers are constantly upgrading their information and knowledge thereby facilitating greater understanding of the world around them (Adams, 1994; Cain, 2010). Children who are introduced to reading at an early age acquire language skills with greater ease, have a richer vocabulary, and develop greater cognitive skills including creative and critical thinking skills (Clarke, Truelove, Hulme, & Snowling, 2014).

When learning to read Cromley (2000) recognises four areas in which children need instruction: phonics, fluency, vocabulary and comprehension. Yet, according to Gough and Tunmer's (1986) simple view of reading (SVR), reading is the product of word identification and linguistic comprehension (see Figure 1 below). This framework, supported by factor analysis (Kendeou, Savage, & van Den Broek, 2009; Rose, 2006), can be used to classify poor readers into three subtypes: (1) word recognition problems only (i.e., poor decoder) (2) a specific comprehension deficit only (i.e., poor comprehender), or (3) a combination of problems with decoding and comprehension (i.e., garden variety poor reader). This component model is useful in gaining insight into reading difficulties. However, it has also gained criticism due to

its simplicity e.g. Gustafson, Samuelsson Johansson and Wallmann (2013) and Aaron, Joshi and Williams (1999) who highlight that SVR does not explain orthographic skills and processing speed issues. Yet Kirby and Savage’s (2008) (page 75) review concluded that the SVR “provides a good fit to much scientific data on typical and atypical development, and variation among students across the school age range.” However, while even the more fervent SVR supporters agree other more in-depth models are required to explore the intricate processes (Kendeou et al., 2009), the SVR does highlight two aspects of reading function, to include both word reading and comprehension.

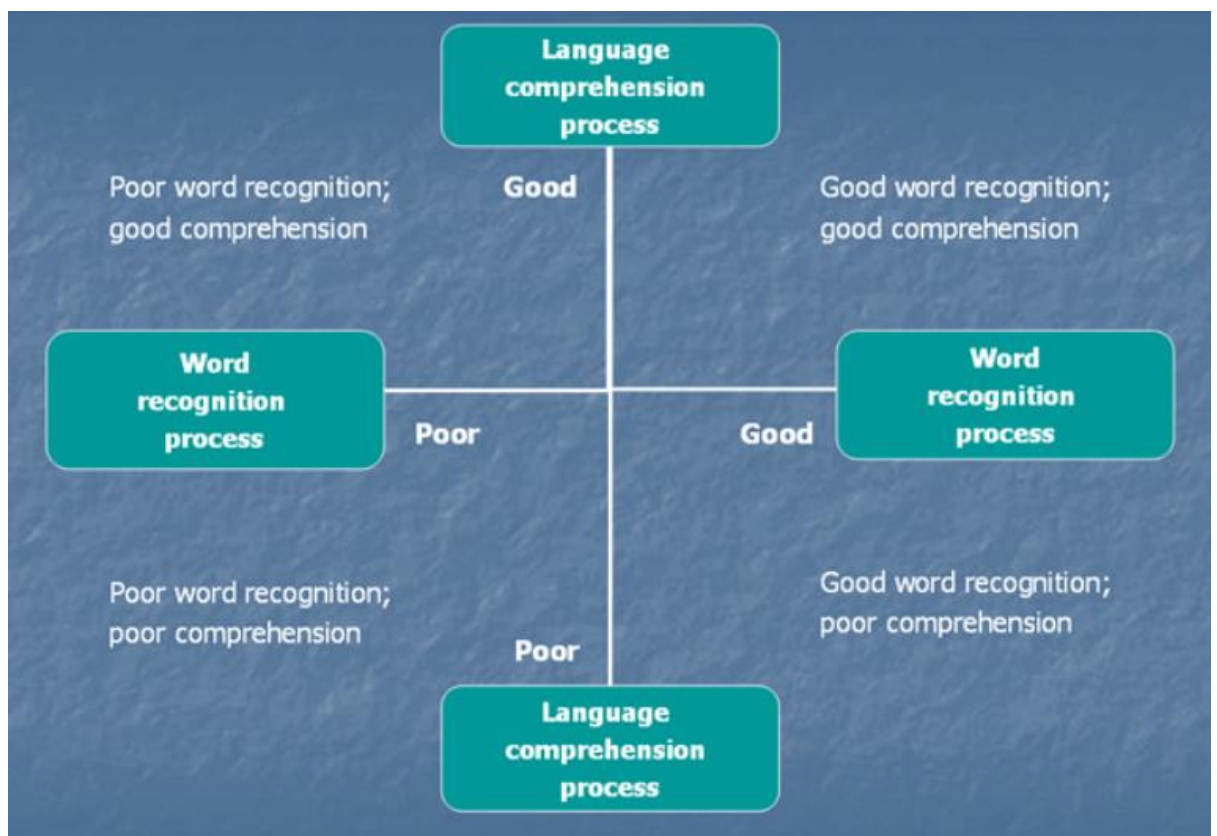


Figure 1. Simple View of Reading: source DfES 2006 page 53

Word reading will be briefly be considered in 1.2. before exploring reading comprehension in 1.3.



## 1.2 Word Reading and fluency

Skilled word reading is a rapid and automatic process which, when working efficiently, requires little effort (Adams, 1994). It requires the decoding of symbols which can be translated into corresponding word sounds (Cain, 2010). This is an intricate and complex process for which various theorists using findings from cross-sectional, intervention and longitudinal studies, have advocated for an assortment of models. Each of these serve as a framework to support our understanding of the word reading development process.

Some assessment of developing reading skills in children emphasise the need for rate as a measure of fluency; however, this is not a good indicator of reading comprehension (Aaron, Joshi, & Williams, 1999). Indeed, being a good comprehender requires strategic reading and implies the use of lower and higher order comprehension strategies (Armbruster, 2010; Hall, 1989; Silva & Cain, 2014) which takes processing time.

Due to the needs within the authority discussed in section 1.6 below, the focus of this thesis is in the domain of reading comprehension and therefore word reading and fluency will only be discussed where there are relevant links.

## 1.3 Reading Comprehension

### 1.3.1 Reading comprehension definitions

While decoding is the foundation of reading, it can be argued that reading comprehension is necessary to make sense of the text. Comprehension is the ultimate goal of reading, and for many this can be difficult.

While there are many definitions of reading comprehension two were chosen by the International Reading Association to go into its Dictionary of Reading and Related Terms (Harris & Hodges, 1981). These were as follows:

- “Comprehension involves the recovery and interpretation of the abstract deep structural relations underlying sentences” (p.51).

This highlights the importance of deep processing with abstract concepts, therefore making demands upon working memory.

- “Comprehension is a process of integrating new sentences with antecedent information in extrasentential structures” (p.51).

This definition highlights the active rather than the passive nature of comprehending texts, and that meaning goes beyond the understanding of individual words. Together, these definitions encapsulate the complexity of the phenomenon known as reading comprehension.

### 1.3.2 Instruction of Reading Comprehension

Indeed, studies in the USA and UK estimated that poor comprehenders comprise 3% to 10% of school-age children (Aaron et al., 1999; Leach, Scarborough, & Rescorla, 2003; Yuill & Oakhill, 1991). Swanson’s (2008) synthesis of 26 studies of classroom observations of teacher behaviour concluded that little reading comprehension (RC) instruction takes place. This was further explored by Ness (2009), who stated this was influenced by a lack of teacher confidence in RC instruction.

### 1.3.3 Reading comprehension and listening comprehension

The development of reading comprehension has been compared to the similar levels of understanding we have in our spoken language (Mills, 2009; Perfetti, Landi, & Oakhill, 2005). While there are undoubtedly links (Cain & Bignell, 2014; Clarke, et al., 2010; Horowitz-Kraus, Vannest, & Holland, 2013), assuming an identical process would imply that to understand the complicated processes involved in reading comprehension, all that would be required is an understanding of listening comprehension. This raises two issues: (1) the format of reading text is often very different to conversational language, (2) if we were to rely upon research relating to the similarity in the processes of reading and listening comprehension, how can methodological issues including speed of stimuli be controlled for? Reading comprehension therefore merits investigation in its own right. Furthermore, Carretti, Caldarola, Tencati, & Cornoldi (2014) found RC interventions for 9-10 year olds increase RC more effectively (medium effect) than listening comprehension interventions (low effect) and therefore, the two components factor out as different skills.

### 1.4 Theories of reading

Turning to theoretical accounts of reading, the Division of Child and Educational Psychology (DCEP) and the working group of the British Psychological Society (BPS) propose that there are four levels of theoretical explanation regarding reading (British Psychological Society, 1999); namely: descriptive theories, external causes theories, biological level theories and cognitive theories. The first three will be briefly considered below. Cognitive theories will be outlined in more detail within Chapter 2

as these offer additional insight into the skills necessary for reading and are indicative of best teaching practice (Harm & Seidenberg, 2004).

#### 1.4.1 Descriptive theories.

Descriptive theories, which describe the process of reading development concentrate upon word reading skills and often come in the form of “stage models,” which are concerned with how reading skills develop with age. Examples include Frith’s (1985) three-stage model, which describes a child’s progress through logographic (reading whole words after having memorised the word’s most salient features), alphabetic (where decoding allows the reading of unfamiliar regular words) and orthographic stages (the use of abstract codes to automatically analyse units without regular rules) towards skilled reading. Alternatively Marsh, Friedman, Welch and Desberg’s four stage model (1981) describes a process of “rote learning”, “discrimination not guessing,” “sequential decoding” and “hierarchical decoding”. Lomax and McGee (1987) have also described a five component model in which the process evolves through stages of; “concepts about print”, “graphic awareness”, “phonemic awareness”, “grapheme-phoneme awareness” and finally “word reading” (Lomax & McGee, 1987).

While varying in their depth of analysis, such linear approaches in the main do not enhance our understanding of the underlying processes involved in reading. Furthermore, as with any stage model, there is often a lack of clarity regarding the transition through the stages, interaction between components, contextual and environmental factors, and their universal use is often poorly defined (BPS, 1999; Donaldson, 1978). They do not specify the interactions between components within reading or contextual and environmental factors due to their linearity. Therefore, for

research purposes, cognitive models (see chapter 2) are considered more useful (Snowling, 1998).

#### 1.4.2 External Causes Theories

These theories consider how reading is possible given that our evolutionary journey did not incorporate the need for reading by the masses. Reading relies upon cognitive abilities, including language and perception, but how did these skills adapt to allow for the complex reading processes? How do these skills interact and co-ordinate the reading process (Rack, Hulme, & Snowling, 1993)? While this is an interesting area of research, it is not the focus of the current study. Yet, there is a link with direct associations between the skills within reading and the development of our cognitive processes, which be discussed in depth in chapter 2.

#### 1.4.3 Biological Level Theories

Biological level theories are those which map onto underlying brain mechanisms to understand the genetic basis for reading (Rack et al., 1993). While there is general agreement that there are heritable factors involved in developing reading skills (Stevenson, 1991) this level of theory is complicated by the fact that the effects of teaching can mediate for dispositional factors e.g. low resilience (Taylor, Roehrig, Soden Hensler, Connor, & Schatschneider, 2010). Concentrating solely upon a reader's neurobiological factors only considers one aspect of the developing reading process, to the exclusion of environmental, contextual and mediating factors. While this type of theory is insightful, the current study will focus upon a more holistic understanding of the developing reading processes.

## 1.5 Reading in Scotland

### 1.5.1 An ongoing priority

The Scottish Government is committed to raising the standards of reading from early years to adulthood and have therefore established policy frameworks to support effective instruction. These include the Early Years Framework (EYF) (Scottish Government, 2008), The Curriculum for Excellence (CfE) (Scottish Government, 2002), Getting it Right for Every Child (GIRFEC) (Scottish Government, 2005), the Children and Young People (Scotland) Act 2014, and the National Improvement Framework (Scottish Government, 2016). Within this literacy context, great importance is placed upon the development of reading, writing and communication skills. Furthermore there exists an emphasis upon the development of higher order literacy skills including critical thinking, analysis, evaluating and interpretation (Scottish Government, 2002, 2010a). This is reflected in the Scottish Literacy Action Plan (Scottish Government, 2010a) which highlights four priorities for Scotland's literacy learners (Scottish Government, 2015c):

- Breaking the link between poor literacy levels and deprivation
- Improving the skills of the few who have difficulties with basic literacy, particularly those who are vulnerable
- Ensuring young people progress successfully from basic to advanced literacy skills
- Raising advanced literacy skills for all.

The Scottish Survey of Achievement (SSA) (Scottish Government, 2006a) showed that children who do not gain a solid foundation in literacy within primary school

decrease disproportionately with regard to their attainment in subsequent years at secondary school. It is therefore unsurprising that the Scottish education system recognises the need for a national evidence base of effective approaches to literacy and effective implementation support (Sosu & Ellis, 2014). In line with research the Scottish Survey of Literacy and Numeracy (Scottish Government, 2015c) continues to reiterate the importance of literacy and higher order skills, as well as the benefit of explicit instruction. In contrast, however, recent studies have shown that reading standards in Scotland have fallen (Scottish Government, 2015c; OECD, 2015), indicating that more needs done to raise standards.

Within the Scottish context there is great variation in quality of language literacy skills and this is greatly affected by socioeconomic status (Scottish Government, 2010a; Slavin, 1998). Health Visitor screening 27-30 month checks have shown that children from the most deprived areas have significantly higher speech, language and communication concerns than the national average (that is, 17.5% compared with 12.7%) (Cleverdon, 2014). Furthermore, PISA 2009 (Scottish Government, 2010b; OECD, 2010) indicates that economic deprivation correlates with poor comprehension, and in response, recommendations include teaching higher order reading strategies and ensuring evidence-based reforms. Therefore, while reading needs to be tackled in Scotland as a whole, particular attention should be paid to areas of social deprivation (Scottish Government, 2015b; Education Scotland, 2016).

It is widely acknowledged that young people living in disadvantaged neighbourhoods often require a longer period of time to achieve a basic qualification than adolescents residing in more affluent areas, particularly in the case of individuals with low-attainment commitment (Nieuwenhuis, Hooimeijer, & Meeus, 2015). This has led to

the acknowledgement of an attainment gap between rich and poor catchment area schools (MacNabb, 2016) which is deemed unacceptable (Sosu & Ellis, 2014). The gap in educational attainment between low-income and high-income households in Scotland starts early. Indeed, Sosu & Ellis (2014) found in their Growing Up in Scotland longitudinal survey that by age 5, the gap can be 10–13 months for vocabulary development, with a 10-month gap for problem-solving development. Lower attainment in literacy and numeracy is linked to deprivation throughout primary school with parental socio-economic background having more influence than the school attended (Sosu & Ellis, 2014). While the gap could be caused by lack of motivation, opportunities or quality of childcare, its origin is still unclear (Sosu & Ellis, 2014). If attributed to thousands of hours of quality implicit learning for those more fortunate, theoretically others may catch up with a significant, but lesser amount, of explicit learning. Therefore good quality teaching and learning may be key to reducing the gap (Sosu & Ellis, 2014).

Yet while narrowing the gap is a worthy goal, consideration also needs given to raising attainment for all (OECD, 2015). The two goals of raising attainment for all and narrowing the attainment gap lie at the heart of Scottish education. Yet, how it is possible to achieve both of these goals concurrently is unclear.

### 1.5.2 Recent developments within Scottish Education

The Curriculum for Excellence (CfE) (Scottish Government, 2002) replaced the 5-14 national curriculum and in doing so formative assessment replaced national testing. Therefore each of the 32 Scottish Local Authorities track students' progress using different means, thereby having sometimes an incompatible and incomprehensible picture of attainment across Scotland. In addition, the biannual Scottish Survey of



Literacy and Numeracy (SSLN) (Scottish Government, 2015a) indicated that Scottish standards had fallen, signifying a need for greater scrutiny of local authority (LAs) schools, which with existing frameworks, was not feasible (MacNabb, 2016). This has led to the Scottish Government's announcement of its intention to reintroduce standardised assessments in literacy and numeracy for pupils in Primaries 1, 4 and 7, and in secondary schools during the coming session of Parliament (Scottish Government, 2016; MacNabb, 2016). This is contrary to the CfE focus which emphasises the benefits of ongoing formative assessment (OECD, 2015), leading to much controversy and debate around the merits of summative standardised assessment versus formative assessment of learning processes (Watson & Doherty, 2015) and their coexistence. There continues to be a great deal of debate surrounding the merits of the reintroduction of standardised tests (Hepburn, 2015). This is fuelled by concerns incited by Australia's experience of standardisation which led to a narrowing of the curriculum, increasing the anxieties of both teachers and students, as well as jeopardising inclusive classrooms (Thompson, 2013). In addition, "washback effects", a widely-known phenomenon where standardised tests leads to teaching to tests rather than taking time to allow the teaching of critical thinking skills, essential for lifelong literacy and numeracy skills, are also feared (Alderson & Wall, 1993). Indonesian research persuasively argues for more empowering systems rather than traditional teaching to test assessments (Furaidah, Saukah, & Widiati, 2015).

The OECD (2015) noted that there was an abundance of formative assessment information within Scotland, yet it was not being sufficiently used to inform practice. This was attributed to a lack of clarity as to how assessment maps onto the curricular

experiences and outcomes (E&Os). Furthermore, the OECD (2015) recommended additional clarity around the role of ongoing assessment, yet did not recommend the reintroduction of standardisation.

The breadth of the CfE is regarded as one of its strengths (Scottish Government, 2002), and the GIRFEC agenda advocates for holistic and all-encompassing assessment. This appears incongruent with the proposed standardised tests, which focus only upon literacy and numeracy in line with PISA's broad themes of measurement, reading, mathematical and scientific literacy (OECD, 2015). Shifting emphasis from a holistic, all-encompassing curriculum towards a more literacy/numeracy focused curriculum is likely to have an impact upon the other curricular areas CfE promotes. However, while the breadth of a curriculum is beneficial to those from high socio-economic backgrounds, it had been argued as inequitable to those less fortunate (Perry & Southwell, 2014).

Yet, while debates continue about the merits of standardisation it is clear that their introduction may allow clarity regarding the between-school differences in performance. However, how this data may be used effectively to shape our approach to education is unclear. Tests in themselves will not improve outcomes for children and young people (Watson & Doherty, 2015), therefore additional actions need to be taken to raise attainment. The Association of Scottish Principal Educational Psychologists (ASPEP) (2014) argue that for any assessment to have impact it must be embedded within the planning of learning and teaching.

Teaching critical thinking skills has the potential to serve a young person throughout their life. Bensley and Spero's (2014) study showed that direct instruction of critical thinking skills (incorporating; argument analysis, critical reading and metacognitive

monitoring) showed significantly greater gains across coursework assessments skills for students. This type of metacognitive skills instruction supports attainment within university test situations without negative teaching to test influences (Liu & Stapleton, 2014). Therefore, although much of the research has been concerned with older students, there is the potential that teaching critical thinking or metacognitive strategies may meet both the Scottish Government's agenda for standardisation, while developing student skills (Scottish Government, 2010a, 2015b), without being susceptible to negative "washback effects".

In addition to the introduction of standardisation, Scotland continues to exemplify how important literacy development is. The Scottish Government has invested £100m in the Attainment Scotland Fund, an initiative offering funding over 4 years (from 2015 – 2019). This initiative known as the 'National Attainment Challenge,' has become the focus for this transformational change. It is based upon the framework successfully used within London to raise attainment (Brighouse, 2003). Although critics attribute the positive impact of the London Challenge to its ethnic composition (Burgess, 2014) especially given its subsequent replication in the City Challenge (DfES, 2008) proved less successful (Kidson & Norris, 2014).

Scotland's National Attainment Challenge is targeted on supporting pupils' literacy, numeracy and health and wellbeing (H&W) in LAs and schools with the highest concentrations of primary-aged pupils living in deprivation (as calculated by the Scottish Index of Multiple Deprivation (SIMD<sup>1</sup>) (Scottish Government, 2006b). The

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<sup>1</sup> SIMD is the official tool for finding the most deprived areas in Scotland. SIMD shows where Scotland's most deprived areas are and is a relative measure of deprivation across small areas in Scotland. 'Deprived' does not just mean 'poor' or 'low income'. It can also mean people have fewer resources and opportunities, for example in health and education. See (Scottish Government, 2006b).

first tranche of funding, totalling £12.9m, has been allocated to these areas. Emphasis is placed upon use of evidence-based approaches to teaching and includes recognition of metacognition, effective feedback and marking, skilled questioning and memorability (Smith, 2015).

## 1.6 Reading and the Local Context

### 1.6.1. The Local Authority demographics

North Ayrshire Council (NAC) is a Scottish West Coast local authority with a population of just over 138,000 people (2.6% of the Scottish population- 2011 census). The authority is geographically, demographically and economically diverse with much of the area classified as rural. It contains a number of areas of multiple deprivation, with 35 of the 46 data zones ranked in the top 15% most deprived areas (Scottish Government, 2006b). Furthermore, one town has been ranked in the top 1-2% most deprived areas in Scotland. The average school leaver attains at a lower level than the average national school leaver. Yet, data analysis shows the average attainment of an NAC school leaver is comparable or better than the average Scottish school leaver from those of the same decile. In addition, within the authority 16.7% of children aged 27 to 30 months has been identified as a concern in respect of speech, language and communication milestones compared to the national average of 12.7% (Cleverdon, 2014).

Although within the local authority there are high degrees of deprivation, children receive a higher total tariff score<sup>2</sup> than the national average for those in decile 1 (most

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<sup>2</sup> Tariff points are calculated on the basis of SCQF credit points. They are used to aid the analyses of attainment data so that schools and local authorities can compare attainment between schools, local authorities, the virtual comparator or other breakdowns of cohorts in the senior phase.

deprived), as seen in Figure 2 below. However there is a trend within the data showing that those from the least deprived areas achieve less tariff points than the national average. This suggests that while the area is one of deprivation, there is scope to raise attainment for all.

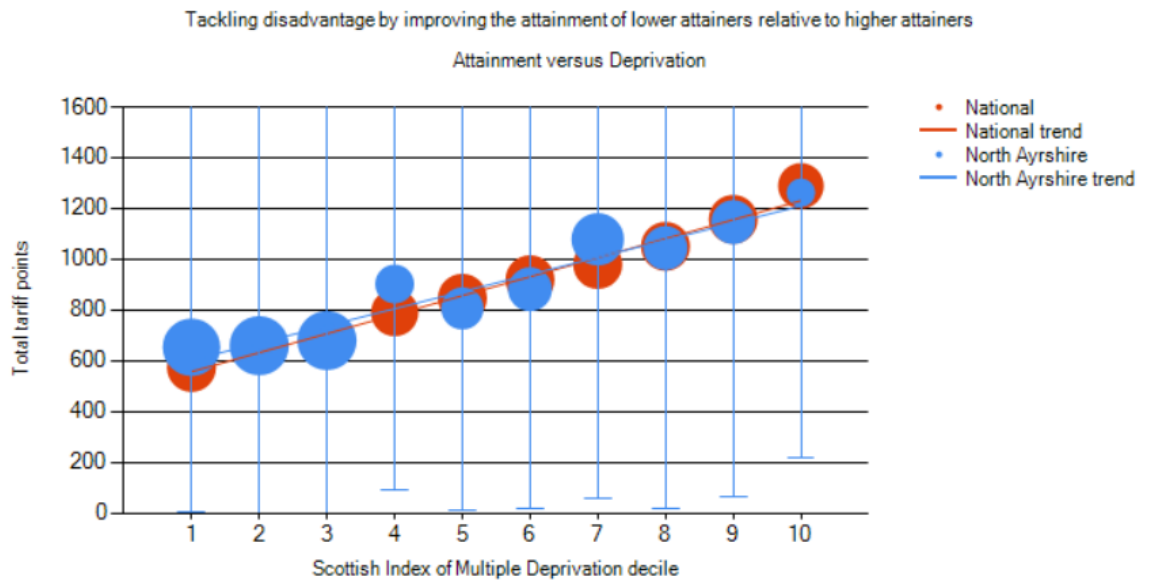


Figure 2 National compared to local tariff score points by deprivation (taken from unpublished LAC Insight Benchmarking data, 2015)

This can also be seen in Figure 3 below, which shows that the lowest 20% achieve better than national averages, while those in the least deprived areas achieve less than the national averages.

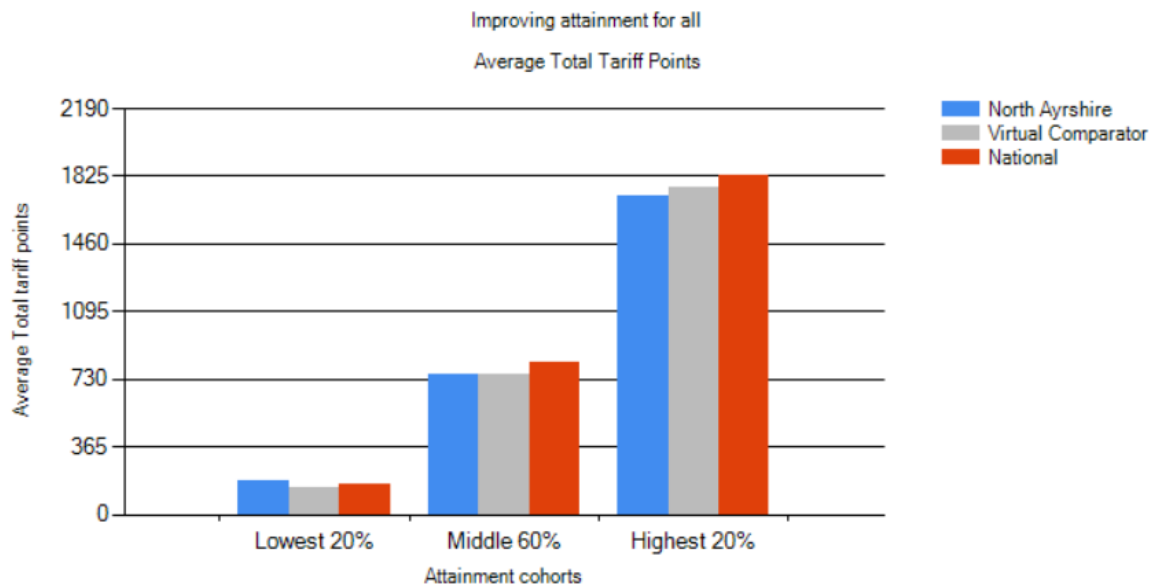


Figure 3 NAC Attainment levels with comparators (taken from unpublished LAC Insight Benchmarking data, 2015)

### 1.6.2. The Local Authority attainment ambitions

The authority is one of eight Attainment Challenge authorities. The Council Improvement Plan highlights the importance of education and in developing skills and capacity, for example, strategic priority 3 states that NAC will be “ensuring people have the right skills for learning, life and work” (NAC, 2015) (p.10). If the authority are to make sure that people have the right skills for learning, life and work, it is recognised they must create the right culture and ethos to support transformational change. It is expected that education establishments will be places where high-quality teaching and learning takes place, delivered by excellent staff. Schools will be places of ambition, opportunity and high expectations. The Education and Youth Employment directorate are leading this transformational change supported by the Council family, the Community Planning Partnership, the Health and Social Care Partnership and Third Sector Providers. However, real transformational change is expected to be delivered within educational establishments that aim to; 1) become the

centre of communities, 2) improve parental partnerships and 3) engage young people in high quality learning.

North Ayrshire Education Department's aim is to bring about transformational change through (NAC, 2015):

- Improved attainment and achievement
- Almost all school leavers entering positive destinations
- Improved learning environments for all our children and young people including those with additional support needs
- Improved wellbeing of our children and young people.

To achieve these aims, NAC's intention is to develop evidence-based pedagogical practice with a focus on literacy, numeracy and H&W. Within the authority, there is a clear plan on how to take numeracy and H&W forward, using evidence-based approaches however developing an evidence based approach for literacy, and more specifically for reading, was an area for development.

### 1.6.3. The Local Authority and reading

There are various approaches to tackling reading issues (Rose, 2006) and when it comes to improving literacy attainment in schools, evidence suggests that any systems change should be multi-stranded and evidence-based (Stobie, Boyle, Woolfson, Truswell, & Connaughton, 2004). However, while large-scale literacy initiatives that incorporate a consistent and structured approach have been successful, such as the Active Literacy programme in North Lanarkshire (Ferguson, Currie, Paul, & Topping, 2011); the resource implications and timeframe for such initiatives are considerable.

It may be noted that the LA education management did not regard raising literacy attainment as part of the Educational Psychologist's (EP) role; therefore, Psychological Services had to request to become involved in literacy planning. This is perhaps unsurprising as in the past the EP role had been considered one more related to an individual deficits based model, with minimal strategic work or universal approaches. However, ASPEP (2013) have highlighted examples of literacy development work where Educational Psychology Services (EPS) have successfully been involved within Scotland. This includes the delivery of professional development on evidence-based teaching, collaboration with management about assessment, and supporting the implementation and evaluation of authority wide literacy programmes. Furthermore, HMIe (2007) regard research and strategic development as a core aspect of the EP's role. The role of research in educational psychology is one that is valued and expected by schools (MacKay, 1997) and EPs are often alone in LAs in having specific skills in research design and evaluation and in being trained to critically analyse research findings (Cameron, 2006).

Informed by research, the LA's Integrated Children and Young People's Service Plan 2015-2018 highlights the need for evidence-based resources to be used. It aims to ensure that young people have the relevant skills, qualifications and positive attitudes for the world of work (e.g. 85% of children in the authority successfully experience and achieved CfE Second Level Literacy in preparation for secondary school). These targets are also in line with research findings that the literacy gap widens most significantly between Primary 4 (ages 7-9) and Primary 7 (ages 10-12) (Sosu & Ellis, 2014). The term "fourth grade slump" refers to this decrease in reading skills for this population. Furthermore those in areas of social deprivation such as NAC are



particularly vulnerable (Chall, Jacobs, & Baldwin, 2009) to this slump, possibly partly due to the fact that Scottish pupils' perception of their reading abilities drops between Primary 4 and Primary 7 (Scottish Government, 2015c).

Thus, there has been an identified need to raise literacy attainment within the authority. Upskilling was required to identify evidenced-based approaches to learning and teaching as well as direct instruction of metacognitive approaches to develop reading comprehension, with upper primary school aged children being most vulnerable.

### 1.7 Summary and Conclusions

In conclusion, this chapter has considered the importance of reading skills and more specifically, higher order reading skills as an area for investigation within the international, national and local context. The next chapter will look at models of reading to identify the core elements of reading and inform an understanding of teaching reading.

## Chapter 2- Models of reading

Chapter 1 highlighted the importance of reading. Discussion took place around the need for reading comprehension research to take place at international, national and local contexts. This chapter will consider models of reading comprehension as these are useful to illustrate current theories of reading, which would otherwise be invisible. These models tend to develop with increasing complexity, as one builds on the other, to provide clues that can enhance our understanding of what potentially makes the reading process break down (Ruddell & Unrau, 2004). This thesis will continue by considering whole reading models to elucidate how research has informed our understanding of the reading process, giving insight into effective teaching instruction and how this can be enhanced.

### 2.1. An overarching reading comprehension framework

To facilitate effective evaluation of whole reading models this chapter will use Kintsch & Rawson's (2005) framework, which, similarly to Block and Pressley (2007) (see 3.1.2), describes four divisions of reading comprehension which can be used to compare and contrast aspects of varying reading theories. This will illustrate the complex processes involved in reading and the difficulty in offering a complete model which adequately describes all phenomena. It will evidence how different models coming from different traditions and paradigms emphasise different parts of the reading processes.

Kintsch and Rawson (2005) describe reading at four different levels:

1. The word/phrase level
2. Microstructures

### 3. Macrostructures

### 4. Situational Model

The word or phrase level is greatly associated with vocabulary. A reader may understand individual words within a text without the ability to integrate this information with the wider text.

Microstructures are where interrelated words are processed to produce connections between propositions. This happens within sentences or between a few sentences by using logical implications. There are two predominant models that describe this inter-relatedness; the first being the Construction Integration (CI) Model (Kintsch, 1988), which describes two phases; construction (where word identification and local coherence is established) and integration (where this input is synthesised with existing contextual knowledge to form a global understanding). The second is the Landscape Model (Rapp & Van Den Broek, 2005), where input of small units of word information increasingly develop wider understanding through the constant activation of cycles of information from current input, previous cycles, reader's knowledge and an understanding of the text thus far.

Macrostructures is an extension of microstructures where larger pieces of information are processed to produce overarching themes and topics. Here, reference points to characters and events converge to develop our understanding of the topics discussed - a process referred to as "argument overlap". Attempts have been made to extend CI models to explain not only micro but macro structures, however, this is an area for further research (Kintsch & Rawson, 2005).

The three levels above create a text based understanding however it is possible to process the text yet still be unable to fully comprehend the information due to a lack of prior information and knowledge. The most developed process we undertake to fully comprehend text is where the text-based understanding is synthesised with our personal experiences, knowledge, emotions and imagery, to produce what is called a Situation Model (Caccamise, Snyder, & Kintsch (2008)).

## 2.2. Categories of Whole Reading Models

Historically, theories took a bottom-up approach before the dynamic interaction of competing higher order thinking skills and knowledge were increasingly acknowledged. Figure 4 below shows these different models alongside some examples of their employment.

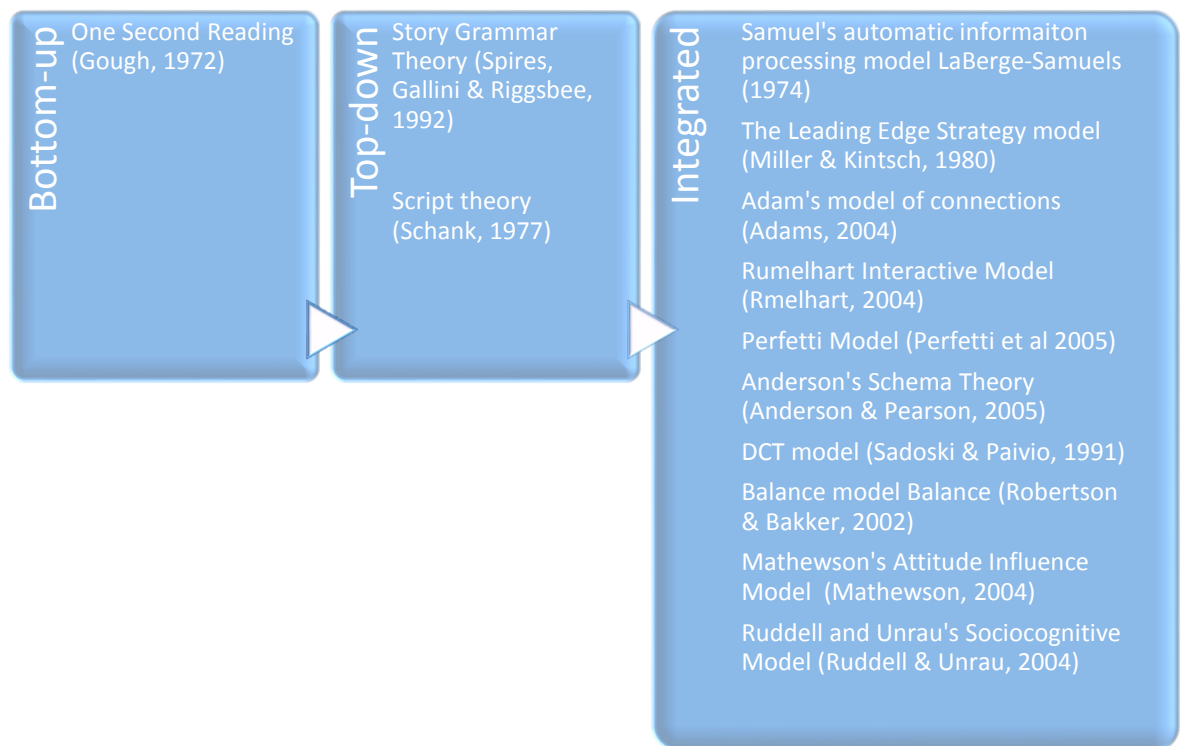


Figure 4. Reading Comprehension Models

### 2.2.1. Bottom-up Models

Bottom-up models describe the data-driven intake of stimulus in a process that develops to become automatic. These models, including the “one-second reading” model (Gough, 1972) describe how the reader, having developed phonological awareness, can recognise letters- and then words to identify word meaning. This approach has been criticised as readers make use of contextual cues and it can require more than letter stimulus to create meaning (Goodman, 1967). Furthermore, this model does not consider the reader’s integration of reading materials with their prior knowledge nor does it consider critical thinking during reading processes (Ahmadi, & Gilakjani, 2012). Its focus is primarily upon word-encoding processing or level 1 of Kintsch and Rawson’s (2005) framework and is only concerned with the very early first few seconds of seeing text. Furthermore, it is a very linear model which

underestimates the contribution of the reader, with no reference to their previous experience of knowledge. As such bottom-up models have fallen from favour.

### 2.2.2. Top-down Models

Within top-down models, Goodman (1967) describes this process as a psycholinguistic guessing game where predictions are made and hypothesis are developed and tested. The top-down process is described as starting with the experience of words and language - a reference point for words and phrases- allowing us to recognise words and letters, having developed phonological awareness.

Top-down models of the reading process describe a concept driven approach where cues from the page, perhaps in the form of context or graphic information are used to create meaning. These theories have been developed due to researchers' interest in memory processes and understandings of story grammars (Newby et al., 1989).

#### 2.2.2.1 Top-down Models and story grammar

Discussion around story grammar has been highly influential to top-down and later integrated models. It describes how the reader unconsciously develops knowledge of sentence structure and grammar through exposure to conversations in daily life (Schank, 1977). Within texts, there is generally a similar structure provided by the author to guide and help scaffold the reader's understanding (Spires, Gallini, & Riggsbee, 1992). Narrative text stories tend to develop characters and plots throughout the text before bringing passages to a conclusion. Within expository writing, the text, is likely to be subdivided into headings and subheadings with overarching themes being separated into sub-themes in a variety of ways (Akhondi, Malayeri, & Samad, 2011). However, poor readers are less aware of these cues and therefore will be unable

to use them (Cain, 2010). This has inspired the creation of graphic organisers which are visual representations of text and can overtly support struggling or developing reading through a process of organising the information into a supportive framework (Cain, 2010; Alvermann, 1986; Boothby & Alvermann, 1984). Training around story grammar has also been effective in providing the reader with clues when reading comprehension breaks down (Akhondi et al., 2011) including poorly-skilled decoders (Newby et al., 1989). Furthermore it has proved to be a successful strategy to assist self-perceived low-ability comprehenders, however the impact upon self-perceived high ability comprehenders is less so perhaps because they already use similar strategies automatically (Alvermann, 1988).

#### 2.2.2.2 Top-down Models and metacognition

Top-down models also emphasise that without sufficient motivation, comprehension monitoring strategies and important metacognitive skills will not be employed. The role of metacognition in the development and use of academic skills is widely recognised in research and practice (Baker, Zeliger-Kandasamy, & DeWynngaert, 2014; Dabarera, Renandya, & Zhang, 2014). Metacognition is typically defined as the awareness and control of one's own cognitive processes (Paris, Cross, & Lipson, 1984). Reading comprehension needs metacomprehension, which has been defined as a subset of metacognition (Dunlosky & Lipko, 2007). As the name 'meta' implies there are many different processes involved; this complexity has led to confusion and over-generalisation of the term "metacognition".

Metacognition has many different definitions. Flavell (1971; 1979) was the first to conceptualise metacognition as our knowledge about our own cognitive processes. As seen in Figure 5 below metacognition can be subdivided into metacognitive knowledge

and metacognitive experiences (Cross & Paris, 1988; Paris, et al., 1984). Early definitions emphasise the knowledge aspect which is concerned with our knowledge of cognitive activity (Moore, 1983; Myers & Paris, 1978) which is further differentiated into:

- Knowledge of self: a relatively stable type of declarative knowledge of ourselves as learners and includes information regarding preferences to formats or abilities of thinking skills e.g. a preference for multiple choice questions or a self-perception regarding problem-solving skills. This can also be referred to as intra-individual differences (Garner, 1987; Paris & Oka, 1986; Paris et al., 1984)
- Knowledge of tasks we face: a type of declarative knowledge, but this time is one concerned with our knowledge of the population's abilities on tasks e.g. it is easier to read information about a familiar topic than a new topic. This has also been referred to as inter-individual differences (Garner, 1987; Paris et al., 1984; Paris & Jacobs, 1984)
- Knowledge of strategies: a more procedural type of knowledge bearing information on commonly accessible strategies e.g. chunking and repetition to aid memory. This has also been referred to as "universals" (Garner, 1987; Paris et al., 1984).

In addition to metacognitive knowledge, metacognitive experiences focus more upon self-regulatory aspects (Paris et al., 1984). Within the domain of reading, the most important metacognitive skill is comprehension monitoring, the evaluation and regulation of comprehension (Garner, 1987; Wagoner, 1983). This is the reflective



skill we require when something (e.g. reading comprehension) fails, and a repair strategy will be needed to understand the written text. It is closely linked with critical thinking and is an ability lacking in poor readers, who tend to read on regardless of comprehension, yet the skills can be taught (Bensley & Spero, 2014).

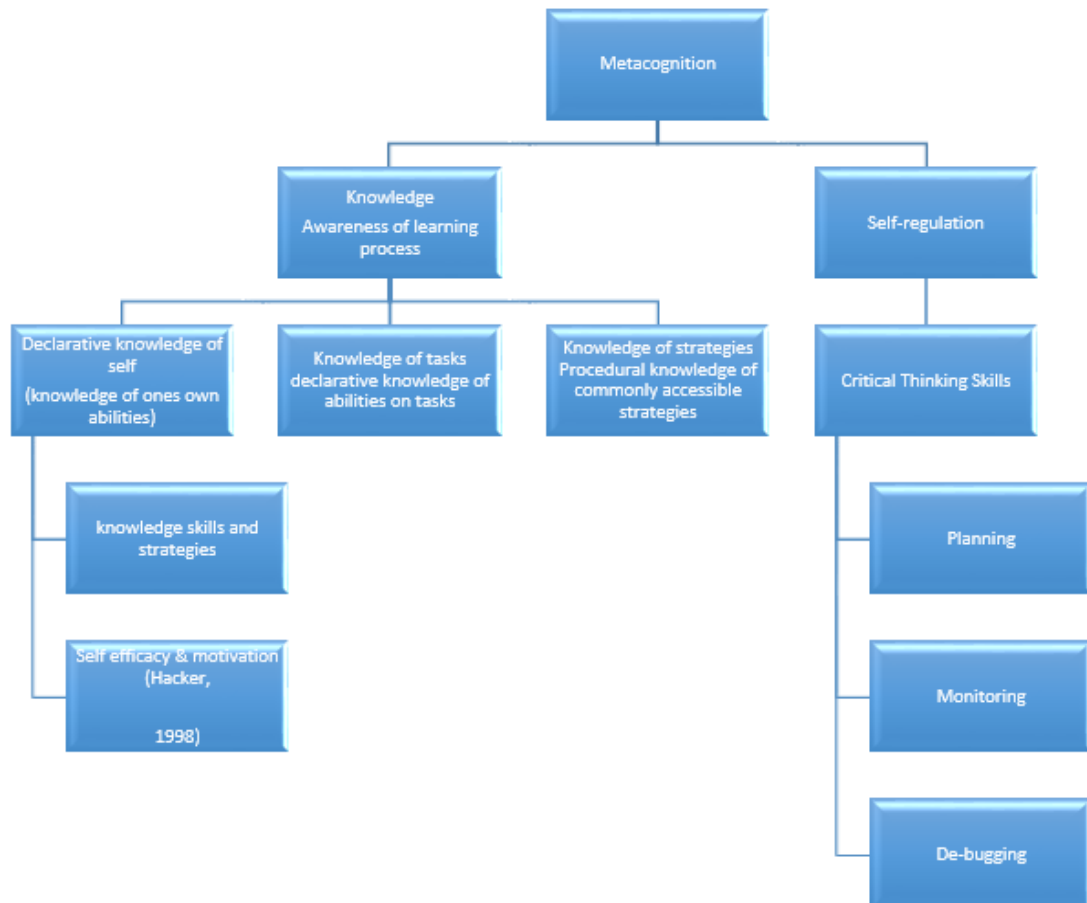


Figure 5- The author's model of metacognition

This model shows the complexity of metacognitive components and also serves as a reminder that even though a reader has an awareness of comprehension monitoring it does not mean that the reader will employ it (García-Rodicio, 2014). There are therefore clear links between metacognition and motivation (Paris & Oka, 1986).

Metacognition and motivation have largely been studied individually due to extensive conceptual issues (Weinert & Kluwe, 1987). While it is hard to define and measure

metacognition it is also difficult to measure motivation. However, the two are highly linked (Law, 2009; Paris & Oka, 1986) as the reader needs to have the desire to comprehend before they are likely to employ any metacognitive repair strategy. Motivation is of paramount importance and it has been argued that it should be at the heart of reading comprehension instruction (Malloy & Gambrell, 2008).

Literature has offered discussion around what differentiates metacognitive strategies from cognitive strategies (Block & Duffy, 2008). While there has been much interest regarding how these are distinct (Baker, 1994), generally cognitive strategies refer to a reader's knowledge of the process while metacognitive strategies rely on the higher order skill, involving "thinking about thinking" through a process of increased self-awareness Ahmadi, & Gilakjani, (2012). Cognitive activities include the use of graphic organisers, summarising, predicting and deductive reasoning, and can be supported by various instructional aids. Here little concern is given to the self-directed use of these tools. Metacognitive strategies emphasise that action is required by the reader to aid comprehension (Paris, Wixson, & Palincsar, 1986) and the strategies they choose to use to control their reading and understanding. These strategies include the evaluation of predictions, how they plan their reading to meet personal goals, relating and manipulating the most important information, choosing to re-read information when understanding has been lost, and evaluating the effectiveness of cognitive reading strategies (Ahmadi, & Gilakjani, (2012). Therefore it is possible to use a cognitive strategy e.g. summarising, in a metacognitive way.

Top-down processes have been criticised (Adams, 1994; Stanovich, 1988) because skilled readers or those reading something which is in line with the reader's skill level, do not rely upon contextual or graphic cues. Furthermore, there appears to be an over-

reliance upon what the reader brings to reading without acknowledging the role of the text. In addition, top-down processes do not explain the process of reading on an unfamiliar topic where background knowledge does not exist (Ahmadi, Ismail, & Abdullah, 2013). When reading works, it tends to be an automatic activity that requires little demand upon cognitive process. Therefore, similar to the bottom-up reading process, purely top-down model explanations have also fallen from favour (Ruddell & Unrau, 2004). However, it is clear that story grammar and metacognition have significant impact upon reading comprehension outcomes (McNamara & Magliano, 2009).

### 2.3. Interactive cognitive models

Neither top-down or bottom-up approaches adequately explain all aspects of reading. The process appears far more complex and it is now recognised that both bottom-up and top-down processes interact (Hall, 1989). This has been reflected in a move towards interactive models, which assume that both bottom-up stimuli and top-down contextual information are compensatory strategies which together support the creation of meaning in the most efficient way possible. The level of skill that the reader has, the type of text, and the goals within reading will all play a part on the degree to which top-down and bottom-up processes are used. For example a skilled reader may read for pleasure and enjoy using little cognitive exertion due to the automatic flow of incoming information; however, the same reader, whose task is to understand a scientific journal on an unfamiliar subject matter, may use all available contextual cues and graphics, thereby engaging top-down processes to make full sense of the article.

The amount and diversity of interactive models is vast; therefore, this paper will concentrate on the most prominent which also illustrates the development of

understanding of early cognitive models towards more complex and multidimensional understandings. It will start by looking at cognitive-processing models, namely:

- LaBerge-Samuel's automatic information processing model (1974)
- The Leading Edge Strategy Model (Miller & Kintsch, 1980) and the similar Prediction Semantics Model (Turner, Britton, Andrcassen, & McCutchen, 1996)
- Adams' Model of connections between reading and writing (Adams, 2004)
- Rumelhart's Interactive Reading Model (2004)
- Perfetti et al's., Model of reading (2005)

Then the chapter will look at models which take a broader approach than those specific to cognitive-processing. These are defined by Ruddell and Unrau (2004) as the most recent wave of socio-cultural reading models:

- Rosenblatt's Transactional Theory (1978)
- Anderson and Pearson's Schema Theory (1984)
- Sadoski and Paivio's Dual Coding Theory (2004)
- Balance Model of Reading by Robertson and Bakker (2002)
- Mathewson Attitude-Influence Model (2004)
- Ruddell and Unrau's Sociocognitive Model (2004)

This section will conclude that reading comprehension is a highly complex and interactive skill that relies upon interactions and transactions and is greatly influenced

by our culture, beliefs, context, motivation and attitude. Consideration will also be given to the practical applications of these models for teachers and learners.

### 2.3.1 LaBerge-Samuel's automatic information processing model (1974)

This interactive model is perceptually-oriented and describes how three memory systems (visual memory, phonological memory and semantic memory) analyse incoming information to increasingly complex degrees. Similar to Gough (1972), it focuses on the word-encoding processing (level one of Kintsch and Rawson's (2005) framework), and highlights the importance of the reader focusing their attention during the reading process. Initially attention is given to decoding until this becomes an automatic skill, after which attention is diverted to skilled comprehension, which LaBerge-Samuels (1974) argues always needs attention due to the diversity of text. Therefore skilled reading with automatic decoding allows a limited processing capacity to invest all its resources in meaning making.

This model developed from other existing theories including; limited capacity processing theory (Kahneman, 1973) and automaticity theory (Samuels, 2004). It was further developed due to the influence of schema theory (see 2.3.7). It links with theories of attention and cognitive processing and can explain skill development, word reading and fluency development. Developing automaticity in decoding skills is highly important for cognitive resources to become available in order for comprehension to take place (Samuels, 2004). The model assumes that comprehension can be gauged by the level of expression within reading- however, it does not fully describe the non-automatic process of how sentences are comprehended. Furthermore, although this model does mention interactions between episodic memory, semantic information and contextual information these interactions are not satisfactorily explained.

There is internal consistency and external validity with this approach as it can explain how readers' skills develop as automaticity improves. However, alternative explanations have been offered for this automaticity; for example, Rumelhart, (2004) argues it is a product of developing memory rather than a limited processing capacity. Also, while LaBerge and Samuels (Samuels, 2004) argue this is an interactive model, critics have described it as overly bottom-up (Rumelhart, 2004) as it does not acknowledge that the perception of letters often depend upon supporting letters. Neither does it acknowledge the impact of the syntactic or semantic environment of the words we read. However, the model has been influential, and does have a diagnostic capacity as it offers explanations as to how the inability to decode (which demands attention) compromises comprehension processing for poor decoders. This model informs potential interventions for such cases e.g. the teacher gives a different decoding level text to redirect attention processing away from decoding to comprehension. Alternatively, offering the reader repeated opportunities for familiarisation of the text, so that decoding can be the focus of early readings, before rereading for meaning, can be a useful approach (Rawson, Dunlosky, & Thiede, 2000). Furthermore, readers that can decode but cannot remember text due to inattention to the page could be guided to give themselves opportunities for self-testing.

### 2.3.2 The Leading Edge Strategy Model (Miller & Kintsch, 1980) and the similar Prediction Semantics model (Turner, Britton, Andrcassen, & McCutchen, 1996)

The Prediction Semantics model (Turner et al., 1996) is similar to its predecessor the Leading Edge Strategy Model (Miller & Kintsch, 1980), both being computer programmes that simulate the reading process and the creation of a coherent mental representation of text.

They describe the reading process as being cyclical. Within each cycle there are two phases; input and reduction. Within the input phase, propositions are deemed important, given their function in linking relationships between texts in order to make the task easier for working memory (WM). As semantic information is perceived, important points, the text propositions, are held by WM. Generally, WM is considered to be an important aspect in reading (Chrysochoou, Bablekou, & Tsigilis, 2011) as it is a predictor of RC ability (Swanson & Alexander, 1997). This is followed by the reduction phase, where a small number of ideas are extracted to understand the central ideas.

As mentioned a great many processes are required for sentences to take their propositional meaning. Given that phonological memory supports listening comprehension and listening and reading comprehension are highly related (Aarnoutse, van Den Bos, & Brand-Gruwel, 1998; Perfetti et al., 2005), it can be concluded that reading comprehension is highly influenced by WM processes. WM is a well-documented core executive function that is required for reasoning, making sense of information as it unfolds over time, and needed for planning and re-ordering (Diamond, 2013). It can be seen how these processes are interlinked with skilled reader processes, sensitivity to story, inferences and comprehension monitoring (Bohn-Gettler & Kendeou, 2014). In fact, reading comprehension relies upon WM (Currie & Cain, 2015; Swanson & Alexander, 1997). While WM is a limited resource (Baddeley, 2000) during reading it co-ordinates a variety of processes, including reading goals, prior text, linguistic knowledge and relevant world knowledge. Furthermore, many reading comprehension models agree that some form of mental representation is needed in order to comprehend text (Kintsch & Rawson, 2005). WM, therefore, must

rely upon the automaticity observed in expert reading, yet struggles during arduous reading experiences of developing and unskilled readers (Kintsch & Rawson, 2005).

The two models (The Prediction Semantics Model and The Leading Edge Strategy Model) differ only in how the reader makes a decision about the information to be kept in mind. While the Miller and Kintsch (1980) model uses an algorithm where recent propositions are organised into a hierarchical “tree structure,” The Prediction Semantic Model suggests that semantic information is used to determine which ideas are kept within the mind. This is done through a rule-based process of prioritisation of text, based on a calculation of strength value informed by connectedness and most recent information available. This engenders an increased level of face validity compared with The Leading Edge Strategy Model, and further studies have shown that there are fewer constraints on The Prediction Semantics model and better generalisability (Turner, Britton, Andrcassen, & McCutchen, 1996). However, there were a great deal of areas requiring further development. For instance, the models have been developed to simulate only adult comprehension and in a simplistic way which may not replicate the complexity of real world reading material. Furthermore, when people read, the process has a level of automaticity that these computer simulations do not have, and computers are usually only concerned with the comprehension of a few sentences.

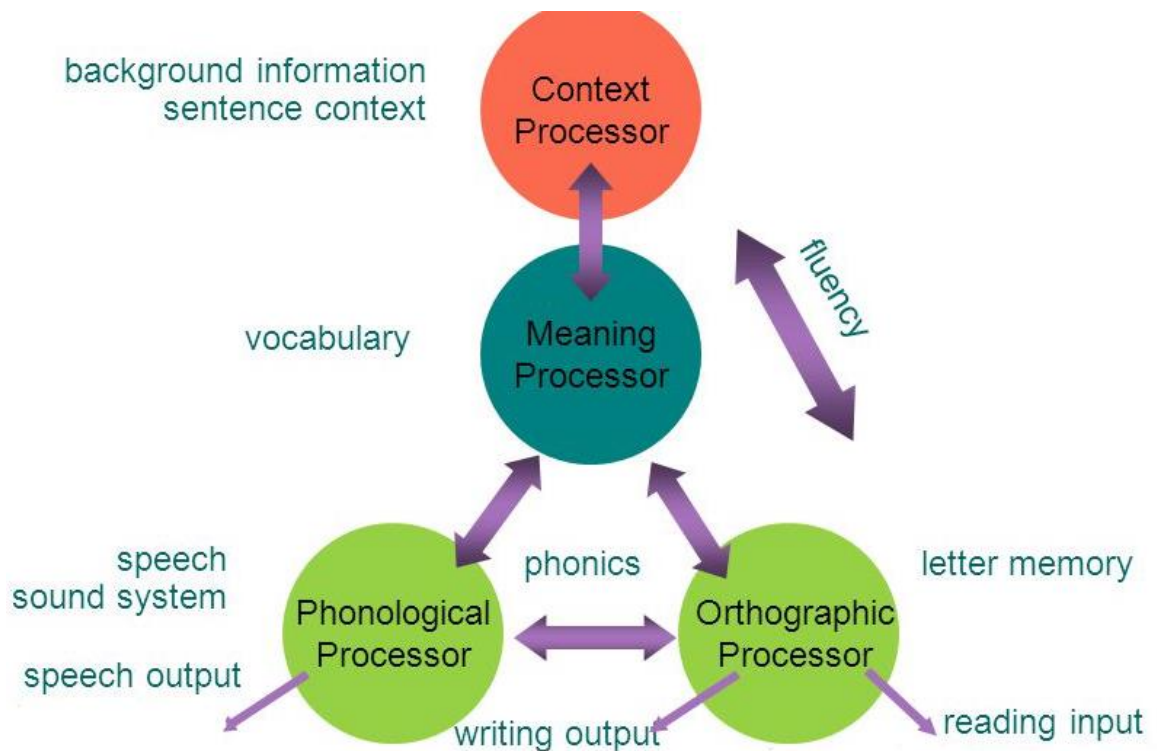
### 2.3.3. Adams Model of connections between reading and writing (2004)

This model was built upon the PDP triangle model of word reading by Rumelhart and McClelland (1986) to incorporate a meaning processor and a context processor in a



four processor design. As such, it is designed to add coherence to the overarching reading system and therefore lacks some detail.

Adams describes how skilled readers simultaneously access the sound, spelling, meaning and context automatically in a four-part model (see Figure 6 below).



**Figure 6 Four Process system- Adams 2004**

The Orthographic Processor determines the text and responds to the relative strengths of the inter-letter associations of letter stimuli. Studies using this model have shown that the ease with which a long word is read increases as skill to syllabify increases. This has informed practice which states that children should receive instruction on syllables.

The Context Processor selects the appropriate word definition from potentially various options. Studies here have shown that meaning comes from word interpretation and as

the complexity of the text increases, guessing words becomes increasingly detrimental. Context is a standby system for word identification.

The Meaning Processor assesses the inter-relatedness of identified words and allows the assemblage of context. As Figure 6 shows, Adams sees vocabulary developing with regular and wide-ranging reading and therefore reading opportunities should be offered. Vocabulary knowledge is comprehension at its most local level; if words within the text cannot be understood, inference and bridging strategies (higher order comprehension strategies) would be useless. Instead, lower order strategies, including paraphrasing, would be more appropriate (McNamara & Magliano, 2009; Hagaman, Casey, & Reid, (2012).

Explicit vocabulary instruction is generally accepted as necessary to ensure that the literacy gap between higher and lower-achieving pupils is minimal. However, this is not regularly part of lessons (Rathvon, 2008). Intentional instruction in vocabulary is especially beneficial for children living in areas of high deprivation with a higher proportion of struggling readers (Carlo et al., 2004). Furthermore, the “fourth-grade slump” has been partly attributed to the fact that too little direct instruction of vocabulary is taught to the upper primary school population (Beck & McKeown, 1983).

The Phonological Processor consolidates the networks between input and meaning and is a support system for unfamiliar words. Research in this areas shows that inability to map graphemes onto phonemes is a huge barrier to the developing reader, who needs to be explicitly taught, given that phonemic awareness is not instinctive (Torgerson, Brooks, & Hall, 2006). This highlights the necessity for the teacher’s instruction to

explicitly teach phonemes, spelling patterns, phonetic translation to graphemes and pronunciation.

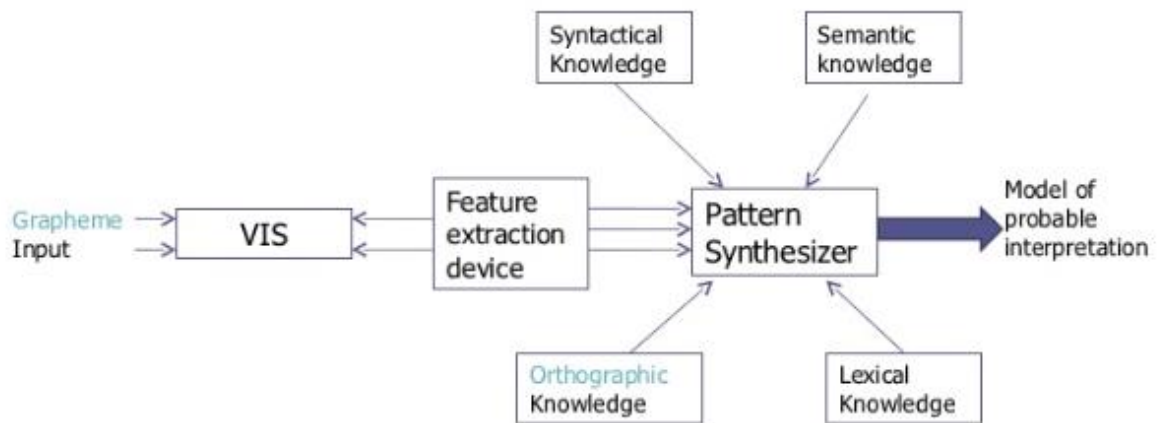
Adams' model recognises that understanding and decoding text are important aspects of the reading process however, without the other systems in place it is useless. Yet, Adams' denounced the usefulness of predicting as a strategy for promoting reading comprehension although there is much contradictory evidence advocating for its usefulness to the reading process (Palincsar, Brown, & Martin, 1987; Palincsar & Brown, 1984).

In conclusion, while this model has given a good overview of the reading process, it lacks detail and does not mention factors beyond the text and reader.

#### **2.3.4. Rumelhart's Interactive Model of reading (2004)**

This model (Rumelhart, 2004) is also based upon PDP paradigms of word reading and illustrates both the perceptual and cognitive processes involved in reading. It describes a reader's hypotheses at letter level through bottom-up processes and hypothesis at word level through top-down processes (see Figure 7). This model contributes to understandings of interactivity models by incorporating feature information, letter level knowledge, letter-cluster knowledge, lexical-level knowledge, syntactic knowledge and semantic knowledge and illustrates how they intermingle in an interactive parallel processing system (Rumelhart, 2004). Language models and cognitive processing theory have informed this framework which describes how different sources of knowledge interact to enable higher-level processing, thus influencing lower level processing (Rumelhart, 2004).

# RUMELHART MODEL



Once a Feature Extraction Device has operated on the Visual Information Store, it passes the data to a Pattern Synthesizer which receives input from Syntactical, Semantic, Lexical and Orthographic Knowledge, all operating at the same point.

**Figure 7 Rumelhart's (2004) Interactive Model of Reading**

While this, mainly descriptive, model does not explain the processes involved in learning to read, it does acknowledge that perception of letters is often dependent upon supporting letters and the contribution of syntactic or semantic environment of words. However, there is no complete understanding of how knowledge sources are acquired or how they work.

This model has been criticised because, while it is interactive, it does not represent the process as being entirely simultaneous with top-down and bottom-up processing occurring alternatively depending upon the purpose of reading. Yet, it has inspired other models including:

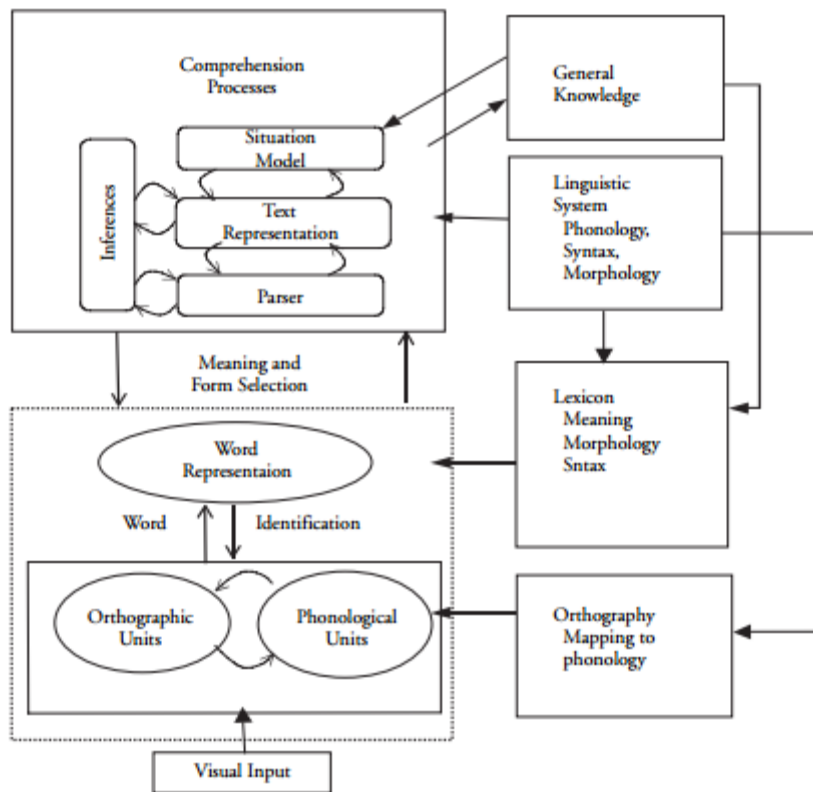
- The Interactive Compensatory Model (Stanovich, 1988), which extended these ideas to more fully depict how the two processes are compensatory. For example, an early reader with lesser decoding skills will use more contextual

or graphic cues (top-down), while an experienced decoder will rely more fully on automatically processed textual input (bottom-up).

- Plaut and Shallice (1993), whose focus was to explain acquired deep dyslexia
- Harm and Seidenberg (2004), who further developed their model to explain well known word reading phenomenon, including homophones and pseudohomophones.

### 2.3.5 Perfetti et al., Model of reading (2005)

The Perfetti et al., model (2005) below in Figure 8 describes an interactive and complex process (Lesgold & Perfetti, 1978; Perfetti, Roth, & Lesgold, 1981) beginning with the identification of words through their orthographic and phonological properties towards the creation of a situation model through a process of inference making. We can see the large amounts of components involved in both word reading skills and reading comprehension and the model illustrates that for comprehension to be successful, vocabulary, word reading, inference making, general knowledge and WM all need to be working effectively together. Each of these subcomponents of RC are interlinked to different degrees; for example vocabulary is linked to inference making skills to a greater degree than memory (Cain & Oakhill, 2014). Similar to other models it illustrates how vulnerable effective comprehension might be as it is so reliant upon a diverse range of processes. Furthermore, it is consistent with the view that when the component parts of reading work together, the process appears to be natural and easy; however, when the comprehension process breaks down, there is a draw upon our analytic reasoning (Adams, 1994; Perfetti et al., 2005) through the use of metacognitive skills.



**Figure 8** Perfetti et al., (2005) model of whole reading

While purely cognitive-processing models like this have been highly influential and have offered increasingly detailed accounts of the cognitive processes involved, with progressively higher levels of sophistication, there has been a shift towards broader views of reading. These do not replace the cognitive processing models, but generally give them a perspective within which to be placed. Some of the more prominent will now be discussed.

## 2.4. Interactive Multidisciplinary Models

### 2.4.1. Rosenblatt's Transactional Theory (1978)

Transactional theory was developed by Rosenblatt (1978) and has been highly influential as a model developed to incorporate all other models. In so doing, it has added to our understanding of reading and effective reading instruction. Rosenblatt's

model (1978) was one of the first researchers to highlight the difference in process between expository and narrative texts. She describes two alternative states of attention; efferent and aesthetic. After beginning reading the reader uses cues to select which stance to take. The efferent state is associated with non-fiction; here the goal of reading is to extract information from the text in an efficient process. The focus is outside the reader and the ideas are to be useful after the reading session.

In contrast, the aesthetic state is associated with fiction and reading for enjoyment. Here, the emphasis is placed upon online/live reading. There is a creative process that brings together the cues on the page with the reader's stream of thoughts and feelings (also regarded as the environment of engagement). This active and dynamic relationship develops a framework within which the information can be organised. Through this, internal-focus, inner-awareness and consciousness develop expectations of the text. These are reformulated by the reader as appropriate.

This model highlights the importance of the reader within the process of meaning making that many other models omit. The text becomes a poem only through the dynamic transaction, interaction and relationship that is created between the reader and the text. The reader brings their emotions and feelings to their interpretation of fictional text; this produces a clarity of core ideas which are purely based upon the reader's own emotions and feelings. Therefore the same piece of text could be interpreted in completely different ways as it is so dependent upon the reader's relationship and experience of the text. Here meaning is developed through the process of reading and creating interpretations within the mind rather than comprehension being merely a product of the print.

The procedure has also been used to explain writing and parallels are drawn between the two processes. Although challenged (Rosenblatt, 2004), these links have encouraged cross-fertilisation of instruction to enhance both reading and writing skills. Furthermore, this model emphasises the need for the reading environment to encourage creativity, thereby enhancing motivation. It also illustrates how goals for reading affect reading outcomes. In addition, the teacher has evolved from being an instructor towards being a facilitator who guides the young person towards increasingly more sophisticated interactions with text. The teacher's role is to provide opportunities for conversation, to deepen comprehension through shared meaning making and social discourse (Ketch, 2005; Palincsar & Klenk, 1992). Yet getting the balance right between supporting effectively and scaffolding appropriately without dominating or dictating continues to be an ongoing goal (Clark & Graves, 2005).

#### 2.4.2 Anderson and Pearson's Schema Theory (2004)

A schema is an organised knowledge of the world. Schema theory describes how this knowledge is integrated with information on the written page in order to add depth and understanding (Anderson, 2004). The following sentence exemplifies the need for schema information:

“The notes were sour because the seam split”

It is difficult to make sense of this sentence unless you have a bagpipes schema. Other research shows the importance of cues and prior knowledge for when participants are given a “trick” passage either on its own, with a supporting illustration or with a related but less supportive illustration. Sense can only be made of the passage if provided with the cue of a supportive illustration (Bransford & Johnson, 1972). Furthermore, the



level of comprehension affects the amount that readers would remember; readers would only remember what they could understand. In addition, the amount/type of pre reading knowledge that the reader has directly impacts upon the type of information that will be retained. For example in a passage about baseball, those with high knowledge of the sport remembered more information about the strategic play, while those with low baseball knowledge remembered more incidental information (Chiesi, Spilich, & Voss, 1979).

Clearly, the background knowledge that we have impacts upon our interpretations of text. Therefore, care needs to be taken in reading comprehension instruction (and assessment) to ensure that fixed answers are not culturally biased, as different cultures potentially can offer very different answers based upon their own prior knowledge (Anderson, 2004). Our world knowledge (our schema) plays a huge part in how we understand what we are reading but also the physical process of reading. For example, it takes longer to read about subjects we have less prior knowledge of as there are fewer schemas offering clues to support our understanding. Reading comprehension can therefore be described as a very flexible, interactive and complex process where we are simultaneously analysing graphonemic, morphemic, semantic, syntactic, pragmatic and interpretive information.

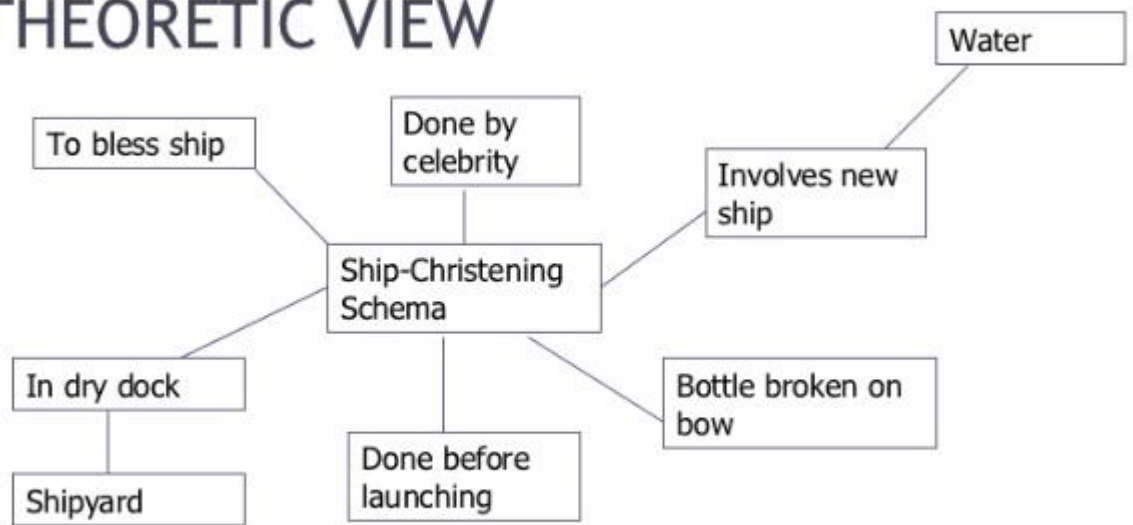
An example of a schema as per schema theory is illustrated in the following:

Queen Elizabeth participated in a long-delayed ceremony in Clydebank, Scotland yesterday. While there is still bitterness here following the protracted strike, on this occasion a crowd of shipyard workers numbering in the hundreds joined dignitaries in cheering as the HMS Pinafore slipped into the water.

What is the name of the ceremony?

As Figure 9 depicts we develop a mental schema based upon previous knowledge in order to build our interpretation of the text and identify the ceremony as a ship-christening.

## ANDERSON & PEARSON SCHEMA-THEORETIC VIEW



The Ship Christening Schema

Figure 9 Example of Schema- Theory Anderson and Pearson (2004)

Anderson (2004) described six functions that the schemata serves:

- Additional scaffolding e.g. our schema of crime novels ensures we infer there will be a criminal
- Schemata provide a structure from which we can decide what is the most important information

- The most important information is more easily identified; creating summaries or edits become easier
- They provide inferential elaboration that the literal text can rarely provide in full; allowing the reader to transcend literal information on the page
- The structure of our schema supports our memories as we can methodically work through formats that cue recollections
- This structure also allows us to question or hypothesise what else could be happening in the text.

Schema theory has been very influential in best practice teaching approaches as it demonstrates the importance of activating relevant knowledge prior to reading. From a culturally equitable perspective, schema theory also illustrates that prerequisite knowledge should never be presumed and topic-specific vocabulary needs to be taught to enhance understanding and inference skills (Reutzel & Hollingsworth, 1988). It is very likely that even within a class of children from similar sub-cultural backgrounds, many children may not have had experiences that could have been taken for granted in mass-produced reading materials. In addition, when teaching children of varying socioeconomic backgrounds, there is potential for unintentional discrimination within the group. New ideas are not equally accessible to all children, regardless of their decoding skills.

An important aspect in the development of a coherent understanding of text is through the process of inference making (Kintsch & Rawson, 2005). There are two overarching types of inference of which the first is “text connecting” where local information is needed to connect information from different parts of the text. An example here might

be: “Fiona took a drink from her bag. It was refreshing”. Here we can infer that the juice was refreshing. The second is “gap-filling” where global information is required to make sense of the information. For example: “Hannah lay on the bed and waited for the doctor to do his ward rounds,” we can infer from our knowledge that Hannah is in hospital.

Our ability to infer at age 7-9 is a greater predictor of later reading ability than vocabulary, reading accuracy, WM or verbal IQ (Oakhill, Cain, & Bryant, 2003). Here, we supplement the literal text based either upon our knowledge base in the case of automatic inference or syllogistic reasoning when controlled inference is necessary. An example of automatic interference might be: “Jane put on a cardigan. She fastened the buttons.” Here our knowledge of cardigans allows the inference that Jane fastened the cardigan buttons. This can be compared with the controlled problem solving type inference e.g. “Judy is younger than John; John is younger than Dan,” therefore we can infer that Judy is younger than Dan. Inference making is regularly required to make sense of the text and skilled readers regularly make causal inferences to ensure a story is coherent (Perfetti et al., 2005).

However, although inference making is critical to effective reading comprehension, not all readers make inferences, resulting in shallow reading (Currie & Cain, 2015). Inference making can be a costly cognitive process (Perfetti et al., 2005) and a balance must be struck between necessary inferences; those required to understand text and additional benefits gained through elaborating information via superfluous inference, is the most economical. However, poor readers often do not make inferences even when necessary for comprehension (Kintsch & Rawson, 2005). There are three reasons why this might be:

- Lack of knowledge to support inferences
- Lack of awareness regarding when to make inferences
- Inability to sufficiently process the text to make inferences.

Supporting the unskilled or developing the learner to make more inferences can be achieved through asking and answering questions about the text to promote a deeper understanding (Davey & McBride, 1986; Perfetti et al., 2005).

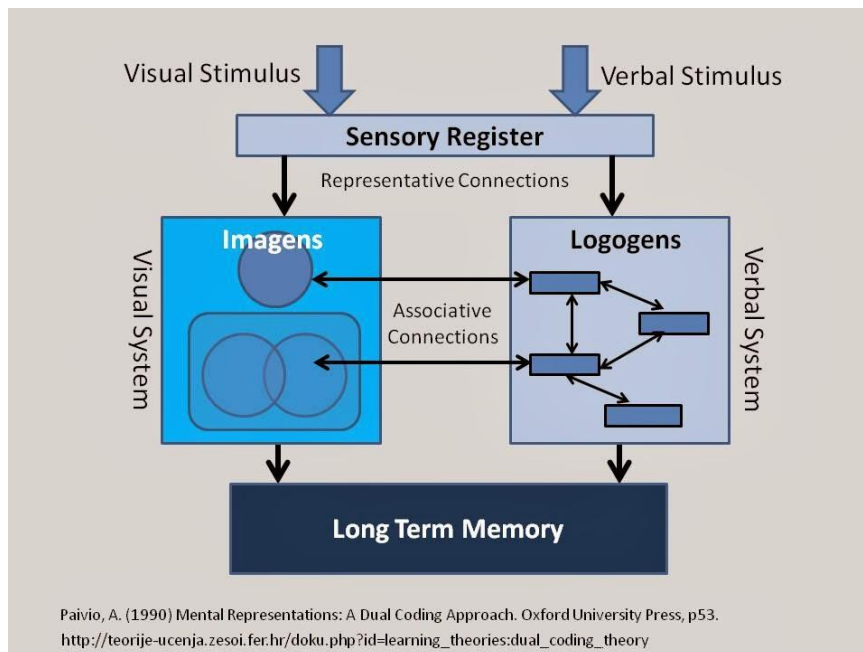
Yet while comprehension needs inferences, inferences need knowledge; therefore comprehension needs knowledge. Theory around schemas has led to a previewing, preparing your mind and pre-reading vocabulary checks in some RC interventions, and has been proved effective (Spires, Gallini, & Riggsbee, 1992).

#### 2.4.3. Sadoski Paivio & Goetz's Dual Coding Theory (1991)

Dual Coding Theory is a general theory of cognition that has been used to describe a variety of phenomenon of which reading is one (see Figure 10). It brought together psychological and philosophical paradigms, and has been regarded as controversial in the alignment of visual and sensual input. It describes how, as information is inputted into the brain, it is characterised into two separate, although intertwined, cognitive codes; each recording separate characteristics. These are either linguistic codes, which are concerned with language, or nonlinguistic codes which are sometimes called imaginary codes. The latter absorbs various sensory sources of information to transform it into a mental image. The dual nature allows for the synthesis of information with memories and prior knowledge, therefore allowing for flexibility of thought.

Dual coding theory assumes a continuity between perception and memory. Within verbal and non-verbal experiences information from the five senses is coded in memory. This process parallels theories of working memory, which illustrate how memories are coded either audibly from the phonological loop or visually through the visual spatial sketchpad (Baddeley & Hitch, 1974). Furthermore, DCT assumes long-term memory functions in a similar way.

DCT contrasts with schema theory, which assumes only one abstract code or schema (Sadoski, Paivio, & Goetz, 1991). Yet, while DCT has been recreated using simulations of the brain (Seidenberg, 2005) there remains disagreement between researchers as to whether the simplicity of schema theory is more preferable to the more complex DCT (Paivio, 2007).



**Figure 10 Sadoski and Paivio's Dual Coding Theory (2004)**

The fundamental idea of using visual imagery while reading text has led to successful studies proving that teaching children to visualise during the reading process promotes comprehension (Gambrell & Jawitz, 1993; Sadoski & Willson, 2006; Schirmer, 1995).

#### 2.4.4. Balance Model of Reading

This model, developed by Robertson and Bakker (2002), takes a very different approach. They emphasise that children need to understand the perceptual features of text before practice of the reading process, which, alongside familiarity with syntactic rules allows reading to become an automatic process. Practice is therefore essential (Adams 1994). They argue that the left cerebral hemisphere mediates the syntactic rules and reading experience after the learning phase of letter awareness, which is mediated by the right cerebral hemisphere. They argue that perceptually or surface dyslexic children (those who can sound out, but not read whole words) are those which fail to make the transition from the use of the right hemisphere to the left; thereby reading continues to be a labored and fragmented process. Yet linguistic/phonologically dyslexic children (those that can read whole words, but cannot sound out) make the transition to the use of the left hemisphere too quickly. This model has influenced the selection of decoding teaching strategies, especially those for dyslexic readers, yet is less concerned with approaches to reading comprehension.

#### 2.4.5. Mathewson Attitude-Influence Model (2004)

It can be recognised in the above information that models vary regarding which of the four levels (Kintsch and Rawson, 2005) are the focus. Increasingly models have incorporated a wide range of phenomena that impact upon reading comprehension.

However, the attitude of the reader has not generally been incorporated to the same degree as cognitive factors (Mathewson, 2004).

Mathewson's Model of Attitude Influence (2004) took a tri-component template of attitude which recognised:

- an affective component (the feelings surrounding reading, a conative component- the action readiness)
- a cognitive component (the evaluation of beliefs)
- an emotional component where the emotional state and external motivators develop an intention to read (or otherwise).

Here all aspects influence whether reading will take place. Each aspect will have several underpinning factors, e.g. how the reader feels about reading will be influenced by their sense of mastery (for each aspect of reading including decoding, vocabulary, fluency or comprehension) or their experiences of reading. While these aspects influence the intention to read, the intention to read affects behaviours (to read or not to read). This action can change as the process of reading takes place (e.g. beginning to lose focus when the text becomes overly complex).

This model highlights affective issues as being important in teaching reading. For example, a child who has no topic interest will have reduced prevailing feelings about reading and therefore a poor intention to read. This could then prevent opportunities to practice reading, reducing the reader's perceived ability, which therefore compounds the intention to read. In cases like this, the reader is less likely to employ fix up strategies when reading breaks down; this is otherwise known as comprehension



monitoring (Baker, 1994; Garner, 1987), and results in readers failing to make meaning of text.

There is wide agreement that there are two types of motivation: task mastery orientation and performance orientation (Dweck & Leggett, 1988; Nicholls, Cheung, Lauer, & Patashnick, 1989). The former is concerned with how people seek to improve their skills and accept new challenges, often referred to as intrinsic motivation. This is driven by factors internal to the individuals, whereby they want to do something to meet their personal goals rather than doing so to oblige others. The latter is driven by the desire to maximise favourable evaluations, often known as extrinsic or surface motivation. This is driven by forces external to the self; for instance, pressure, punishment and rewards that guide the individual to do things differently. This is the least beneficial way of enhancing long-term performance (Dweck & Leggett, 1988; Nicholls et al., 1989).

The judgement in our capabilities is also referred to as self-efficacy, which is highly linked to reading motivation (Bandura, 1976; Carr & Borkowski, 1989). If the individual has a sense of self-efficacy, they will see new reading material as a challenge and therefore use their cognitive capabilities and become active readers in the goal to comprehend text (Pressley, Goodchild, Fleet, Zajchowski, & Evans, 1989a). Yet, to ensure motivation, the challenge should be moderately and not excessively stretching (Rellinger, Borkowski, Turner, & Hale, 1995). Furthermore, when we consider metacognitive knowledge, the reader requires a sense of competency that they are able to read - a sense that the prose is at an appropriate level of difficulty in order to have sufficient motivation to invest time in reading (Law, 2009). The better the reader, the more metacognitively aware they are (Moore, 1983).

Studies show that in the Early Years quality interactions with books has a profound impact upon motivation (Mathewson, 2004). In later years, motivation is also increased by offering a variety of print and opportunities for reading. Motivation for reading decreases as children get older (Oldfather & McLaughlin, 1993) and various research has been concerned with why this might be. Are young children perhaps getting into the habit of evaluating their performance poorly? Instruction in literacy sessions, driven by extrinsic motivators including social comparison and competition has the devastating impact of reducing competency beliefs and reducing intrinsic motivators (Eccles, Wigfield, & Schiefele, 1998). The focus on attainment (an extrinsic motivator) rather than reading for enjoyment (an intrinsic motivator) ironically has a detrimental impact upon attainment. This is further exacerbated by the teachers' style which throughout school stages gradually reduces the opportunities for children to negotiate their learning and express their preferences (Oldfather & McLaughlin, 1993). Therefore the way that teachers relate to and motivate pupils hugely impacts upon reading abilities as it is essential that children feel a sense of success in literacy lessons to make RC happen and is one of the largest influencing factors to success (Slavin, Cheung, Groff, & Lake, 2008).

Mathewson's Model illustrates the dynamic interplay between attitude and reading ability which influences reader interpretations and can offer them reading satisfaction or otherwise. The reading process thereby alters our feelings, goals, values and self-concept, which in turn continually influence our intentions to read or otherwise.

#### 2.4.6. Ruddell and Unrau's Sociocognitive Model (2004)

This approach transcends previous models by acknowledging not only the text and the reader but also the context of the classroom, with a teacher, to recognise the social

nature of reading. It builds upon previous theories that acknowledges children have prior knowledge, ideas, beliefs and varying degrees of motivation. Here, the Sociocognitive Model (Ruddell & Unrau, 2004) is a metaphor for the reading process and incorporates three components; (1) reader, (2) teacher and (3) text/environment, as seen in Figure 11 below.

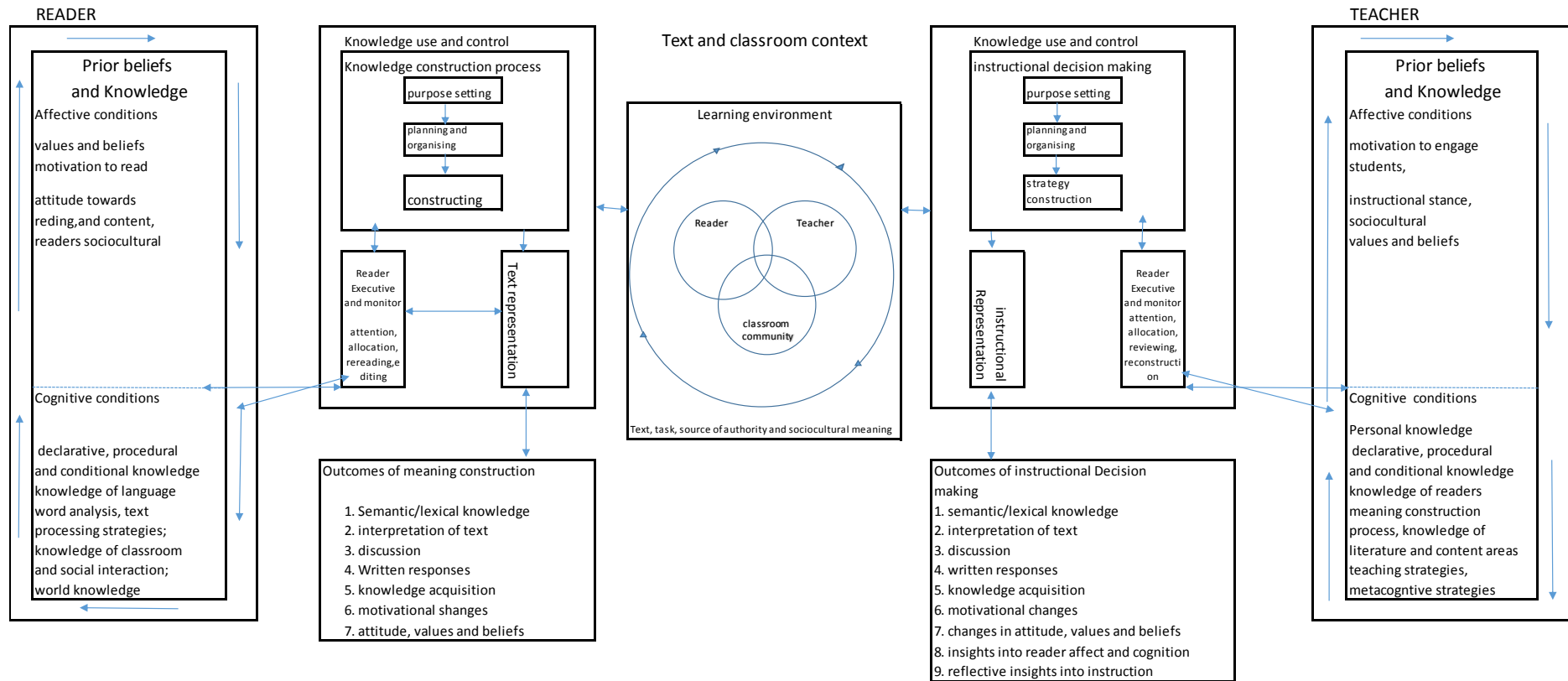


Figure 11 Ruddell and Unrau's Sociocognitive Model (2004)

(1) The reader comes with a set of prior beliefs and knowledge which is subdivided into affective conditions and cognitive conditions. Affective conditions include attitude, motivation and sociocultural beliefs and values, while cognitive conditions include declarative, procedural and conditional knowledge, knowledge of language, text decoding strategies, metacognitive strategies, knowledge of the classroom, social interaction and person and world knowledge. These reader attributes guide them in how they use, construct, monitor and represent meaning in a process called “knowledge use and control.” Here, the process of reading is guided by the reader’s purpose, planning and organisation and construction skills interact to develop a representation of the reader’s interpretation of the text. The process is directed by the reader’s “executive and monitor” which allocates attention and comprehension monitoring skills through synthesis of the information with the reader’s prior knowledge, beliefs and values to develop hypotheses, predictions and conclusions of the text. There are various potential outcomes from this process including new understandings, updated knowledge or changes in attitudes. Furthermore, the child’s attribution beliefs of their effectiveness as a learner impacts upon their reading ability (Bandura, 1976; Carr & Borkowski, 1989; Chan, 1994).

Comprehension monitoring describes the process whereby a reader recognises that understanding of the text has broken down and therefore employs fix up strategies to re-read and repair the breakdown in comprehension. It is this awareness that is necessary to ensure coherence of text is gained. Early readers tend to concentrate only upon decoding, with metacognitive processes developing with age and experience (Baker, 1994; Garner, 1987). Yet even though metacognitive skills develop, reading always relies upon the ability to think about what is being read, make a decision to take action and employ that action (Dabarera, Renandya, & Zhang, 2014; Payne & Manning, 1992). Without the use of metacognitive strategies, coherent reading would be impossible Ahmadi, et al., (2013). Studies exploring this phenomenon have taken various error detection approaches at the semantic, syntactic or

spelling levels (Kintsch & Rawson, 2005). While comprehension monitoring strategies are needed for effective reading, just because the reader has learned this strategy and notices that text meaning is lost, does not necessarily mean that the fix up strategy is employed (García-Rodicio & Sánchez, 2014). Comprehension monitoring is recognised to be a metacognitive strategy to develop reading comprehension and there is general agreement that, for an effective RC intervention, these metacognitive strategies should be included (Ahmadi et al., 2013; NRP, 2000; Snow, 2002) as it not only ensures reading comprehension, but also vocabulary (Boulware-Gooden, Carreker, Thornhill, & Joshi, 2007).

Comprehension monitoring and metacognitive strategies more generally are therefore closely linked with self-regulation and motivation (O'Shea & O'Shea, 1994; Souvignier & Mokhlesgerami, 2006). This link is reciprocal as developing comprehension monitoring skills also enhances motivation for reading (Payne & Manning, 1992). Furthermore, motivation, strategy instruction and self-regulation together enhance retention (Souvignier & Mokhlesgerami, 2006), again illustrating the dynamic link between reading skills.

(2) The second component, the teacher, has similar cognitive and affective variables but is more related to their philosophies, values, beliefs and understandings of effective teaching practices. These components then inform their instructional representation through their style, activities and the learning opportunities offered. The process is also directed by the teacher's "executive and monitor" which allocates attention and monitoring skills through synthesis of the information with the teacher's prior knowledge, beliefs and values to inform their mediation.

The teacher is therefore responsible for supporting the reader to make meaning creating an optimum socially-mediated environment (Gersten, Fuchs, Williams, & Baker, 2001). The outcomes for the teacher include a variety of reflections of their teaching practices or new

knowledge or values. As the knowledge, beliefs, values and attitudes of the reader is brought to the reading process, topic exploration with the teacher, through collaborative discussion prior to reading, will have a profound impact upon the ease and depth of understanding as well as motivation for engagement. Engagement, in turn, leads to better memory retention of the information read (Pressley, Johnson, Symons, McGoldrick, & Kurita, 1989b). Conversation develops meaning and development of metacognitive strategies (Haller et al., 1988) such as re-reading and comprehension monitoring (Dabarera et al., 2014; Wagoner, 1983). Direct vocabulary instruction and exposure to story grammar in expository and narrative texts are also key components and should be within teaching instruction (Newby et al., 1989; Reutzel & Hollingsworth, 1988). Furthermore, the teacher being in tune with the pupil's attributes and adapting their instruction to suit the child; thereby being in tune with the child's stance, will enhance levels of motivation and comprehension. In addition, creating a safe environment where children can discuss texts without fear of failure, within a culture where it is good to seek verification and unique understandings instead of conforming to one teacher's perceptions of the "correct" answer is essential. Also beneficial is the child/teacher discussion to update and reevaluate meaning and various different rich interpretations as part of their inclusive classroom reading community (Dowhower & Speidel, 1988). The skills of questioning, cognitive challenging, re-evaluation and creating meaning can thereby transcend the contexts of literacy instruction towards construction of meaning across learning contexts over time (Gillies, Nichols, & Burgh, 2011).

(3) The third component is the text/environment, which is the coming together of all facets into an understanding of text. Exposure to reading and the number of authors that a person is familiar with, independent of ability is more related to reading skill than memory (Britton & Graesser, 1996). Personal choice of reading material, with an emphasis placed on reading for pleasure is also important, as are social opportunities and joint engagement through interactions

with others to discuss and explore interesting texts (Brooks, 2013) through an exciting curriculum (Ellis, Denton, & Bond, 2014).

The model explains how good instruction improves developing readers' skills, yet only for those with sufficient motivation. However, teachers are in a prime position to influence and instill motivation. Teachers come equipped with skills in teaching children however it is necessary for them to continually adapt their personal approach to becoming increasingly more tailored to individuals as and when necessary in order to fully engage their pupils (Ruddell & Unrau, 2004). This is a paradigm shift away from assessment of children in order to categorise their skill towards assessment, to be used by the teacher as an opportunity to develop and adapt their teaching style to better scaffold and support the reader (Ellis et al., 2014). The teacher can develop an understanding of the pupil's ability through; discussion, written responses, interpretation of text and knowledge acquisition (Ruddell & Unrau, 2004).

Here, the relationship between the different components of teacher, environment and student are crucial (Davies et al., 2013). This model is unlike previous models as it acknowledges the potential impact of the quality of the teacher's lesson, which bears upon individuals' motivation. Also, the structure of the classroom or learning environment influences the developing reader's sense of ownership in their learning process through the level of self-direction and independence. This develops the pupil/teacher relationship, enhancing trust and leading to meaning-negotiation (Davies et al., 2013; Ruddell & Unrau, 2004).

This theory brings together previous ideas, including schema theory, motivational theories and transactional theory and emphasises the importance of effective interactions within classrooms as the teacher mediates meaning through discussion and comparison of ideas. Furthermore, its inclusion of language knowledge again emphasises the importance of phonological, syntactical



and lexical knowledge in addition to vocabulary as being important components in the skilled reading process.

## 2.5. Synthesis of whole models of reading

Table 1 below brings together each of the models discussed and shows:

- What type of model it is in relation to the levels described by Kintsch & Rawson, (2005)
- The degree to which prior information and social elements are incorporated
- The usefulness of the model within the classroom
- Its theoretical underpinnings
- Its primary influences and any issues with the model.

Together these models have continued to enhance our understanding of the reading processes and in so doing have had varying degrees of influence upon instruction.

As can be seen, different models allow insight into different levels of reading comprehension (as defined by Kintsch and Rawson, 2005). However, to get a true picture of reading comprehension, these processes need to be synthesised and a clearer understanding developed to explain the interactions between the sub-processes. At present this model does not exist, yet many models and associated theories have been highly influential. Each has evolved as supporting theories and understandings of aspects of reading have developed and other areas for further research include more investigation into expository text RC, as theory is predominantly in narrative texts (Fox and Alexander, 2009). Fox and Alexander (2009) makes the distinction between two types of model: extraction and assembly models and constructive–integrative models, and Table 1 has also differentiated the discussed models according to these

criteria. The former was the traditional approach seen in early models which emphasised the need to decode or extract meaning and interpretation or assemble the author's meaning. The product of this is then matched with the reader's existing mental contents and essentially interpretation of reading is either done correctly or incorrectly. However, more recently the constructive–integrative approach has been favoured as it acknowledges the dynamic interplay or meaning between the reader and the author. The reader creates their own meaning and constructs individualised interpretations of text. The process of reading comprehension, therefore, has evolved from being described as constructive to evermore connective. Motivational, metacognitive and socioemotional factors out-with the text are regarded as increasingly more influential to the success of the reading process (Fox & Alexander, 2009). The reader who does not have a reading goal is less likely to engage transient interest in focused reading for meaning. Furthermore, the impact of emotional factors and readiness to engage in learning transcend traditional views of reading and highlight that successful reading is not purely cognitive. This means that effective instruction requires pedagogical programmes that emphasise the need for optimal relatedness between the teacher and child/children. The quality of the relationship determines the rapport, which is required to ensure that emotional and affective dimensions are accounted for. These are essential components necessary for optimal success of any reading programme.

**Table 1 Models of Reading Comprehension**

Model	Type of model	Explains reading comprehension at a word or phrase level (inc vocab)	Explains microstructures- word connections between propositions	Macrostructures- themes and topics understanding	Acknowledges prior information and knowledge, imagery and emotion	Acknowledges the social aspect of reading comprehension	Acknowledges context of the classroom	E&A or CIM model	Theoretical Underpinnings	Influence on Reading instruction	Issues with model
LaBerge-Samuel's automatic information processing model (1974)	Cognitive	√	X	X	X	X	X	E&A	Limited processor theory, attention (cocktail party effect) and cognitive theories. Favoured bottom-up processing plus top-down interaction	√- Vocabulary needs explicitly taught, importance of focused attention during reading, need for decoding to become automatic to allow allocation of resources to comprehension	Arguably overly bottom-up, as does not acknowledge syntax or semantic environment. Does not adequately describe the process of how meaning made
The Leading Edge Strategy Model (Miller & Kintsch, 1980)	Cognitive	√	√	X	X	X	X	E&A	Cognitive theories and Theories of Working Memory	√- Link of reading comprehension with working memory	Only used to replicate adult reading. Only deals with a small proportion of semantics and does not replicate adult automaticity.
Prediction Semantics model (Turner, Britton, Andrassen, & McCutchen, 1996)	Cognitive processing	√	√	X	X	X	X	E&A	Cognitive theories and Theories of Working Memory	√- Link of reading comprehension with working memory	Only used to replicate adult reading. Only deals with a small proportion of semantics and does not replicate adult automaticity.

Adams Model of connections between reading and writing (1990)	Cognitive	√	√	√	X	X	X	E&A	Linked to the PDP model of word reading and cognitive modelling. Favoured bottom-up processing plus top-down interaction	√- Advocates for instruction on syllables. Opportunities for reading necessary. Importance of vocabulary, phonemes, spelling patterns instruction. Reading aloud promotes early literacy.	Word level analysis described in the context of experienced not developing reader
Rumelhart's Interactive Model of reading (2004)	Cognitive	√	√	√	X	X	X	E&A	Favoured bottom-up processing plus top-down interaction. Language models	Considers the importance of context of letters and words	Superseded by transactional models. Does not explain learning to read. Model fairly descriptive rather than explanatory
Perfetti et al., Model of reading (2005)	Cognitive processing	√	√	√	X	X	X	E&A	Reading comprehension has reciprocal relationships with spoken language comprehension and lexical knowledge	Importance of word reading, inference making, vocabulary knowledge, topic general knowledge. Coherence is a goal of reading therefore, its loss requires acknowledgement by the reader and steps taken to rectify understanding. They suggest reciprocal supports to adopting a high coherence standard.	No output described in the model. Some elements lack detail.
Rosenblatt's Transactional Theory (1978)	Transactional	X	X	X	√	X	√	E&A	Came from multidisciplinary approaches including philosophy, linguistics and sociology. Reader and text are two aspects of dynamic situation. Vygotskian Theory	Acknowledged differences between fiction and non-fiction reading. Importance of readers' goals. Creativity encouraged avoiding prescriptive pre-packaged curricula. Instructor as facilitator	Research required around the development of selective attention

Anderson and Pearson's Schema Theory (2004)	Schema	X	X	X	√	X	X	E&A	A theory of general cognition Culturally aware, therefore ecological systems theory	Importance of text structure. Importance of culturally aware classroom. Importance of prior knowledge to scaffold our inferences, hypothesis and general RC	Overly concerned with verbal processes (?) Much research focuses on topical context rather than in the broadest cultural or linguistic terms
Sadoski and Paivio's Dual Coding Theory (1991)	Dual	√	√	√	√	X	X	E&A	A theory of general cognition Links to theory of memory	Influenced the use of imagery in the text Metacognitive comprehension strategies impact on RC ability	Assumes words and images are the only way we remember things.
Balance Model of Reading by Robertson and Bakker (2002)	Neurological	√	√	X	X	X	X	E&A	Brain development. Emphasis upon bottom-up components	Children need to understand perceptual features of text and syntactic rules. Links use of images and text interpretations	This type of neurologically based research to inform classroom practices is in its infancy.
Mathewson Attitude-Influence Model (2004)	Attitude-Influence	X	X	√	√	X	√	E&A	Theories of motivation, self-efficacy and personal construct theory	Fostering a positive attitude to a breadth of reading materials. Use minimal external incentives to read. Use of materials that stimulate individual's ideas and feelings, thereby increasing readiness for reading. Taught strategies needed for successful reading.	Reading environment and Teachers affective state not acknowledged. Lacks detail of underpinning processes

Ruddell and Unrau's Sociocognitive Model (2004)	Sociocognitive	X	X	√	√	√	√	CI M	Theories of motivation, self-efficacy and personal construct theory Reading is a negotiation of meaning-construction through bottom-up/top-down processes Vygotskian learning	Activation of reader's prior beliefs, attitudes, values re topic. Purpose for reading Use of metacognitive strategies Awareness of teacher and reader's stance. Understanding of sociocultural values. Sharing authority in meaning negotiation. Encouraging understanding and reflection.	Lacks detail of underpinning processes
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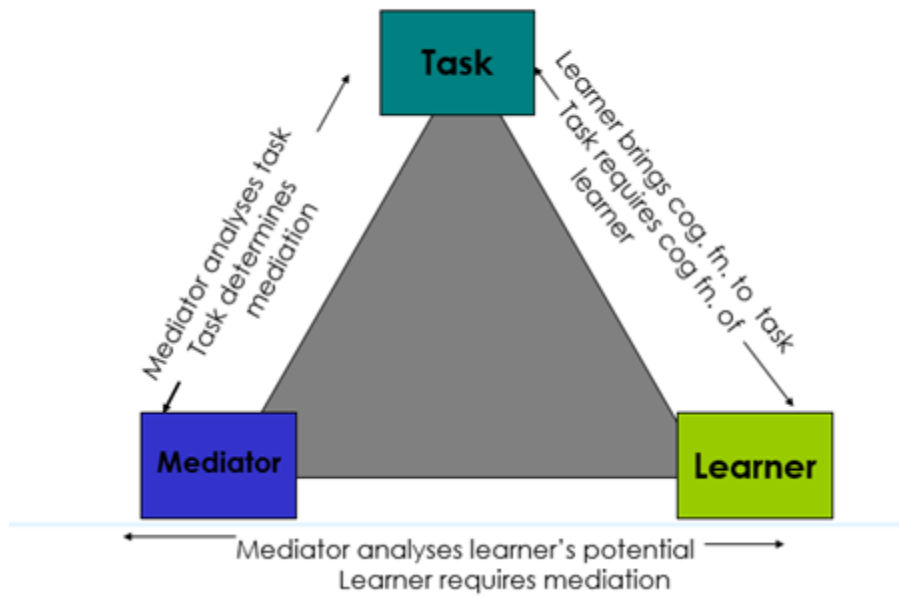
Traditionally many models concentrated only upon a few selected cognitive skills; however, models have increasingly acknowledged more reader attributes in the form of motivation and metacognition (van Kraayenoord & Schneider, 1999) but also the equally important teacher elements and text/classroom properties. These skills include: sensitivity to story structure (Akhondi et al., 2011; Alvermann, 1988; Newby et al., 1989; Spires et al., 1992), making inferences (Currie & Cain, 2015), comprehension monitoring (Armbruster, 2010; Berkeley & Riccomini, 2013; Dabarera et al., 2014; Eme, Puustinen, & Coutelet, 2006; Payne & Manning, 1992) vocabulary (Beck & McKeown, 1983; Lubliner & Smetana, 2005), working memory (Chrysochoou et al., 2011; Swanson & Alexander, 1997), topic knowledge (Armbruster, 2010; Kintsch, 1988), attention (Cain & Bignell, 2014; Diamond, 2013; Topping, 2014) and motivation (Chan, 1994; Mathewson, 2004). Equally important are teacher components including teacher skill (Block, Oakar, & Hurt, 2002; Ruddell & Unrau, 2004; Topping, 2014) and teacher connection (Ketch, 2005; Palincsar & Klenk, 1992; Paris et al., 1983; Paris & Oka, 1986). Furthermore the learning environment (Davies et al., 2013; Palincsar & Herrenkohl, 2002; Ruddell & Unrau, 2004) needs to be considered. Together, these three aspects of learner, teacher and learning environment are highly interactive (Bohn-Gettler & Kendeou, 2014). This is consistent with Shanahan et al's (2010) findings that describe the capacity with which children can comprehend during reading as being linked with decoding skills, vocabulary, breadth of conceptual knowledge, knowledge of RC strategies, thinking and reasoning skills (e.g. analysis of content) as well as motivation to understand and work towards goals.

Many lessons take the same format which has been criticised for not reflecting the growth that learners make over time (Block & Duffy, 2008). Indeed when thinking about reading comprehension there is a need to acknowledge not just the learning package but the classroom environment, the quality of teacher explanations in dynamic transactions and the supporting and scaffolding instruction to the individual child. This leaning triad (see Figure 12 below)

acknowledges the dynamic interplay between teacher, learner and task, which requires teacher's individual skill to modify and adapt their approach based upon situations in an un-prescriptive way (Block & Pressley, 2007; Palincsar & Klenk, 1992). Therefore, teachers' adaptability, flexibility and creativity need to be capitalised upon in order for pupils to fully benefit from reading comprehension instruction. Getting the balance right in supporting and monitoring teachers within an overarching structure without being too dogmatic is the goal; with teachers providing supplementary explanation on an "as necessary" way (Block & Duffy, 2008). Fundamentally the teacher's scaffolding is teaching the child how to become strategic rather than imparting a knowledge of a strategy. When a teacher identifies a pupil who is struggling to answer a reading comprehension question, the answer is to scaffold them in the use of strategies rather than moving on to other pupils who may answer correctly, which often happens too regularly (Duffy, 2004). Therefore learning how to comprehend is a far more complex process than the linear one necessary for developing decoding skills. It requires a flexible approach which relies upon discursive conversations and scaffolding of strategy use (Davies et al., 2013; Palincsar & Klenk, 1992).



## A Tripartite Learning Partnership



**Figure 12. The Tripartite Learning Partnership**

This Chapter leads to seven main conclusions:

1. When selecting a reading programme, the complexity of the different skills required to become a skilled reader should be acknowledged. All the above sub-components throughout instruction including having the learner being ready to engage in the task of reading should be recognised. It should be a truly universal approach without cultural or socioeconomic bias. Indeed, the dynamic of a diverse pupil group enriches the learning environment for all (Dills, 2005).
2. Recognition needs to be given to levels of teacher efficacy in delivering evidence-based reading instruction. They should have the opportunity to learn effective strategies and reflect upon their practice.
3. Care needs to be taken to ensure that the right reading materials, which motivate and sustain attention towards fulfilment of personal learning goals, are available.

4. Reading is developed within social contexts as the cultural influences on reader's expectations develop unique interpretations. Readers thereby construct meaning as individuals through the lens of their culture. Interpretations that perhaps may at first glance be considered incorrect could instead be correct within a different cultural construal.
5. Also, given the variety of skills involved in the reading process it can be concluded that a "one-size-fits-all" reading recovery programme is poor practice. For those readers with specific reading difficulties, an assessment of individual need must be thorough in order to ensure that the correct intervention is identified which supports the development of the reading component(s) that are lacking.
6. While previously it was considered that instruction of reading necessitated only imparting decoding skills (Adams, 1994) it is now widely recognised that reading comprehension Mistretta needs to be explicitly taught (Cain, 2010; NRP, 2000; Pressley, Wharton-Mcdonald, Hampston & Echevarria, 1998).
7. Reading requires behaving metacognitively (Hall, 1989; Şen, 2009). This is being a strategic reader with the ability to control, manipulate, monitor and regulate our cognitive processes in order to pursue our goal of reading - sometimes defined as "thinking about thinking" (Armbruster, 2010; Baker, 1994; Garner, 1987). Therefore, teaching children to think strategically is crucial to successful literacy and as it is linked to cognitive development and social contexts has broader implications for academic success (Paris et al., 1983).

It is clear that reading can be regarded as a highly-complex skill where practice develops automaticity (Ellis et al., 2014). Opportunities for reading are therefore essential. Increasingly researchers are extending understanding of reading comprehension to transcend literal interpretations of text; however, we are still far from taking a completely phenomenological

ontological view which emphasises the importance of the readers reading experience. However, this approach is difficult to incorporate into the structured learning environment of the classroom and perhaps is an area for further investigation.

Many comprehension strategies and intervention packages have been produced to support the teaching of RC. The next chapter will begin with an overview of RC strategy research before considering how these have evolved into programmes of multiple RC strategies. Chapter three will evaluate some of the more well-known packages and consider how implementation considerations impact upon outcomes.

## Chapter 3- Reading comprehension strategies and interventions

Chapter 2 compared and contrasted models of the overarching process of reading and concluded that they had been influential in developing our understanding of the reading process and effective reading instruction. This chapter will consider the effective strategies that enhance reading comprehension, how these have been brought together into multiple comprehension strategy instruction (MSCI) approaches packages and the effectiveness of some of these packages before aligning them with models of reading. Discussion around implementation issues will then take place.

### 3.1 Reading comprehension instruction

The importance of teaching reading comprehension strategies was not generally acknowledged until Durkin (1978) undertook classroom observations illustrating that, while reading comprehension was assessed, there was no evidence of its tuition. This led to an increase in RC research, which confirmed that little RC instruction took place (especially metacognitive RC instruction) (Eme, Puustinen, & Coutelet, 2006). Yet children benefit from explicit instruction (Morrow, Pressley, Smith, & Smith, 1997; Rosenshine, Meister, & Chapman, 1996; Pearson & Gallagher, 1983) especially those with lower reading skills (Brown, Pressley, Van Meter, & Schuder, 1996; Duffy, et al., 1987).

In addition, benefits were recorded for older children and young adults who had previously missed out on RC instruction (Edmonds et al., 2009). Therefore, there was an identified need for reading comprehension interventions that taught appropriate strategies for reading effectively. Yet, teachers needed guidance in how to support children's RC development (Block & Duffy, 2008) and since then the development of optimal approaches have been a goal of researchers and educators. While there has been an increase in programmes targeted towards effective instruction, there continues to be less evidence to suggest they are explicitly taught (Parker & Hurry, 2007).

### 3.1.1 The definition of comprehension strategies

Comprehension strategies can be defined as conscious, planned sets of steps that good readers use to make sense of text or a “routine that represents a specific mental processing action that is part of a complex process executed towards a goal such as understanding what one has read” (McKeown & Isabel, 2009). Reading comprehension strategies can be either cognitive or metacognitive (see 2.2.2).

Early research was concerned with measuring the effectiveness of discrete approaches which confirmed the impact of strategies including; mental imagery and links with the Dual Coding Theory (section 2.4.3) (Baumann, 1984; Gambrell & Jawitz, 1993; Horowitz-Kraus et al., 2013; Pressley, 1976), summarisation (Brown & Day, 1983; Pressley et al., 1989b), structure (Taylor & Beach, 1984) organising data (Gardner, 1986) and story mapping (Idol & Croll, 1987).

Other research has looked at adult readers with no specific training to identify the strategies most likely to be used. For example, McNamara (2004) found that the most likely used strategy was paraphrasing, followed by bridging, while the least likely was prediction. What was also interesting within this study was that different results were found when different types of text were being used, therefore strategy use was not only dependent upon the reader’s ability, consistent with Transactional Theory (2.4.1) and the Sociocognitive Model (2.4.6).

What constitutes as a strategy has altered significantly over time, with 45 strategies being proposed from 1978 until 2000 (Block & Duffy, 2008). However, since 2000 approaches have been combined into only nine strategies (Block & Duffy, 2008). Indeed what constitutes as a strategy or a skill has added complexity to a complex issue (Garner, 1987; Harris et al., 2008).

### 3.1.2 Meta-analyses of reading comprehension research

Given the number of studies analysing the effectiveness of discrete strategy meta-analyses have been undertaken to get a clearer picture of the overarching themes. These have taken various approaches, many being concerned with specific populations (Berkeley, Scruggs, & Mastropieri, 2010; Mastropieri & Scruggs, 1997; Sencibaugh, 2007; Swanson, 1999). One of the first synthesis of comprehension strategies took place in 1988 by (Haller et al., 1988). They reviewed 20 studies which suggested an average effect size (ES<sup>3</sup>) of 0.71 for 26 instructional techniques including self-questioning and raising awareness of textual inconsistency, monitoring and regulation strategies. However, further research was needed to differentiate effectiveness between strategies.

Mastropieri and Scruggs (1997) found that questioning strategies led by the teacher had the greatest impact in promoting reading comprehension, with an ES of 1.33, which had been compared with text enhancement (ES 0.92) and included the use of illustrations, spatial organisations and adjunct aids or skill training and reinforcement (ES 0.62), which included reinforcement, direct instruction or repeated readings strategies. The use of graphics has been further supported in the qualitative research field by Brenna (2013) yet this has been criticised (Jaeger & Wiley, 2014).

Sencibaugh (2007) found 15 studies conducted between 1985 and 2005 which met their criteria of reading comprehension intervention studies for children with an identified learning disability. They categorised their comparison into approaches dependent upon auditory or language strategies or visually dependent strategies, and found that the former was more effective than the latter, with effect sizes being 1.18 compared with 0.94 respectively.

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<sup>3</sup> Standardised effect sizes are being used as this allows all effect sizes to be put on the same scale using Cohen's *d*

However, there is a wide variation in ages and definitions of what constitutes as a LD. Further information on effect sizes of pre and post comparisons and treatment control are not explicit.

Swanson (1999) reviewed 92 studies from 1963-1997 in their meta-analysis on reading instruction with LD children. Cognitive and direct instruction approaches proved to be most effective (ES 1.15) compared with strategy instruction alone (ES 0.98). Furthermore, researcher-designed measures (ES 0.81) showed greater impact than standardised measures (ES 0.45). The most effective strategies include direct questioning, modelling by the teacher, strategy cues and elaboration through the provision of concepts explanations, steps or procedures.

Berkeley, Scruggs and Mastropieri (2010) also undertook a meta-analysis of RC interventions and studies from 1995-2006 for children with LDs including those with dyslexia or those categorised as “reading disabled”. This included 40 studies and it was found that RC instruction had a beneficial impact when measuring with both norm-referenced tests (ES 0.52) and other measures (ES 0.70). This analysis confirms many of the most effective approaches including questioning/strategy instruction (ES 0.75) and text enhancements (ES 0.61). It also highlighted some ineffective approaches including perceptual training (ES 0.08) and modality training (ES 0.14). Importantly, congruent with Parker and Hurry (2007), they highlighted that specialised RC strategy instruction is not generally taking place and that intervention implementation is an area for further research.

The largest literature review of reading practices was conducted by the NRP (2000), comprising 100,000 studies looking at each of the five components of reading; phonemic awareness, phonics, fluency, vocabulary and reading comprehension. While these components were considered separately it is clear from their conclusions below that reading is a complex task requiring interactivity between all five components-the sum of which is greater than its

constituent parts. While the NRP did not undertake a meta-analysis of reading comprehension approaches, (due to the small number of studies), they did conclude that for comprehension to develop the following was true:

- Linking phonemic awareness to letters makes learning more efficient
- Fluency was a factor required for comprehension and learners benefited from guided instruction
- Vocabulary needed to be taught explicitly
- Comprehension needed to be taught explicitly and six strategies were identified as effective:
  - Twenty-two studies explored comprehension monitoring, the ability to recognise when the reader understands the text
  - Ten studies reported upon cooperative learning, i.e. for when readers need to learn to work in groups, listen and understand their peers as they read, and help one another use strategies that promote effective reading comprehension and readers learn to focus and discuss reading materials
  - Reported within 11 studies was the use of graphic and semantic organisers including story maps which externally systematise information, thereby aiding understanding
  - Question-answering strategies were reported by 17 studies to help readers develop skills in answering questions and making inferences
  - Question generation was reported in 27 studies as a strategy for readers to develop their ability to generate questions or inferences



- Summarisation was reported within 18 studies as a strategy to develop reader's understanding of key points within text
- In addition, many of these strategies have also been effectively used in the category of "multiple strategy" or Multiple Comprehension Strategy Instruction (MSCI) where readers and teachers interact over texts. Thirty-eight studies reported upon various ways to coordinate several processes to construct meaning from texts. How instruction of a multiple strategy approach could be employed for the highest impact was an area for further research (Block, 2008).

Block and Pressley (2007) later refined these strategies into four subgroups (similarly to Kintsch and Rawson (2005) (see 2.1). Those are appropriate for:

1. Vocabulary comprehension
2. Paragraph understanding
3. Longer passage reading of 7 or more pages
4. Integration of the self with the wider world

Parallels can be drawn with Kinsch and Rawson's (2005) four-level framework of reading comprehension. Here, Block and Pressley emphasise the need for reading strategies at each level which is also in line with best practice (James-Burdumy, et al., 2009; Shanahan et al., 2010).

While identification of these strategies has been influential, difficulties remain. For example, strategies were defined as a conscious, planned sets of steps that good readers use to make sense of text. However, graphic organisers are perhaps better described as a technique and cooperative learning as a structured format for learning (McKeown & Isabel, 2009). Furthermore, as noted in section 2.2.2.1 comprehension monitoring is a complex term that

perhaps merits greater consideration than a single strategy, which can include self-questioning and awareness of textual inconsistencies (Haller et al., 1988; Wagoner, 1983).

Another issue is that approaches developed to support strategies e.g. summarisation, have been varied across studies (McKeown & Isabel, 2009). Clarity of each strategy is needed before questions can be asked regarding which of their components make them so useful, e.g. is summarisation useful because, as Anderson and Thiede (2008) suggest, it allows accurate monitoring of learning thereby inducing metacognitive knowledge?

As can be seen, over time these individual strategies have been amalgamated into various different manifestations taking MSCI approach (NRP, 2000) which are now generally regarded as more effective than the use of individual approaches (Gersten, Fuchs, Williams, & Baker, 2001; NRP, 2000; Rosenshine & Meister, 1994). Furthermore, these multiple strategies are especially effective “where teachers and pupils interact over texts” (NRP, 2000).

Many interventions have blended these aspects into approaches that develop children’s reading comprehension. The inclusion criteria was as follows:

- Studies are of sufficient sample size to determine a reliable effect size
- The MSCI approach must take a universal approach
- The approach must have multiple strategies
- Other interventions which have been identified as beneficial for improving reading comprehension include BRP Durham, Phono-Graphix, ARROWS and paired reading (Brookes, 2013), although comprehension is not the main or only focus of the intervention and therefore are not included in this thesis.

Some are highly branded into widely established approaches including Reciprocal Teaching (RT), Informed Strategies for Learning (ISL), Think-Aloud Instruction (TAI), Collaborative

Strategic Reading (CSR), Transactional Strategies Instruction (TSI), Peer-Assisted Learning Strategies (PALS), Concept-Oriented Reading Instruction (CORI) and Strathclyde Higher Order Thinking Skills (SHORS). These will each be evaluated before comparisons made.

### 3.2. Examples of Evidence Based Approaches to improving RC Skills of Primary School Aged Pupils

#### 3.2.1 Reciprocal Teaching (RT)

Reciprocal Teaching is one of the most influential of the MSCI RC approaches and was developed by Palincsar, Brown, & Martin, (1987). Children are taught to use four strategies; predicting, clarifying, questioning and summarising, through a process which encourages them to become more aware when comprehension has broken down and thereby employ active strategies to “debug” and regain text meaning. Founded upon Vygotskian principles, it is concerned with scaffolding children within the zone of proximal development Vygotsky (1930-1934/1978) and has greatly influenced the development of RC interventions (Ahmadi, & Gilakjani, 2012).

In general, reading lesson scaffolding is generally seen to support decoding while its use in RC instruction is less evident (Clark & Graves, 2005) yet RT has enabled the importance of scaffolding to be emphasised across reading. An example of this scaffolding in RT is via the use of audio-books for children with poor decoding skills. This allows developing readers to focus upon the development of RC (Le Fevre, Moore, & Wilkinson, 2003).

Rosenshine and Meister (1994) undertook a review of 16 RT studies and found they had a median effect size of 0.32 when standardised assessment had been used and an effect size of 0.88 when experimenter-developed assessment had been used. For populations of lower ability only one of the five studies using standardised tests offered statistically significant results indicating non-universality of the RT approach when measured with standardised instruments.

However, the quality of teacher dialogue which is crucial to RT success was not measured and further research continues e.g. assessing which teacher and peer group dynamics are the most effective (Spörer, Brunstein, & Kieschke, 2009).

These findings were reiterated by Davis's (2010) meta-analysis of reading comprehension strategy instruction approaches, which included 19 studies and reported an effect size of 0.31.

In Brooke's more recent (2013) synthesis of RC research, RT evidenced an impact on reading accuracy and a greater impact on comprehension. However, this was for a small sample (N=88) with no comparison group therefore no effect size could be reliably calculated.

Unfortunately, however, as an approach, RT can be difficult to implement (Greenway, 2002) and has variable impact depending upon the proficiency of readers (Harrison, 2004). There is a large commitment required by staff who must feel confident with the approach in order for it to be successful (Greenway, 2002). Also, RT has been criticised for failing to link cognitive theory to the approach (Sadoski, 2008).

### 3.2.2 Informed Strategies for Learning (ISL)

Devised by Paris, et al., (1984) this approach was designed to increase metacognitive awareness. It provided various strategies to children aimed to enhance RC and comprehension monitoring. The programme takes the form of modules in line with a curriculum structure with less focus upon teacher instruction than RT. It has been extended for those with learning disabilities (Rottman & Cross, 1990) and emphasises the goal of reading and how explicit knowledge and use of strategies can be best used to fulfil these goals. Typical strategies include: activating prior knowledge, visualising, drawing inferences, summarising and monitoring.

In the original study, although improvements were recorded no statistically significant impact was generated when comparing pre and post-test standardised scores. In Davis's (2010) meta-

analysis three studies were found which take this approach. Of these the effect sizes were estimated at 0.81 when standardised tests were used, compared with 1.30 ES when non-standardised tests were used. However, the training and implementation necessary for ISL is quite significant and as yet all the results should be interpreted with caution, given the small sample sizes. Furthermore, there is no evidence which suggests this approach is equitable across children with varying abilities.

### 3.2.3 Think-Aloud Instruction (TAI)

Think-Aloud has not traditionally been regarded as a MSCI programme however Davis (2010) argues that they clearly illustrate multiple approaches and therefore should be classified as such. Bereiter and Bird (1985) were the first to use this approach which was previously associated with problem-solving in reading. Thinking aloud has been a method of measuring on-line thinking skills. However, this has been criticised as it measures a reading process which is no longer authentic (Bereiter & Bird, 1985; Garner, 1987). This is because it slows down the process of online reading.

Bereiter and Bird (1985) showed that thinking aloud combined with strategy modelling and practice outperformed controls in Grade 7-8 pupils. Davis's (2010) meta-analysis yielded four such studies with effect sizes estimated at 0.37 impact when standardised tests were used compared with 0.47 ES when non-standardised tests used. Furthermore, this approach was equally beneficial to students with varying skills in reading however as before results should be treated with caution due to low sample sizes. This approach has been especially beneficial to second-language learners (McKeown & Gentilucci, 2007) and has been influential in beginning a wave of RC instruction through conversation and interaction (Kucan & Beck, 1997).

### 3.2.4 Collaborative Strategic Reading (CSR)

This MSCI approach emphasises peer collaboration, but has been inspired by RT and Transactional Strategy Instruction (TSI, outlined below) (Klingner & Vaughn, 2000; Klingner, Vaughn, & Schumm, 1998; Vaughn et al., 2011). It was developed with peer mediation opportunities to practice RC and to support English language learners (Vaughn, Klingner, & Bryant, 2001). Four strategies are advocated for, previewing, predicting, “click and clunk” (recognising difficult words) and a “wrap-up” procedure to develop summarising skills. These are first modelled by the teacher before use within the peer collaborative setting. Measured using standardised instruments of RC, estimated effect sizes are in the region of 0.28, yet small sample sizes have produced results that are potentially unreliable (Davis, 2010). Discussion around CSR indicates that as with all collaborative learning processes, teachers need to feel confident in their skills to implement the system effectively and ensure all students benefit. This, therefore requires a potentially lengthy and detailed implementation plan (Palincsar & Herrenkohl, 2002) and the long term impact of this approach is unclear (Demachkie & Oweini, 2011).

### 3.2.5 Peer-Assisted Learning Strategies (PALS)

Within the PALS process, children model three tasks: partner reading and retelling, paragraph shrinking and prediction relay. Then groups of same aged, mixed-ability children work together collaboratively to complete similar tasks (Fuchs, Fuchs, Mathes, & Simmons, 1997). While similar to RT it is more highly structured and requires lengthy teacher training. Effect sizes for PALS are estimated at 0.43 when using standardised tests and 0.36 when measured using non-standardised tests (Davis 2010). Furthermore, while the programme benefits children with varied abilities, it is quite intensive both in terms of time and cost (Calhoon, 2005).

### 3.2.6 Concept-Oriented Reading Instruction (CORI)

CORI uses a blended framework of modelling direct explanation and independent practice to develop RC with typical strategies, to include: activating prior knowledge, summarising, questioning and text structure. However, it is different to other approaches as there is a far greater emphasis upon motivation for reading and student choice of reading materials using both narrative and expository texts (Guthrie et al., 2004). Reading motivation research has indicated that quality texts, student choice and collaborative discussion are effective at raising reading comprehension achievement (Wigfield & Wentzel, 2007) and these are core concepts within CORI. Furthermore, it focuses heavily upon text analysis and evaluation as learners work towards their learning goals (Guthrie et al., 1996).

Effect sizes are estimated at 0.62 when using standardised measures and 0.71 for non-standardised measures (Davis 2010) and increased motivation has effect sizes of 0.98 (Guthrie et al., 2004). However, as with other approaches, the study populations were small and therefore the results should be treated with caution.

### 3.2.7 Transactional Strategies Instruction (TSI)

TSI is so called because the approach is concerned with the teacher/pupil interactions at play within learning (El-Dinary, 2002). The authors of this approach emphasise the cognitive/metacognitive distinction between creating “strategy generators” instead of “replicators” (Anderson & Roit, 1993). Typical strategies of this approach are: activating prior knowledge, questioning, predicting, visualising, monitoring, text structure, summarising, clarifying and goal setting.

Consistent with mediated learning experience (MLE) (Feuerstein, Klein, & Tannenbaum, 1991) and the zone of proximal development (ZPD)(Vygotsky, 1930-1934/1978) importance is placed upon the “transactions,” i.e. the interplay between the adult and child interactions. The teacher models their thinking processes while using RC prompts to promote effective use

of RC strategies while children are encouraged to use the approaches with increasing independence, although effective scaffolded support is available when required (Pressley, El-Dinary, Gaskins, Schuder, Bergman, Almasi, & Brown., 1992). The process occurs over a large time period, starting with a few strategies before new ones are introduced.

This approach has few studies and therefore the gains seen must be treated with caution, however, it takes a similar approach to the robust evidence-based RT with its importance placed on the teacher-child dialogue. Davis's (2010) meta-analysis, which incorporated only 2 studies, showed the effect size using standardised measures being 0.67 and 2.13 using researcher developed RC measures. However, this approach has been criticised as it is difficult to ensure the optimal quality of teacher-pupil dialogue necessary for successful implementation into mainstream classes. Furthermore, the approach has been criticised given its structure could interfere with the enjoyment of reading (Ferro-Almeida, 1993).

### 3.2.8 Strathclyde Higher Order Reading Skills Programme (SHORS)

The SHORS programme has its roots in two studies: James-Burdumy et. al., (2010) and Shanahan et al., (2010) which fed into a smaller Scottish study (McCartney, Boyle & Ellis, 2015) James-Burdumy et. al., (2010) was a large-scale study by the US, Department of Education to assess which of four supplementary reading comprehension curricula interventions proved to have the largest impact. It took place across 10 American districts and included over 200 schools and 10,000 Grade 5 children across 2 school years. These were (1) Project CRISS (Santa, Havens & Valdes, 2004) (2) ReadAbout, developed by Scholastic (Feldman & Kinsella, 2005), (3) Read for Real, developed by Chapman University and Zaner-Bloser (Crawford, Martin & Philbin, 2005), and (4) Reading for Knowledge, developed by the Success for All Foundation (Madden & Crenson 2006). They measured children's reading comprehension ability, teacher questionnaires, and did classroom observations to evaluate both interventions and their implementation. Results showed none of the curricula interventions had



a significantly positive impact on student outcomes. Furthermore, Reading for Knowledge (Madden & Crenson 2006) appeared to have a statistically significant negative impact. However, this study design, which used Expository Reading Comprehension (ERC) observation forms for all interventions plus individual intervention specific implementation observations were all analysed. This indicated which aspects of all interventions had the largest statistically significant positive impact and highlighted:

- Explicit RC instruction
- Teachers' management and responsiveness
- Student engagement.

The Shanahan et al., (2010) study looked at the research around evidence based approaches to teaching reading comprehension to young children from kindergarten (Primary 1) to Grade 3 (Primary 5). Of the 812 studies on reading comprehension 27 met their criteria for selection based upon the quality of evidence. From this five recommendations were made as follows:

- Strong evidence suggested teachers teach students how to use reading comprehension strategies. This can be by way of individual strategies or a combination of research based strategies. The teacher, having autonomy, increases responsibility of strategy use ever towards the developing reader. Effective strategies were considered to be: activating prior knowledge, questioning, visualizing, monitoring clarifying and fixing-up, drawing inferences and summarising/retelling
- Moderate evidence suggested that teachers teach students to identify and use the text's organisational structure to comprehend, learn, and remember content. Here, provision of instruction around common structures and links between texts is promoted

- Minimal evidence suggested teachers guide students through focused, high-quality discussion on the meaning of text. Here, a dialogue of questions and answers are promoted to develop deeper understanding of texts
- Minimal evidence suggested teachers select texts purposefully to support comprehension development. Here, rich, high-quality multiple genres are appropriate
- Moderate evidence suggested teachers establish an engaging and motivating context in which to teach reading comprehension. Here giving students a choice of reading material, collaborative discussion opportunities and support to allow them see the benefit of reading and see themselves as a successful reader.

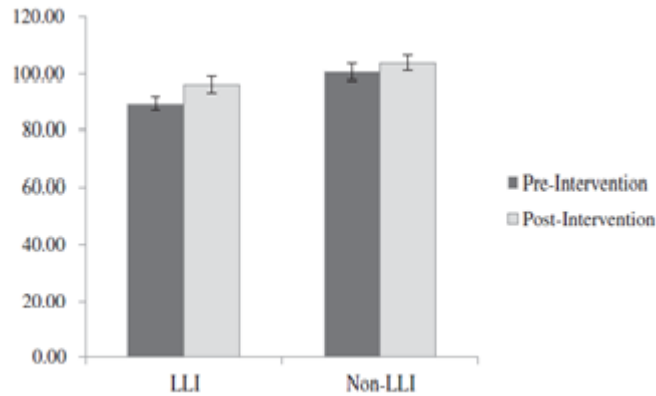
Indeed, Shanahan et al., (2010) recognises that there is insufficient evidence to wholly invest in one of these five approaches to the exclusion of everything else. Therefore, they recommend a far more flexible approach which, when used, can be far easier to implement (Boyle, McCartney, O' Hare, & Law, 2010).

The intervention used in the McCartney, et al., (2015) study took these factors, which showed that they had an impact upon reading outcomes and designed the intervention around these aspects. The approach encourages a shift in practice; instead of new curriculums or prescriptive lesson plans, SHORS is a methodology that allows teachers to blend the approach with their teaching resources in whole class and group settings.

McCartney, et al., (2015) facilitated the training of teachers where they are encouraged to discuss and share what this might look like for them within the classroom. This involvement creates ownership and potentially increased effectiveness (Kelly & Perkins, 2012).

Interestingly, the McCartney, et al., (2015) study also compared the progress of LLI and non-LLI pupils and found that over a year their reading comprehension abilities improved with

similar rapidity. Figure 13 below compares pre and post test results from each of the intervention groups (LLI and non-LLI) and shows comparable levels of impact. This intervention therefore meets the need within the authority to have an equitable intervention.



**Figure 13 Universal findings of McCartney et al., (2015)**

This flexible method has been recommended in very early years settings (Shanahan et al., 2010) and for older children (James-Burdumy et al., 2009) to good effect. Furthermore McCartney, et al., (2015) showed:

- An effect size of 0.46 using standardised measures
- Universality as the intervention had equal impact for children with language learning impairment (LLI) as well as general populations
- Indicated ease of implementation within the Scottish context.

However, their study had no control and is therefore an area for further research.

### 3.3 Comparison of RC intervention approaches and their links to theoretical models of reading comprehension

Research within the field of reading comprehension has developed a large number of models aiming to develop our understanding and with this the types of learning opportunities that may

be needed to support reading development. Therefore to bring together research on reading models and MSCI programmes a matrix was created which can be seen in Table 2 below. Each model of whole word reading's main criteria has been cross referenced with the MSCI strategies discussed. The elements of the model concerned with decoding aspects of reading were omitted, given that some packages supported decoding to some extent while others were wholly to address RC, yet this study is focused upon the latter.

**Table 2 Matrix of Reading comprehension components and Reading Comprehension instruction programmes**

Model implications for instruction	Model of reading		The Leading Edge Strategy Model (J. Miller & Kintsch, 1980) and Prediction Semantics model (Turner, Britton, Andrassen, & McCutchen, 1996)	Adams Model of connections between reading and writing (1990)	Perfetti et al., Model of reading (2005)			
	Vocabulary needs explicitly taught,	importance of focused attention during reading,						
	Link of reading comprehension with working memory	Opportunities for reading necessary	Reading promotes literacy.	Importance of inference making,	Importance of topic general knowledge.	Supports to monitor comprehension		
<b>Reciprocal Teaching (Palincsar, Brown, &amp; Martin, 1987)</b>	Not mentioned	√	Not mentioned	√	Not mentioned	√	Not mentioned	√
<b>Informed Strategies for Learning (Paris et al., 1984)</b>	Not mentioned	√	√	Implied	Not mentioned	√	Not mentioned	√
<b>Think-Aloud Instruction Bereiter and Bird (1985)</b>	Not mentioned	√	Not mentioned	Implied	Not mentioned	√	√	√
<b>Collaborative Strategic Reading Vaughn, Klingner, Bryant, (2001)</b>	Not mentioned	Not mentioned	Not mentioned	Implied	Not mentioned	√	√	√
<b>Peer-Assisted Learning Strategies (Fuchs, Fuchs, Mathes, &amp; Simmons, 1997)</b>	Not mentioned	Not mentioned	Not mentioned	√	√	Not mentioned	Not mentioned	√
<b>Concept-Oriented Reading Instruction (Guthrie et al., 2004)</b>	√	Not mentioned	Not mentioned	Implied	Not mentioned	√	√	√
<b>Transactional Strategies Instruction (El-Dinary, 2002)</b>	√	√	Not mentioned	Implied	Not mentioned	√	Not mentioned	√
<b>Strathclyde Higher Order Reading Skill Programme (McCartney et al., 2015)</b>	√	√	√	√	Not mentioned	√	√	√

Model implications for instruction	Model of reading Rosenblatt's Transactional Theory (1978)				Anderson and Pearson's Schema Theory (1984)			Sadoski and Paivio's Dual Coding Theory (1991)	
	Acknowledged differences between fiction and non-fiction	reading Importance of readers goals	Creativity encouraged avoiding prescriptive pre-packaged curricular	Instructor as facilitator	Importance of text structure.	Importance of culturally aware classroom.	Importance of prior knowledge to scaffold our hypothesis and general RC	Influenced the use of imagery in text	Metacognitive comprehension strategies impact on RC ability
<b>Reciprocal Teaching (Palincsar, Brown, &amp; Martin, 1987)</b>	Not mentioned	Not explicit	Not mentioned	√	Not mentioned	Not mentioned	√	Not mentioned	√
<b>Informed Strategies for Learning (Paris et al., 1984)</b>	Not mentioned	√	Not mentioned	Not mentioned	Not mentioned	Not mentioned	√	Not mentioned	√
<b>Think-Aloud Instruction Bereiter and Bird (1985)</b>	Not mentioned	Not mentioned	Not mentioned	Not mentioned	Not mentioned	Not mentioned	√	No	√
<b>Collaborative Strategic Reading Vaughn, Klingner, Bryant, 2001</b>	Not mentioned	Not mentioned	Not mentioned	√	Not mentioned	Not mentioned	√	Not mentioned	√
<b>Peer-Assisted Learning Strategies (Fuchs, Fuchs, Mathes, &amp; Simmons, 1997)</b>	Not mentioned	Not mentioned	Not mentioned	Peer support	Not mentioned	Not mentioned	Not mentioned	Not mentioned	√
<b>Concept-Oriented Reading Instruction (Guthrie et al., 2004)</b>	√	√	To some extent (subcategory reading choices)	√	Not mentioned	Not mentioned	√	√	√
<b>Transactional Strategies Instruction (El-Dinary, 2002)</b>	√	Lesson goals not reader goals	√	√	√	√	Not mentioned	√	√
<b>Strathclyde Higher Order Reading Skill Programme (McCartney et al., 2015)</b>	√	√	√	√	Not mentioned	√	√	√	√

Model of reading											
Model implications for instruction	Mathewson Attitude-Influence Model (2004)				Ruddell and Unrau's Sociocognitive Model (2004)						
	Fostering a positive attitude to a breath of reading materials.	Use minimal external incentives to read.	Use of materials that stimulate individual's ideas and feelings thereby increasing readiness for reading.	Taught strategies needed for successful reading.	Quality relationship between teacher and pupil	Purpose for reading	Awareness of reader stance re topic.	Understanding of sociocultural values.	Sharing authority in meaning negotiation.	Encouraging understanding and reflection.	
<b>Reciprocal Teaching (Palincsar, Brown, &amp; Martin, 1987)</b>	Not mentioned	Not mentioned	√	√	Not mentioned	√	Not mentioned	Not mentioned	Not mentioned	√	
<b>Informed Strategies for Learning (Paris et al., 1984)</b>	Not mentioned	Not mentioned	√	√	Not mentioned	√	Not mentioned	Not mentioned	Not mentioned	√	
<b>Think-Aloud Instruction Bereiter and Bird (1985)</b>	Not mentioned	Not mentioned	√	√	Not mentioned	√	√	Not mentioned	Not mentioned	Not mentioned	
<b>collaborative Strategic Reading Vaughn, Klingner, Bryant, 2001</b>	Not mentioned	Not mentioned	√	√	Implied-not explicit	√	√	Not mentioned	Not mentioned	√	
<b>Peer-Assisted Learning Strategies (Fuchs, Fuchs, Mathes, &amp; Simmons, 1997)</b>	Not mentioned	Not mentioned	No	√	Not mentioned	Not mentioned	Not mentioned	Not mentioned	Not mentioned	√	
<b>Concept-Oriented Reading Instruction (Guthrie et al., 2004)</b>	Restricted breath	√	Implied	√	Not mentioned	Not mentioned	Not mentioned	Not mentioned	√	√	
<b>Transactional Strategies Instruction (El-Dinary, 2002)</b>	√	√	√	√	Implied	√	Implied	Not mentioned	√	√	
<b>Strathclyde Higher Order Reading Skill Proramme (McCartney et al., 2015)</b>	√	√	√	√	√	√	√	√	√	√	

As can be seen, the variation of reading models means no one package is in line with all models. Indeed some approaches do not necessarily come from the same theoretical stance. Furthermore many packages are not explicit in justifying their rationale for programme components. In addition, some key elements of good instruction are implied within programmes but are not explicit. For example, it is implied that children have sufficient time to read and practice their skills. Furthermore, some models, e.g. RT, have evolved and therefore no longer evidence-based even although research previously proved its foundations to be effective. It is possible to get an MSCI package which when its context is transferred, some elements of its implementation are different to how it was initially. However, it is reassuring to see that in the main, MSCI packages are generally consistent with theory.

A comparison of the different MSCI reading comprehension interventions was then undertaken on the basis of:

- Potential effectiveness as the approach with the biggest impact is desirable
- Ease of implementation as this is critical to success
- Universality as it is the desire of the authority to raise standards for all
- Accessibility as there are a variety of resources currently within the authority, an approach which puts these to use without the need for further investment is preferable.

Each of the approaches was then ranked by assigning a quantitative score on the basis of the MSCI's descriptions given within the previous literature review. This can be seen in Table 3 below.



**Table 3 Comparison of MSCI interventions**

<i>MSCI</i>	<i>Potential Effectiveness</i>	<i>Implementation ease</i>	<i>Universality</i>	<i>Accessibility</i>	<i>No. of ticks</i>
<i>Reciprocal Teaching</i>	√√√	√	√	√√√	8
<i>Informed Strategies for Learning</i>	√√√	√	?	-	4
<i>Think-Aloud Instruction</i>	√√	?	√√	?	5
<i>Collaborative Strategic Reading</i>	√	√	√	√	4
<i>Peer-Assisted Learning Strategies</i>	√√	√	√√	√	6
<i>Concept-Oriented Reading Instruction</i>	√√	√	?	√	4
<i>Transactional Strategies Instruction</i>	√√	√	√	√√	6
<i>Strathclyde Higher Order Reading Skills Approach</i>	√√	√√√	√√	√√√	10

However, as can be seen, the SHORS approach as described in section 3.2.8 is best at meeting these criteria. However, it lacks a control study and therefore is an area for further research. Within the education environment, care needs taken to ensure that it is implemented with due care that ensures the fundamental components of the intervention are adhered to with fidelity.

### 3.4 The process of Reading Interventions: Insights from Implementation Science

Within recent years, economic forces have dictated the need for interventions to be effective and economical. This necessitates assurances that money is not wasted on programmes that do not improve outcome. Hopefully, before adopting any new approach, checks have ensured that it has been rigorously evaluated and proven to be beneficial. However, often in schools these apparently effective approaches prove to be ineffective in practice and are cast aside in favour of more fashionable products or procedures. Advocates of implementation science were pioneers in asking questions about why it could be that an apparently robustly evaluated intervention could be ineffective at bringing about positive change. Indeed, reading comprehension interventions need implementations to be planned and feasibility checked before theory can be put into practice within schools (McMaster et al., 2015).

Implementation science is the study of how evidence-based programmes can transfer into organisations (of various disciplines) successfully (Kelly & Perkins, 2012). Research has studied the failure of evidence-based programmes across contexts, including within the education system. This had unpicked some of the key elements that make a difference to the effective translation of theory into practice (Fixsen, Blase, Timbers, & Wolf, 2007). These investigations consider how new programmes can become integrated effectively in everyday procedures and ensure sustainability.

With every new programme, there will be a change to the systems and processes previously adhered to. Change is not generally embraced therefore a key factor in implementation success is the creation of optimal conditions that allow people to become ready for change (Kelly & Perkins, 2012). Key to every new initiative is not only a rigorous evaluation of programme impact but also an equally stringent appraisal of its implementation (Kelly & Perkins, 2012).

An **intervention** is defined as “a specified set of activities designed to put into practice an activity of known dimensions” (Fixsen et al., 2005). Fixsen et al., (2005) also define an intervention as being **effective** and more likely to be sustainable when it is taken on board with **fidelity**. Implementation with fidelity means that the programme is adopted in line with the research base and has the same content, coverage, frequency and duration as was designed (Carroll et al., 2007). The components which are core to the design of an intervention should be adopted with fidelity otherwise it will fail to have the sustainable impact that the previous programme evaluation indicated (Fixsen et al, 2005).

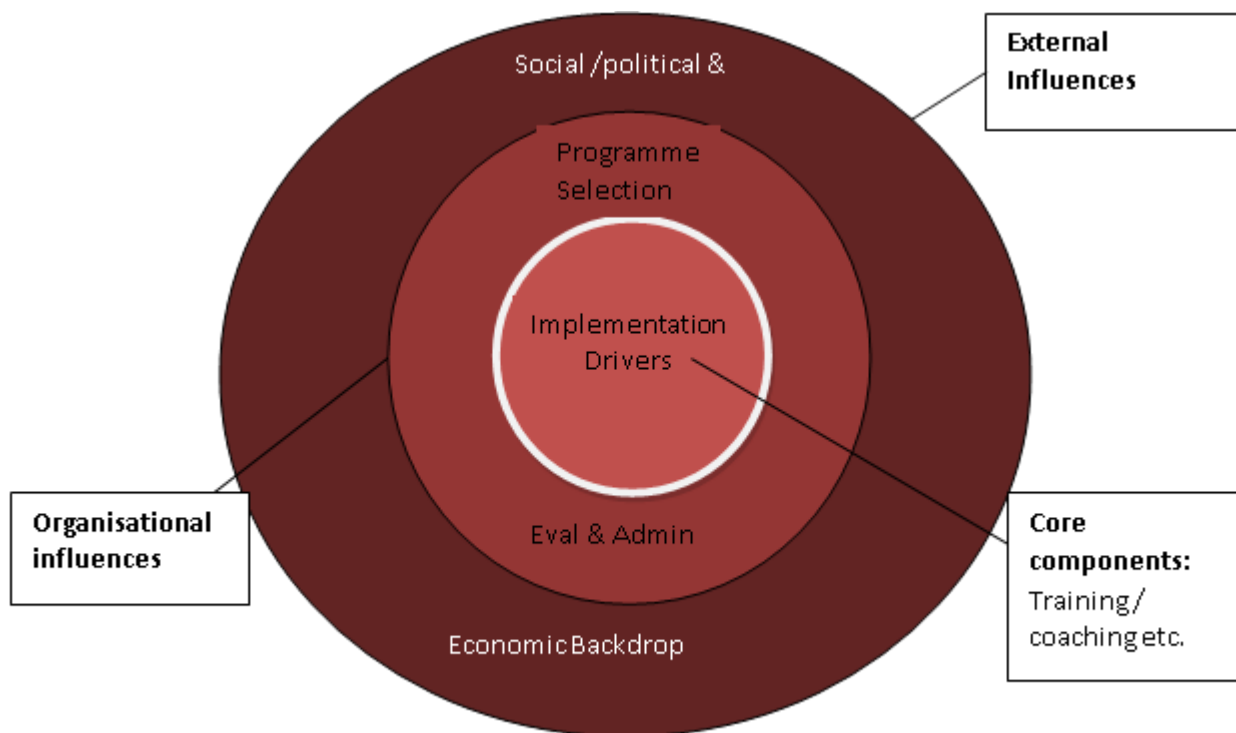
### 3.4.1 Theory of Implementation Science

Michie, Fixsen, Grimshaw, & Eccles, (2009) studied personal readiness for change and found that this relied upon the individual having the capability, opportunity and motivation for change. Given the number of people and the systems involved in organisational change, this is complex. Critical to the success of change is the support to ensure the individual feels committed and confident in being able to be part of change (Armenakis, 1993; Weiner, 2009). Even the most evidence-based programmes can be ineffective if implemented poorly, and in so doing money, time and resources are wasted on low-impact, large-scale projects.

Organisations by their nature have a variety of multifaceted levels and structures within which there is an interplay of influences. Efforts have been made to try to employ frameworks to support change within the complex establishments. One early approach has been described by Lewin (1951), who adopted a three-stage model. The first is getting people motivated and ready for change. The second is the transition process and the beginnings of changing practice. The final stage involves the embedding of new ideas into everyday procedures. Subsequent models have built up these ideas to different degrees, providing various implementation science models for practice.

Senge (2006) states: “We tend to focus on snapshots of isolated parts of the system and wonder why our deepest problem never seems to get solved.” In line with the constructionist model and ecological systems theory (Bronfenbrenner, 2009), implementation science addresses the whole system which is an organisation. It acknowledges both the organisation’s complexity within community, cultural, social and political influences and takes a systematic and planned approach to change.

As Figure 14 below illustrates, in order for an intervention to be successful, its internal components need to be compatible with wider organisational and external influences. Furthermore, it is essential that all agencies work together collaboratively to ensure that organisations are consistently functioning across these different systems.



**Figure 14 Internal components and external influences for consideration in implementation**

An individual’s readiness to adopt the change is influenced by group dynamics and leadership. This is further influenced by the community, socioeconomic and cultural environments all of

which affect implementation impact. In short, it is not enough to assume an intervention will be effectively implemented; indeed, the choice of intervention is only half of the picture when aiming to bring about positive change.

#### 3.4.1.1. Poor Implementation

Too often, the most current intervention packs get championed by teachers after having heard persuasive marketing as the cure all for school problems, regardless of its evidence base or viability (Slavin, 2002). In addition, many of these are used once and quickly regarded by teachers as ineffective without an evaluation of either the intervention or the implementation. Unfortunately, there is always the risk that an ineffective intervention gets adopted due to successful implementation, while the robustly-evaluated approach is cast aside to poor implementation (Kelly & Perkins, 2012).

The quality of implementation was also found to have a profound impact upon outcomes in Barnett's (1995) analysis of 36 public, empirically-based early childhood programmes. Similar findings were also reported by Greenberg et al., (2005) who concluded that school initiatives required quality implementation of all programme core components; without deviation, for anticipated positive outcomes to be realised. Therefore, in a world of increasing accountability and transparency and a context of socioeconomic deprivation, never before has the evaluation of intervention and implementation been more vital. This ensures cost-effective services that offer the maximum positive impact.

#### 3.4.1.2. Frameworks for practice

Implementation science is not specific to any one discipline and, as such, different models have previously been proposed. Nineteen frameworks were distinguished in Michie, Van Stralen and West's (2011) investigation. This informed their "Behaviour Change Wheel", a framework

for the selection of interventions, and where key factors within change are summarised as being opportunity, capability and motivation.

One of the most important measures when assessing implementation is the degree to which the intervention is employed as was intended (Fixsen et al., 2005). This is especially important given the degree to which teachers can adapt interventions, including reading comprehension interventions (Marks et al., 1993). Carroll et al., (2007) designed a framework to measure fidelity which includes implementation indexes with adherence to content, coverage, frequency and duration and also state moderating influences created by intervention complexity, facilitation strategies, quality of delivery and participant responsiveness. Alternatively, Klimes-Dougan, et al., (2009) have suggested three indexes: exposure, adherence and quality of implementation. This was later developed by Mihalic & Elliott (2015), who also included participant responsiveness and programme differentiation. These five factors can therefore be used to assess implementation.

When planning the design and roll out of an intervention, three phases have been described; pre-adoption, delivery and post-adoption (Greenberg et al., 2005). However, a more elaborate six-stage framework has been described by Fixsen, Naoom, Blase, Friedman, & Wallace, (2005):

- Current situation exploration
- Consideration of change or the installation phase
- Preparation for change or initial implementation phase
- Full implementation, wherein change is being engaged
- Innovation, where after practicing interventions with pure fidelity, subtle adaptations are made to best fit the user

- Maintenance of procedures to ensure sustainability.

Being aware of where you are on the journey to full implementation adds a self-reflection framework that can be invaluable to inform design and planning (Kelly and Perkins, 2012).

One final framework which has successfully been adopted into Scottish Educational Psychology circles is the conceptual Implementation Components Framework, (Fixsen, Blase, Naoom, & Wallace, 2009). This highlights key aspects or drivers that are necessary for successful implementation as they underpin mechanisms that enable sustainability:

- Staff selection
- Pre-service/ INSET Training
- Consultation and coaching
- Staff performance evaluation

Furthermore, drivers required to sustain systems system change at a wider level are:

- Decision support data systems
- Facilitative administrative support
- Systems interventions

Each of these drivers informs how interventions should be designed and evaluated, and will therefore be considered in more detail.

### 3. 4.2 Core components of implementation

#### 3.4.2.1. Staff selection

Selection of the right staff is key to programme success as this can potentially make the difference between a successful or unsuccessful venture. Staff beliefs and values have a huge

impact upon the fidelity with which they implement the intervention. For example Klimes-Dougan's (2009) found that staff personality including; openness, levels of commitment in the face of challenges, breadth of skill, openness and conscientiousness had a larger impact upon fidelity measures than staff's prior knowledge. The staff collaborative working and developing shared understandings of practices also ensure optimal working philosophy (Maher et al., 2009). Furthermore, in the context of literacy, those charged with the task of implementing a reading intervention need to accept it in order for it to be successful (Rich & Pressley, 1990).

While information and designs should be shared with the wider team Fixsen, Blase, Timbers and Wolf (2007) also found that having leaders or organisation champions dedicated to taking new interventions forward offered greater impact. In their study, use of leaders over a three-year period increased implementation success from 14% to 80%. Although this was a small-scale study due to the difficulty in matching comparable conditions in an experimental study these results do highlight the potential impact of the inclusion of the implementation leader approach. It serves to ensure that interventions stay high within priorities and remain undiluted.

#### 3.4.2.2. Pre-service/ INSET Training

When new approaches are being adopted, training is required; yet to ensure that training really meets the attendee's needs, pre-training requirements should be assessed. Training is one of the most effective ways to improve teaching and learning practices and has proved successful in the field of reading instruction (García, Pearson, Taylor, Bauer, & Stahl, 2011). This can most easily be done by offering brief information and conducting a readiness checklist to ensure that participants have been appropriately selected (Kelly and Perkins, 2012). The ethos of the programme should fit alongside the participants' attitudes and feelings, thereby generating motivation for change (Gregson & Sturko, 2007). This also gives trainers the opportunity to ensure training can be targeted to best meet the needs of the group through appropriate differentiation (Trivette, Raab, & Dunst, 2012). The training should be designed to



share ideas and support the move toward positive change that can, in some cases be daunting for individual participants (Griffith & Burns, 2014). Through the process of collaborative discussion, participants have an element of ownership; thereby they can personalise their goals through activities and develop competence and self-efficacy (Deci & Ryan, 2002).

#### 3.4.2.3. Consultation and coaching

There are requirements within education for all practitioners to enhance their performance by engaging in ongoing professional development and this is also critical in ensuring effective RC practices (Slavin, Cheung, Groff, & Lake, 2008). Critical reflection through consultation allows for ongoing professional discussion, which enhances the systematic study of practice. Ongoing consultation allows for problems in implementation to be identified and problem-solving to take place, thereby preventing the intervention from being disbanded due to lack of support (Wagner, 2000). Instead, the embedding of new practices should be supported to become enmeshed into every day procedures. The consultant supports the practitioner to develop their skills in using the intervention as intended and in so doing generates confidence and quality assurance (Wagner, 2000). This coaching allows training to be realized. Joyce and Showers's (2002) meta-analysis of training within education found that only 5% of training translated into practice when coaching was absent, compared with 95% when coaching was accessed. The impact of ongoing support and coaching is considerable, and they should be built into any change design. Blase, Fixsen, Van Dyke, & Duda (2009) also highlighted that handbooks and materials can be very useful in supporting the implementation of practices. Yet, although evidently highly related to impact outcomes Dane and Schneider's (1998) study showed that only 20% of reported interventions had, a coaching network and supportive materials.

#### 3.4.2.4. Staff performance evaluation

Opportunities for staff involved in the change process benefit from the opportunity to discuss progress and reflect upon their practice with their peers. This allows for critical reflection and helps cement the new ideas into practice. Similar to taking part in consultation, peer support allows for early problems to be identified and rectified at an early stage and again prevents new practices from being disbanded (Kelly & Perkins, 2012). While core components of the intervention should be implemented with fidelity, lesser contextual factors which promote implementation can be discussed to ensure that change occurs.

#### 3.4.2.5. Decision support data systems

As the process of implementation occurs rigorous monitoring should take place to ensure sustainability. Information drawn from a variety of sources in a multiple-method approach, including; service user feedback, quality performance indicators and organisational fidelity measures (Fixsen, et al., 2005) serves as valuable information that can be used to inform the process. Ongoing measurement of fidelity supports implementation, and this perhaps could be done using the indexes described by Carroll et al., (2007).

#### 3.4.2.6. Facilitative administrative support

The impact of new approaches in many ways is determined by the level of support and investment provided by the organisation's SMT. The leadership team in driving change forward, sends a clear message to staff about the importance of the procedures. Their support should be evident in a variety of ways by supporting the programme and allowing time for the core components of the new procedures. Systems around interventions also need to be in line so that policies, procedures and administrative systems support newly-adopted interventions.

### 3.4.2.7. Systems interventions

Within the ecological framework, this aspect of implementation highlights the need for the new practices to be in line with wider policies and priorities. As policy highly influences a schools priorities, to be sustainable there cannot be a conflict in approaches.

This section has considered each of the core components which are key aspects for consideration in the design of a new programme for change. Section 3.4.4 will now consider how the impact of evidence based programmes is founded upon the quality and fidelity of the implementation.

### 3.4.3. Towards successful implementation

We have considered the core components that are necessary to implement evidence-based approaches and as discussed, this can have a tremendous impact upon outcomes. Any intervention needs to be both evidence based and implemented with fidelity. Fidelity can be very much reliant upon transparent partnerships and genuine collaboration (Mintra, 2012). The implementation of the “Incredible Years” (IY) programme (Webster- Stratton, 2011) is an excellent example of this, for while rigorously evaluated, its translation into practice has varied considerably in quality.

IY has been adopted by many countries, and while slight adaptations are inevitable to contextual and cultural needs, vigilance is necessary to ensure its core components remain intact (Ringwalt et al., 2003). To aid success, there are recommended intervention guidelines, explicitly stating what aspects are, and are not, flexible within an 8 step implementation process (Webster - Stratton, Reinke, Herman, & Newcomer, 2011).

Jaycox et al., (2006) have also been concerned about fidelity when evaluating three different interventions aimed at reducing dating violence. They highlighted the difficulty in achieving

the balance between flexibility and fidelity, and advocate for core aspects to be clearly identified within the implementation design.

Another study of implementation has been conducted to support the implementation of Promoting Alternative Thinking Strategies (PATHS) (Greenberg & Kusche, 1996) which is an empirically-based, universal programme to support the social and emotional needs of children. Within the educational context Kam, Greenberg, & Walls (2003) confirmed that implementation is a complex process and cited strong school leadership and implementation fidelity as key predictors of impact. The fidelity of the response dose-level of staff commitment and delivery of the programme are core components. Unfortunately, it can often be the case that programmes are implemented successfully in only a fraction of establishments with satisfactory integrity (Kelly & Perkins, 2012). This obviously means that those studies which did not follow rigorous implementation procedures did not maximise time or resources.

#### 3.4.3.1 Challenges to successful implementation

Leadership is essential to effective implementation as they are the driving forces of change. Furthermore, leaders need to be aware of the importance of measuring implementation effectiveness as well as intervention success. A key element of success is ensuring the necessary time for training and support is built into the plan for change within phased implementation phases but most importantly in the early stages to ensure awareness is fully raised and process is invested in. In short, implementation science needs taught, otherwise dynamic new approaches will fail (Axford & Morpeth, 2012).

While, previously, insufficient time has been spent upon implementation factors (Sullivan, Blevins, & Kauth, 2008), there is increasing awareness that designs should incorporate the change management research and acknowledge that full procedural change takes time and support (Fixsen et al., 2009; Ogden et al., 2012). Yet this is an ongoing battle as organisations,

including schools, are under increasing pressure to deliver outcomes over short time frames. Therefore explicit transparency of implementation and its importance needs to be communicated to ensure cost effective allocation of resources across time. Consequently, if an intervention fails due to lack of adherence to implementation, problems will require additional time and resources to meet this need. Therefore, investment in implementation time for overall cost-effectiveness is essential (Topping et al., 2011).

Time constraints can be one of the biggest barriers to fidelity of implementation (Carroll et al., 2007). Therefore, realistic, clear goals need to be discussed and agreed upon to ensure all that occurs is not just a series of poorly implemented programmes (Maher et al., 2009).

An additional challenge for effective implementation is staff turnover as having the right staff involved from the beginning is essential to implementation success. Furthermore, staff who are the most innovative may also be targeted for taking many programmes or approaches, thereby having less time allocated to each intervention. Another consideration potentially could be that as staff are required to take part in collaborative groups or steering meetings, they may perceive added responsibility negatively. This could lead to union involvement and potentially to considerations about remuneration. Therefore, all associated costs, monetary or otherwise need full consideration before setting out upon the change process.

Policies may be in place within organisations that conflict with the new approaches and care should therefore be given to ensure these are regularly reviewed to ensure that the intervention is not undermined.

Although proper implementation is onerous, overall, adherence to its principles leads to more effective and impactful results and should not be underestimated.

#### 3.4.4. Implementation Science and implications within reading instruction

Ideally having an empirical evidence-based approach would be sufficient to bring about positive change. However, this is only half of the picture: recognition of implementation considerations is essential to ensure a sustainable impact is maintained in an effective and cost-effective way is also important. To do this within the Scottish education system the EP can work to empower schools through:

- Collaborative working within schools where there is a true partnership to support ongoing improvement and build a knowledge of the school context (Jaycox, et al, 2006)
- Support the school in the selection of the highest impact intervention which meets the real (and not perceived) need of the school
- Support in the selection of the right staff through tests for readiness
- Support in the implementation within the school context
- Ensure implementation quality by measuring fidelity
- Continue to advance understanding of implementation science through research
- Support LAs in developing implementation standards
- Raise awareness of implementation science to promote effective practice
- For new processes of change create implementation support groups to ensure implementation evaluated and monitored throughout the process (Dane & Schneider, 1998).

It is also important to ensure that with any new initiative staff should not feel overwhelmed by trying to squeeze additional tasks into an already hectic schedule. Time should be available as this ensures that core components will be adhered to. Progress, as ever, should be carefully

monitored and this is only managed through effective working relationships which take a sensitive and flexible approach. Furthermore, an intervention cannot be isolated; it must be regarded within the wider ecological system and those economic, political, social and organisational factors (Sullivan et al., 2008). If these factors are not consistent, implementing any intervention is unlikely to be done with fidelity. The different layers of staff, policies and systems within an organisation should be acknowledged within a multifaceted framework. Furthermore, some staff may be less amenable to change than others and a sensitive approach should be taken to avoid devastating staff morale. Many teachers will perceive that their old methods offer impact, even when the evidence base suggests otherwise and this change will need to be nurtured through effective working in partnership.

Within the context of education schools and educational psychologists are in a prime position to offer support in the selection of both the design and evaluation of intervention, plus the training, coaching, implementation and implementation evaluation. This will continue to support positive change.

### 3.5. Implementation Science, reading comprehension and SHORS within NAC

Implementation science is a universal strategy to ensure programmes make sustainable, positive differences. It acknowledges the systems in place which interact with each other and has the potential to significantly improve outcomes for individuals everywhere. Implementation science needs to be incorporated into the design and evaluation of every school programme to ensure effectiveness and sustainability. There are many challenges evident and players should concentrate on the long-term gain rather than short-term fixes to successfully embrace this approach and invest the necessary funding, support and attention. The EP is in an ideal position to support the education system in using these principles and embrace new opportunities of joint working and cross-sector collaboration. It is therefore necessary that the

implementation of the currently identified literacy intervention also uses this science to inform this study.

While ensuring that the intervention is implemented with fidelity, observation, support and ongoing coaching, it is necessary to ensure that the teacher component is properly observed as it is vital to the programme's success.

The present project focuses on a multiple strand reading comprehension instruction intervention with roots in two large scale studies: the work of James-Burdumy et. al., (2009) with Grade 5 students in the US and that of Shanahan et al. (2010) with Primary 5 pupils in the UK. These strategies and approaches were investigated in Scotland by McCartney et al., (2015) as part of the Strathclyde Higher Order Reading Skills (SHORS) project, but the study design did not incorporate a control group. This project will add to existing literature in the following ways: firstly, it is a controlled study of an innovative approach to reading comprehension to determine the potential of SHORS as an intensive, high-impact, short-term and feasible intervention within primary schools; secondly, it will extend the literature in regard to the effects of self-efficacy, intrinsic motivation, metacognitive knowledge of strategy use and intervention implementation upon reading outcomes; and thirdly, as we have considered implementation science, it will take account of the interactive variables of learner, teacher and learning environment (Bohn-Gettler & Kendeou, 2014), and through measurement of outcomes at each of these levels, will develop our understanding of their relative contributions.

The overarching methodology will be discussed in chapter 4. This project will take the form of a two part study: a pilot and a main study.

- The pilot study informed the main study by determining the feasibility, appropriateness of instrumentation, and to determine the required sample size required for subgroup analysis. This will be referred to as Study 1- Pilot, detailed in chapter 5.



- The main study, informed by the pilot, will be referred to as Study 2- The main study and is detailed in chapter 6 and 7.

### 3.6 Conclusions

Discussion has taken place around reading comprehension and its complexities which have led to a variety of instructional approaches. MSCI approaches have been evaluated against each other on the basis of potential effectiveness, implementation ease, universality and accessibility. One approach has been identified that would merit from additional research and will be the focus of this project. While the intervention needs to be evidence-based so too does its implementation, which has also been discussed. Chapter 4 will detail the overarching methodology for this study.

## Chapter 4: Methodology

### 4.1 Background

There are many areas for further RC research in the UK (Zheng, 2014) and within Scotland (McCartney et al., 2015). Higher order reading skills, that is, reading for meaning or reading comprehension is a particular area of development. Theoretical models for reading outline the complexity involved in the process and the wide range of intervention packages illustrate the difficulty in identifying the right approach. Chapter 3 identified the SHORS approach that has the potential to be effective at increasing RC while still being easy to implement, universally appropriate and accessible to the authority. However, this approach does require additional research with a control to add rigour to the evidence base. This has informed the current study which takes the format of a two part study, encompassing a pilot and a main study.

### 4.2 Aims

The aims of the Pilot Study 1 (Chapter 5) are:

- To investigate the feasibility of implementing a quasi-experimental study with a control group of the SHORS intervention within NAC
- To identify appropriate procedures for recruitment
- To evaluate the effectiveness of measurement tools and implementation support offered to schools
- To determine an intervention effect size to inform the power calculation required to determine the required sample size for Study 2
- To investigate dosage issues and programme duration in the light of the findings of McCartney et al. (2015)

The aims of the principal intervention or main study 2 are:

- Does condition (control or experimental) have differential effects on the children's reading comprehension outcomes?
- Does condition (control or experimental) have differential effects on the children's self-reported use of reading comprehension strategies?
- Does condition (control or experimental) have differential effects on the children's self-efficacy and intrinsic motivation for reading?
- What is the relationship between intrinsic motivation, self-efficacy and self-reported use of reading strategies?
- Would the intervention be more effective as a universal approach for all pupils or as a targeted intervention for pupils with reading difficulties?
- What were the facilitators/barriers to implementing the reading comprehension intervention?
- What were the facilitators/barriers to sustaining the SHORS intervention after the completion of the quasi-experimental study?
- What is the feasibility of capacity building by training teachers to implement the SHORS intervention?

#### 4.3. Study Research Questions and Hypothesis

##### 4.3.1 Pilot Study Research Questions

1. What is the feasibility of implementing a quasi-experimental main study of the SHORS intervention within North Ayrshire?
2. What are the appropriate procedures for participant recruitment for a main study of the SHORS intervention within North Ayrshire?

3. How effective are the measurement tools, currently identified for the main quasi-experimental study of the SHORS intervention within North Ayrshire?
4. How many participants are needed to ensure sufficient statistical power for a quasi-experimental study of the SHORS intervention within North Ayrshire?
5. Will the dosage of an eight weeks SHORS intervention programme be of sufficient duration to facilitate statistical significant impact?

#### 4.3.2 Main Study Research Questions and Hypothesis

Quantitative analysis - Results will be reported in Chapter 6.

1. Does condition (control or experimental) have differential effects on the children's reading comprehension outcomes?

- Hypothesis A – The children within the experimental group will have higher reading comprehension post-intervention scores after controlling for pre-test reading comprehension scores.

- Measure – WIAT-II<sup>UK</sup> (Wechsler Individual Achievement Test – Second Edition) (Wechsler, 2005) reading comprehension sub-scale

2. Would the intervention be more effective as a universal approach for all pupils or as a targeted intervention for pupils with reading difficulties?

- Hypothesis B - Of the children within the experimental condition, there will be no difference between the tertiles' change scores of children of lower, average and higher reading ability and as such the intervention can be described as a universal approach

- Measures – WIAT-II<sup>UK</sup> reading comprehension sub-scale

3. Does condition (control or experimental) have differential effects on the children's decoding of target word rates?

- Hypothesis C - The children within the experimental group will have increased decoding of target word post-intervention scores after controlling for pre-test decoding of target word.
- Measure – WIAT-II<sup>UK</sup> reading comprehension sub-scale target words measure

4. Does condition (control or experimental) have differential effects on the children's fluency rates?

- Hypothesis D - The children within the experimental group will have increased fluency rate post-intervention scores after controlling for pre-test fluency rates.
- Measure – WIAT-II<sup>UK</sup> reading comprehension sub-scale fluency measure

5. Does condition (control or experimental) have differential effects on the children's self-reported use of reading comprehension strategies?

- Hypothesis E – The children within the experimental group will have higher self-reported use of reading comprehension strategies post-intervention scores after controlling for pre-test self-reported use of reading comprehension strategies.
- Measures - Self reported use of strategies

6. Does condition (control or experimental) have differential effects on reading habits; in particular the frequency of children's reading at home?

- Hypothesis F - The children within the experimental group will report an increased amount of time spent reading at home post-intervention scores after controlling for pre-test self-reports of the same

- Measures: Question on reading at home frequency
7. Does condition (control or experimental) have differential effects on reading at home habits; in particular the number of books children reported they read at home?
- Hypothesis G - The children within the experimental group will report an increased amount of books read at home post-intervention scores after controlling for pre-test self-reports of the same
  - Measures: Question on number of books read at home
8. What is the relationship between intrinsic motivation, self-efficacy and self-reported use of reading strategies?
- Hypothesis H- Positive correlations will be observed between the variables of reading comprehension, intrinsic motivation and self-reported use of reading strategies?
  - Measures – WIAT-II<sup>UK</sup> reading comprehension subtest, self-reported use of strategies and Motivation for Reading Questionnaire subtests.

Research questions for qualitative analysis results will be reported in Chapter 7.

9. What were the facilitators/barriers to implementing the reading comprehension intervention?
- Measures: Readiness Questionnaire
  - Fidelity observation
  - Post intervention semi-structured interview
10. What were the facilitators/barriers to sustaining the SHORS intervention after the completion of the quasi-experimental study?
- Measures: Readiness Questionnaire

- Fidelity observation
- Post-intervention semi-structured interview

11. What is the feasibility of capacity building by training teachers to implement the SHORS intervention?

- Measures: Readiness Questionnaire
- Fidelity observation
- Post intervention semi-structured interview
- Teacher survey
- Teacher RCV baseline observation

#### 4.4 Design

The overall design was a mixed-method approach. The pilot was used to inform the main study in this small-scale cohort design study. The quasi-experimental control group design is a between-group comparison with a matched control. Although an experimental approach with randomisation at the individual child level is preferable this was not practical in the educational setting which has naturally occurring groups (classes) and therefore a similarly unbiased quasi-experimental approach was taken. This element of randomisation was at the school level instead of the child level. Yet the fact that unbiased teachers were conducting the intervention, it was hoped, would alleviate any possibility of subversion bias.

Zhang and Tomblin (2003) argue that allocating groups on the basis of pre-test scores on the dependent variable can be problematic in longitudinal research designs, given the tendency for regression to the mean. Internal validity within the pilot was established using small groups with abilities across the spectrum of low/average/high performing children (as determined by

within school curriculum based assessment information and teacher professional judgement,) while external validity would require replication with larger samples (Anderson- Cook, 2005). However, as noted in 6.4.1. pre-intervention New Group Reading Test (NGRT) (Burge et al., 2010) reading comprehension data collected by the LA was used to confirm the equivalence of reading comprehension skills across the participating classes within the main study. This procedure allied to the use of the WIAT-II<sup>UK</sup> as the dependent variable in the main study reduced bias and increased internal validity.

#### 4.5 Epistemology

The underlying epistemology of this project will be the ecological and accountable critical realism approach (Robson, 2011). This ensures a dynamic shared negotiation of meaning by balancing positivism (where logical reasoning interprets all information from observations of facts and pure truths) and relativism (where there is no absolute truth as this meaningful understandings are within the participants) (Robson 2011).

#### 4.6 Ethics

The University Ethical procedures were adhered to throughout this study. Approval from the School of Psychological Sciences and Health's ethics committee was sought and granted. Ethical considerations were taken as follows:

- The researcher ensured that children were not subjected to over-research by ensuring they were not taking part in any other research project
- The researcher (fully disclosed and considered suitable for working with children) was familiar with North Ayrshire Safeguarding and Child Protection procedures and followed them should any child or children disclose anything during the research process that would potentially indicate that the child is in danger
- Children were assigned individual codes so that no details such as full name, date of birth and house number could be used to identify an individual participant



- Data obtained via questionnaire was screened for personal details and anonymised
- Data obtained via questionnaires was screened to ensure any disclosures were reported as per safeguarding guidelines
- When explaining a research project to participants (adults and children), the researcher advised them regarding anonymity and confidentiality which was maintained wherever possible unless it was disclosed that the participant or another child were at risk of harm
- Participants were made aware of their rights to withdraw any time during the project
- Debriefing took place for all participants (adults and children)
- Detailed, but rigid, instructions were given standardisations during pre and post-assessment. This creates the risk of an over-formality, therefore the researcher spent time putting the participant at ease prior to commencing
- To reduce the risk of unfairness, the inclusion of data was carefully considered if there was a possibility of cultural biases (especially concerning tests which include pictures and concepts)
- Children had the option to opt out of the study at any time.

#### 4.7 Recruitment and consent

Methods of recruitment for the investigation are consistent with obtaining active, informed consent from parents and pupils. Information sheets and consent forms stipulated that there was no expectation that participants take part and no inducement (payments, expenses or other incentives) was offered to participants or proposed participants. Recruitment of primary schools was through a letter (Appendix 1a and 1b) distributed to the Head Teachers (HT) of primary schools within North Ayrshire Council.

- Opt-in consent and implementation readiness was gained from the school Senior Management Teams (SMT) and Class Teachers (CT) implementing the programme.

This was gained through discussion and completion of a readiness contract/pre-intervention questionnaire (Appendix 2) and consent form (Appendices 3a,3b,4a and 4b)

- Opt-in consent was sought from parents of the children taking part in the study. This was gained via a parent information and consent sheet sent from and returned to the school (Appendices 5a,5b,6a and 6b)
- Opt-in verbal consent was sought from the children taking part in the study at pre/post-test points. They were assured they could withdraw at any time (Appendix 7).

Opt-in consent is preferable to the University's ethics committee, and as such, the approach that was attempted within the pilot study. Thereafter, school feedback would inform whether this would be a viable approach for the main study.

## 4.8 Methods

### 4.8.1 Participants

The study took place in North Ayrshire where the investigator is employed as an Educational Psychologist. Participants were pupils from primary schools within NAC (2 schools in pilot study 1 and approximately 4-6 schools in the main study 2, depending upon class sizes and informed by the pilot to ensure adequate power for statistical significance). The school selected the specific children to take part in the study however they were requested to involve a cross section of ability children based upon their within school assessment information and professional knowledge.

Study 1 (pilot): N=12 children aged 8-10 from two Primary 5 non composite classes (6 per class).

Study 2 (main study): Although final numbers were to be informed by the pilot, it was anticipated that circa N=100 children aged 8-10 participants were mainstream co-educated Primary 5 pupils of mixed ability from four authority schools. This was based on the minimal score difference which could be detected by the least reliable of the standardised instruments used as primary outcome measures and equated to a Cohen's *d* of 0.74, with a one-tailed test at 5% level of significance and power of 0.8. An attrition of 10% to prevent against fall out rating requires a sample size of 98, rounded up to 100. The unit of randomisation was at the level of the school. Each participating condition was from a separate school to avoid contamination effects. Given the class numbers within the authority, a sample of 100 children equates to approximately 4-6 classes of Primary 5 children who would be required to take part (depending upon class sizes to ensure adequate power). This allows for approximately 2-3 classes (of different schools) of children in the intervention study and 2-3 (classes/schools) for the control. However the final sample size was informed by the pilot and will be discussed in Chapter 6.

To minimise the possibility of a possible recruitment bias participating schools were of the same ranked quartiles (a NAC grouping of schools based upon a series of indicators including free school meals, clothing grants and SIMD data zones) and were randomly assigned to either the experimental (group A) or control conditions (group B).

#### 4.8.2 Materials

Both the control and intervention groups followed the CfE (Scottish Government, 2002) with their access to books and materials being comparable. Both groups were required to have literacy lessons of equal times.

#### 4.7.2.1 Intervention Group

The intervention programme took the form of the McCartney et al.,’s (2015) study which followed Shanahan et al.’s (2010) good practice guide and James-Burdumy et al.,’s (2009) research. It occurred daily in regular classroom literacy sessions in reading curriculum, in whole class, small group or individual activities. The current study requested participant teachers to employ the intervention 4 x 45 minutes per week over 8 weeks or a dose of 32 sessions. A short in-service training session (Appendix 8) was provided to the class teacher/s identified. This was offered also to SMT and classroom assistants to provide opportunities for professional dialogue on the SHORS approach and how it could be more effectively embedded within daily practice.

The intervention highlights text comprehension strategies below and illustrative ‘key messages’ (in italics) were emphasised similarly to McCartney et al., (2015):

- Children would actively engage in reading comprehension by consciously accessing their prior knowledge; *‘Prepare your mind. What is this about?’*
- Children would develop and answer questions about important ideas in the text; *‘Wonder to yourself. Does this seem likely?’*
- Children would visualise what a text means; *‘If this was a film, what would I see?’*
- Children would clarify points of misunderstanding; *‘If I don’t understand, stop, re-read. If I still don’t understand, find the problem word. Does it remind me of other words? If necessary, look it up.’*
- Children would make inferences around the text; *‘How does this relate to what I already know? What was new?’*
- Children would summarise; *‘What do I know so far? What do I need to know?’*
- Children would retell the main points of the text; *‘In my own words, that means . . . .’*

In addition, and again in line with the McCartney et al.,’s (2015) research, the awareness of the use of the strategies was increased with the use of hand gestures when strategies were being used (Courtney & Gleeson, 2010). Use of hand gestures allows young readers to take a more interactive role in reading rather than in previous lesson formats where children read silently before being asked a series of questions about the text (Pressley, et al., 1998). This raised awareness of strategy use and maximises retention of information via a variety of neural processing pathways (Baker, Zeliger-Kandasamy, & DeWyngaert, 2014). Using a series of hand gestures also allows the teacher to see when children are using strategies and shows children how each of these strategies interact with each other (Raphael & Au, 2005). It has also been argued that gestures can give clarity to the teacher in how to better facilitate reading comprehension instruction (Block, Paris, & Whiteley, 2008). Given that a one-off modelled lesson of a reading comprehension strategy is insufficient in systematically using the strategy, the use of hand gestures allows the development of the skill, while teachers can be aware of when and where strategies are/are not being used and can therefore scaffold appropriately. Gardner (1999) summarises this by stating that activity and action are both important for primary children's learning allowing them to transcend the role of passive recipients to become more participatory, whereby recall and learning have a greater lasting impact.

An additional signal was encouraged for when children hear a voice ‘reading aloud’ in their head and post reading reflection was encouraged by asking children how the story could have ended differently (‘crunch points’). Furthermore, the intervention used McCartney et al.’s (2015) targeted approach to develop the vocabulary. Handouts with intervention information and strategies were provided (see Appendix 9 and 10 for examples), as were classroom reminders including a classroom poster (see Appendix 11 for example). Children were also encouraged to use text organisational structures and to be given opportunities to participate in

direct teacher/children discussion. Finally reading texts were to be carefully selected jointly by children and teachers to be of high interest to promote maximum motivational engagement.

After training was given to the teachers and discussion had taken place around the interventions core components, they were asked to sign a pre-intervention questionnaire/contract to ensure readiness to invest in the intervention.

#### 4.4.2.2 Control Group

In the case of the control condition, the teacher(s) and children did not have access to intervention information, additional opportunities for professional dialogue around reading comprehension instruction, SHORS specific information on strategies, videos of exemplar instruction, handouts or classroom reminders/posters. Instead, they continued as per their regular practice in whole class, small group or individual activities, as appropriate. They were also asked to schedule their literacy lessons of equal time as the intervention class (4 x 45 minutes per week over 8 weeks).

### 4.8.3 Measures

#### 4.8.3.1 Reading Comprehension: *WIAT-II<sup>UK</sup> Reading Subtests*

Given the complexity of the reading process (see chapters 2 and 3), it is understandable that measuring the process of reading comprehension is a complex and difficult task. Multiple choice type questions may be sufficient for measuring local understanding of text but higher order understanding with integration to the wider world requires more open ended essay type exploration (Caccamise, Snyder, & Kintsch, 2008). However, while the latter approach may be more informative through daily formative assessment it is open to significant inter-rater reliability variation that renders it impractical for research which generally supports a more traditional approach using standardised measures.

Within reading comprehension studies, there has been disagreement regarding the validity and reliability of measurement tools (Keenan, Betjemann, & Olson, 2008) and therefore this continues to be an area for further research (Block, 2008). This is due to debate around the different cognitive demands that can be placed upon children during such tests e.g. rapid naming, phonological processing, orthographic processing, fluency, vocabulary, and working memory (Bowyer-Crane & Snowling, 2005; Kendeou, Papadopoulos, & Spanoudis, 2012).

A study conducted by Klingner & Vaughn (1996) illustrated the impact of using various tools lacking in sufficient reliability and validity for measuring reading comprehension. In their study, they compared the reciprocal teaching model with different student grouping methods of peer tutoring and cooperative groups. Results were mixed on outcome measures based on the different grouping methods. The normative Gates-MacGinitie Comprehension subtest (MacGinitie & MacGinitie, 1989) indicated that students who received reciprocal teaching combined with cooperative groups outperformed students who received reciprocal teaching combined with peer tutoring. However, outcomes on the researcher-developed measure of comprehension were in favour of the peer tutoring learning treatment. This is confirmed within the variety of studies outlined above which similarly differ with regard to effectiveness between researcher-developed tools and norm-referenced cognitive tests (see chapter 3). Similarly to Solis et al., (Solis et al., 2012) and Swanson's (1999) synthesis of RC interventions, all the studies outlined above vary in effect sizes depending upon how RC was measured, with researcher-developed tools indicating greater impact than standardised tools.

Davis (2010) notes in his meta-analysis that 42% of identified sample cases used standardised RC tools and for 12% use alongside researcher generated tools. Forty-eight percent used researcher developed tools only these usually being in the form of multiple-choice or short

answer tests<sup>4</sup>. The disparity in results is to be expected as a researcher developed measure will be designed to measure the aspect of reading that the intervention is targeting while standardised approaches will be measuring more general reading skills. Therefore, the latter approach takes a broader look at the transference and generalisation of an intervention and was the approach taken within McCartney et al.,'s (2015) study.

An initial comparison of standardised tools was conducted on two levels. The first level sifted on the basis of UK standardisation, age appropriateness for the population, availability of parallel forms and availability. This reduced the number of potential tools from 8 to 3. These three were then compared on the basis of reliability and validity (see Table 4 below). The Neale Analysis of Reading Ability (NARA-II) (NFER-Nelson) (Neale, 1997) was then subsequently discounted due to the many demands it makes in addition to that of RC which makes it insufficiently accurate to use within research (Cain & Oakhill, 2006; Spooner, 2001). Furthermore, it has been superseded by, the York Assessment of Reading for Comprehension (YARC) (2nd. Edition) (GL Assessment, 2011) (Martin, 2011).

A great deal of consideration was given to whether the WIAT-II<sup>UK</sup> or the YARC would be a better measure, especially given that standardisation should take place ideally within no more than ten years, but certainly no more than fifteen years previously (Boyle & Fisher, 2006). However, the YARC manual states that its reading comprehension reliability is lower than that of measures of “reading rate” and “reading accuracy” and in some cases can be lower than 0.7. The manual states that reliability of 0.70 or higher would be more desirable (Snowling et al, 2009). A comparison of RC assessment instruments can be seen in Table 4 below.

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<sup>4</sup> The remaining 10% of Davis's (2010) identified sample cases did not measure reading comprehension outcomes.



Table 4 Comparison of Reading Comprehension assessment measures

Standardised Test	UK/Scotland standardised	Age Appropriate for Population?	Standard error or measurement	Reliability	Validity
Neale Analysis of Reading Ability (NARA-II) (NFER-Nelson, 1997)	Yes/Yes	Yes- 6 years – 12 years 11 months age-range	6.1 for Comprehension (Neale, 1997)  (MSD = 16.91 and an ES equivalent of 1.13)	Comprehension, ranging from .65 for age 12-12:11 to .87 for age 6-7:11	The test appears to have content validity for the content area-oral reading skills.
Wechsler Individual Achievement Test – Second Edition (WIAT-II <sup>UK</sup> )	Yes/yes	Yes- 4 years– 16 years 11 months	RC from 6.54-7.04 and overall reading from 1.50-2.12  (MSD = 10.17 and an ES equivalent of 0.67)	Average stability coefficients ranging from .093-0.98 across the three age groups tested (6 to 9, 10 to 12 and 13 to 19 years).  Standard error of measurement for RC varies for age groups from 3.00 to 3.67  Coefficient corrected $r=0.94$  Minimal Significant different therefore requires an effect size of 0.554-0.678	Adequately measures the achievement constructs that they were designed to measure.  Correlations of the WIAT-II <sup>UK</sup> scores with other achievement test scores are moderate to high
York Assessment of Reading for Comprehension (YARC) (2 <sup>nd</sup> . Edition) (GL Assessment, 2011)	Yes /Yes (10.2% from Scotland)	Yes-4 years 6 months – 12 years 4 months	SEM = 7.19  (MSD = 19.93 and an ES equivalent of 1.32)	Internal consistency ranging from 0.48 to 0.77 for RC  Reliability of RC pairs passages all desirable at 0.70+	Comprehension questions are dependent on information only contained in the passage

As stated, given debates regarding the validity and reliability of measurement tools (Keenan, Betjemann, & Olson, 2008) identification of one of sufficient standard continues to be an area for further research (Block, 2008). Yet, although the WIAT-II<sup>UK</sup> is not an ideal tool, it is more technically suitable than the alternatives available. Furthermore, the McCartney et al., (2015) study of the current intervention also used the WIAT-II<sup>UK</sup> and therefore offers opportunities for a direct comparison and extension of their study. As such, the WIAT-II<sup>UK</sup> reading comprehension subtest was chosen as the candidate measure of instrumentation.

The minimal significant difference (MSD) is the smallest difference which needs to be observed taking measurement error into account so that pre-post intervention change scores are of practical significance and cannot be attributed solely to test/retest error (Chapman et al., 1995). It can be calculated using the Standard Error of Measurement (SEM) in the following equation (Weir, 2005):

$$MSD = SEM \times 1.96 \times \sqrt{2}$$

Here, 1.96 is the z value used to construct a 95% confidence interval. The standard error of measurement for the WIAT-II<sup>UK</sup> is 3.67 which corresponds to an  $MSD = 10.17$  standard score points. This means that there needs to be a score change of at least this magnitude, which in turn equates to a standardized ES of 0.67 or greater, in order to argue that observed change cannot be attributed to measurement error (Weir, 2005). To increase inter-rater reliability, training on the WIAT-II<sup>UK</sup> reading comprehension subtest was given to the research assistants who were conducting the test with the researcher (Appendix 12).

#### 4.8.3.2. MRQ

As many reading models state, there are more aspects to reading than cognitive factors (Anderson, 2004; Mathewson, 2004; Rosenblatt, 1978; Ruddell & Unrau, 2004; Sadoski, Paivio, & Goetz, 1991). Therefore other reader related attributes of motivation for reading

(Mathewson, 2004) and comprehension monitoring of strategy use were also undertaken (Ruddell & Unrau, 2004) (described in the sections below).

Given the links between reading comprehension and motivation for reading (see Chapter 2) it was considered useful to measure the impact of an RC intervention upon motivation (Mathewson, 2004). The most widely-used measure in this area is the self-report questionnaire, the Motivation for Reading Questionnaire (MRQ) (Guthrie & Wigfield, 1997) and is generally highly-regarded (Davis 2010). It is a public-domain group-administered instrument designed to provide teachers with an efficient and valid (see below) way to assess reading motivation qualitatively and quantitatively by evaluating students' self-concept as readers and the value they place on reading.

The Motivation for Reading Questionnaire (Guthrie & Wigfield, 1997) is a 54-item questionnaire to assess students' motivation for reading rated on a 4-point Likert scale (from 1= "very different from me" to 4= "a lot like me"). It measures eleven different constructs within motivation: reading efficacy, challenge, curiosity, aesthetic enjoyment, importance of reading, recognition, compliance, reading for grades, social reasons, competition, and avoidance. Of the sub-scales the following 4 were selected given that they are measures of intrinsic (rather than extrinsic) motivation (Deci & Ryan, 1985):

- Reading efficacy (e.g., "I know that I will do well in reading next year"). Wigfield and Guthrie, (1995) were consistent in the beliefs held by Bandura (1976) and Schunk (1991) who argue strongly that perception of efficacy is one of the strongest predictors of achievement <sup>5</sup>
- Reading challenge (e.g., "I like hard, challenging books") <sup>6</sup>

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<sup>5</sup> Given that raising attainment is an aim of this project this is deemed an appropriate measure.

<sup>6</sup> Reading Efficacy and Reading Challenge measure aspects of self-efficacy and feelings of reading competence and are based upon the work of Bandura, (1976) and Guthrie, (1996).

- Reading curiosity (e.g., “If the teacher discusses something interesting, I might read more about it”)
- Aesthetic enjoyment (e.g., “I make pictures in my mind when I read”).

Intrinsic motivation and learning goals have also been strongly argued to be critical predictors of long term participation in the activity in question, in this case intrinsic motivation for reading (Deci & Ryan, 1985; Dweck & Leggett, 1988; Eccles, Wigfield, & Schiefele, 1998; Nicholls, Cheung, Lauer, & Patashnick, 1989). This intrinsic motivation is long-lasting, self-sustaining and is more able to promote ongoing teaching and learning. Other MRQ scales in contrast measure extrinsic motivational factors which are temporary effects reliant upon external motivators such as, rewards or punishments, and therefore are not the focus of the current study. MRQ sub-scales selected for use and their reliability can be seen in Table 5:

Table 5. MRQ scale data

Subscale	Validity recorded at Fall and Spring	(Measures No of Items	No of Items	Items
<b>Reading Efficacy</b>	0.63-0.68	3		<ul style="list-style-type: none"> <li>• I know that I will do well in reading next year</li> <li>• I am a good reader</li> <li>• I learn more from reading than most students in the class</li> </ul>
<b>Challenge</b>	0.68-0.80	5		<ul style="list-style-type: none"> <li>• I like hard, challenging books</li> <li>• If the project is interesting, I can read difficult material</li> <li>• I like it when the questions in books make me think</li> <li>• I usually learn difficult things by reading</li> <li>• If a book is interesting, I don't care how hard it is to read</li> </ul>
<b>Curiosity</b>	0.70-0.76	6		<ul style="list-style-type: none"> <li>• If the teacher discusses something interesting, I might read more about it</li> <li>• If I am reading about an interesting topic, I sometimes lose track of time</li> <li>• I read to learn new information about topics that interest me</li> <li>• I read about my hobbies to learn more about them</li> <li>• I like to read about new things</li> <li>• I enjoy reading books about people in different countries</li> </ul>
<b>Involvement</b>	0.72-0.76	6		<ul style="list-style-type: none"> <li>• I read stories about fantasy and make believe</li> <li>• I like mysteries</li> <li>• I make pictures in my mind when I read</li> <li>• I feel like I make friends with people in good books</li> <li>• I read a lot of adventure stories</li> <li>• I enjoy a long, involved story or fiction book</li> </ul>

Validity was tested by Wigfield and Guthrie (Guthrie et al., 1996) using factor analyses, which indicated evidence of construct validity of these and the other seven subscales for 4th and 5th grade students (equivalent to Primary 5 and 6). This was also supported by Unrau and Schlackman (Unrau & Schlackman, 2006) in a sample of 6th, 7th, and 8th grade students, with a confirmatory fit index of .90, suggesting relatively good model fit.

Initially, these measures were all intended to be dependent variables. However, closer inspection of the psychometric properties of these tools (investigated due to reliability issues observed during the pre-test period) indicated that the MRQ scale could only reliably be used as a covariant (Baker & Wigfield, 1999; Guthrie & Wigfield, 1997). Furthermore, given similar issues observed with the children's self-reports of strategy use, this measure could only reliably add descriptive information (Haefel & Howard, 2010).

#### 4.8.3.3. Children's self-reported record of strategy use

This study concentrates upon developing learner's use of strategies and therefore it was considered useful to measure children's declarative knowledge, a component part of metacognition. Two overarching approaches have been taken to measure meta-comprehension, namely indirect and direct. Indirect measures of metacognition infer meta-comprehension activity from the participant's performance on cognitive tasks where it is generally assumed that metacognition is required to complete tasks successfully. These include Cloze procedures (where words are missing and text requires completion or error detection tasks). However, studies have found that children can be reluctant to report errors within texts and therefore these tests are generally of low reliability. Furthermore, it is unclear which skills are being assessed within Cloze procedure as they are generally used around broader reading skills than metacognitive knowledge (Gellert & Elbro, 2013).

Direct measures include "Think-Aloud" retrospective interviews and hypothetical scenarios (Duffy, et al., 1986). "Think-Alouds" (Baumann, Hooten, & White, 1999; McNamara &

Magliano, 2009) are where the participant is asked to give a running commentary of their thought processes during reading however, this has been criticised for interfering in the RC process as it places an additional burden upon cognitive functions (Garner, 1987) and is therefore potentially unreliable. Retrospective interviews and giving a participant a hypothetical scenario are also direct methods of measuring metacognition. However, the reliability of any standardised measure of metacognitive awareness is unreliable (Garner, 1987; McNamara & Magliano, 2009), especially for unskilled readers (Artelt & Schneider, 2015). Fostering a better understanding of the relationship between reading comprehension abilities and strategy use continues to be an area for further research given that their link is not completely understood (McNamara & Magliano, 2009).

Having a non-standardised measure of strategy use which is in line with the reading comprehension intervention was the preferable alternative used to acquire the children's perceptions of their metacognitive knowledge of the approaches overtly captured within the intervention. Unreliable though it may be in measuring pure metacognition and strategy use, it potentially serves to reinforce the self-efficacy of individuals' reading abilities and provide information on their perception of skills. After these considerations were made the same children's self-report of strategy use questionnaires were used as those developed within the McCartney et al.,'s study (2015) (Appendix 13).

#### 4.8.3.4. Teacher's Semi structured post intervention interview

Ten open ended questions were designed to explore the implementation and feasibility of the SHORS project (Appendix 14.) They were designed to explore the interpretative resources, the intervention teacher may have available for making sense of their part in the intervention. Questions were designed to answer qualitative research questions.

#### 4.8.3.5 Observation Schedules

To assess the effectiveness of the intervention, two types of observation were used to inform the study. These were:

1. Reading Comprehension and Vocabulary (RCV) Observational Measure (Gersten, Dimino, Jayanthi, & Newman - Gonchar, 2009)
2. A fidelity of implementation observation.

##### 4.8.3.5.1. RCV Observational Measure

Observations measure the quality of literacy instruction and are based upon the protocols developed in the RCV Observational Measure (Gersten et al., 2009) which take a time sampling approach initially designed by Vellutino and Scanlon (Scanlon, 1996). This was the same coding structure as James-Burdumy et. al.,'s (2010) observational methodology and is used to assess the quality of teacher practice, and aims to provide an objective and reliable framework for large scale projects (Atkins, 2013).

##### 4.8.3.5.2. Fidelity of Implementation Observation

The implementation observation aims to measure the fidelity of implementation for the intervention group only, in a similar format to the James-Burdumy et al., (2010) study. This measure was designed to ensure that it reflected the critical elements of the intervention. It takes an event sampling approach, where a tally of events such as types of instruction, was used to organise observational data for subsequent analysis.

##### 4.8.3.8. Readiness Questionnaire

Intervention teachers were asked to complete a readiness questionnaire which was adapted with the permission of Dr Barbara Kelly from her Preschool PATHS Readiness Questionnaire (2011) and follows the Implementation Drivers as identified by Fixsen, et al., (2009). From this, commitment to the programme and ensuring it would be facilitated in line with implementation science principles (Fixsen, et al. 2009) can be agreed (see Appendix 2).

#### 4.8.3.9. Teacher survey

Similarly to the James-Burdumy et al., (2010) study, teacher data was gathered to offer a context for the project results and illustrates the wider factors which impact upon educational outcomes. In the same form as James-Burdumy et al., (2010), the survey incorporates two subscales:

- Teacher professional culture scales (Consortium on Chicago School Research, 1999). This is a scale with 35 items and aims to indicate the quality of teacher instruction and has a reliability rating of 0.87 (James-Burdumy et al., 2010)
- Teacher efficacy scale (Hoy & Woolfolk, 1993) (abridged) which identifies those teachers most likely to benefit from professional development (Sparks, 1988) and has a reliability rating of 0.90 (James-Burdumy et al., 2010).

Teacher surveys were used to identify any differences in teacher experience and school ethos prior to the intervention period. Responses for each of the sub-headings on the survey were coded by the degree of prevalence to create an average score for each of the following areas:

- Opportunities for professional discussion
- Levels of respect and trust within the school
- Access to new ideas within the school
- Support in times of change
- Quality of CLPD provided
- Support by leaders within school
- Self-efficacy in teaching reading
- Self- efficacy in teaching



In addition, information regarding the teacher's professional and educational background was also collated. Teachers taking part in both intervention and control conditions could therefore be compared according to these variables.

## 4.9 Procedure

### 4.9.1 Intervention duration

The intervention (for both the pilot and main study) followed the procedure of the McCartney et al., (2015) study. Systematic reviews of reading comprehension instruction for typically developing children (Fukkink & de Glopper, 1998, Rosenshine, Meister & Chapman, 1996, Rosenshine and Meister, 1994, Davis, 2010) and for non-typical or at risk children (Berkeley, Scruggs & Mastropieri, 2009, Elbaum, Vaughn, Tejero, Hughes & Watson Moody, 2000, Gajria, Jitendra, Sood & Sacks, 2007, and Talbott, Lloyd & Tankersley, 1994) found no dose-response relationship between effect size and instructional duration (within the range of an estimated 100 minutes of instruction compared to over 4000 minutes in the longest programmes (median = 810 minutes) or 2-36 weeks (median = 5 weeks) in the 98 included studies that reported details of dosage. However, studies with SES of 0.50 or greater reported a median duration of 8-weeks (range 2-36 weeks). Accordingly, the intervention had an 8 week duration. As with all aspects of the design, it was intended that the findings from study 1 would inform study 2, which potentially could be altered if deemed necessary.

### 4.9.2 Timeline

The timeline for the studies can be seen in Table 6. with the timeline for Study 2 informed by the findings from the pilot Study 1.

Table 6: Study Time line

<b>Week 1, Teacher selection</b>	Teachers of P5 classes were identified on the basis of participating schools as agreed by the HT. Schools with comparable socio-economic demographics were randomly assigned to either control or intervention groups.
<b>Week 2-3 Getting consent</b>	Active consent was sought from these teachers, parents/carers and the pupils themselves. These teachers completed the teacher survey (see Section 4.8.3.9)  Consent from parents/carers for children's assessment was received for 6 children per class. The P5 teacher's literacy lessons were observed using the RCV (see Section 4.8.3.5.1)
<b>Weeks 4-5 Pre-test Pre-test phase</b>	For those children for whom parent/carer permission for participation has been granted, pre-tests of dependent variables were administered, subject to the pupil's verbal consent. This incorporated the measures described above.
<b>Assessments and randomisation</b>	The WIAT-II <sup>UK</sup> was administered on an individual basis by the researcher and the children's self-reported scales and MRQ were administered in groups to avoid any undue intrusion.  If the researcher found that a pupil had a low score she asked the permission of the pupil to pass this information on to the teacher (as per the pupil consent script).
<b>Week 6- In-service training of intervention</b>	For those in the intervention group, teacher training on the SHORS method took place. This took place via a 2 hour training (Continuous Lifelong Professional Learning, CLPL) session delivered by the researcher, as per guidance from McCartney et al., (2015). The teacher then completed a pre-intervention questionnaire to ensure sufficient motivation and investment in the programme.
<b>Week 7-14 intervention programme-</b>	Intervention teachers administered the intervention for 45 minutes per day four days per week over 8 weeks (32 sessions). During this period, random classroom literacy lesson observations took place in weeks 9 and 12 to ensure the fidelity of intervention implementation. Fidelity schedules were used to measure implementation (Kelly and Perkins 2012). Teachers were also be asked to complete implementation records (as per McCartney et al., 2015) to record the extent to which the intervention protocol was followed.
<b>(Although it is an 8-week programme the dates show a 10 week period to allow for Easter holidays)</b>	Teachers of those in the control condition were asked to run their regular literacy lessons for 45 minutes per day, four days per week, over 8 weeks (32 sessions).
<b>Weeks 15-17 Post-test assessments and implementation assessment</b>	Children's post self-ratings (as per McCartney et al., 2015) and MRQs subscales were gathered for all children in groups. WIAT-II <sup>UK</sup> reading comprehension subtest information was assessed by the researcher on a 1:1 basis. All children and teachers were debriefed after assessments. Teacher implementation records were gathered to assess implementation effectiveness.
<b>Weeks 18-27 Analysis phase</b>	WIAT-II <sup>UK</sup> reading comprehension and word reading subtest scores and MRQ data and children's self-reported scales was analysed using analysis of covariance (ANCOVA). Thematic analysis of observation data, children's strategy use records and teacher implementation records was undertaken, with checks to ensure reliability of coding and prevent researcher bias (Robson, 2011).

Pre-test readiness questionnaires and semi-structured interviews took place in the teacher's classroom. Assurance was given to the teacher that there would be no disclosures of their information and data would be disposed of after use. The teachers were reminded that they

could withdraw at any time or refuse to answer any uncomfortable questions. Throughout the interview key points were recorded by the researcher with notes fully visible to the teacher. At the end of the session the notes were discussed to ensure accurate representation. The teacher was also fully debriefed and data was categorised into themes based on core concepts (see 4.10.2).

Scheduled visits for the implementation observations took place as detailed in the timeline. These also served as opportunities for coaching and consulting as necessary on the implementation of the approach.

## 4.10 Data Analysis

### 4.10.1 Quantitative-WIAT-II<sup>UK</sup>, MRQ and children's self-reported scales

All candidate statistical tests are parametric tests and as such conform to the following assumptions:

- Independence of observation-violations would be seen within the design if the data was randomly and independently sampled
- Scale of measure-outcome variable is on a continuous scale (not nominal or ordinal scale)
- Normality of distribution of data with no skew
- Homogeneity of variance with same error trends (tested by Levene's test).

It was recognised that either an ANCOVA or an ANOVA of change could be conducted to analyse the results. The pros and cons of each test can be seen in Table 7 below.

Table 7: Comparison of approaches to quantitative analysis

	ANOVA using change scores	ANCOVA	Independent t-test of change scores
<b>Assumptions</b>	There is only one random effect-measurement error	Covariate is related to the dependant variable	
	Concerned with hypothesis relating to reading comprehension change/ improvement.	<p>Covariant is not related to the intervention effect</p> <p>Pre- and post-correlations are above 0.5</p> <p>Absence of baseline difference (randomly allocated groups)</p> <p>Homogeneity of regression slopes</p> <p>Concerned with hypothesis relating to reading comprehension ability</p>	
<b>Pros</b>	More reliable if there is a group effect present at pre-test	Where pre- and post-test correlations exceed 0.5 this is a more powerful statistical test	Robust to large departures from non-normality for reasonable sample sizes
	More reliable where groups are not randomised	More reliable if there is not a group effect present at pre-test	Missing values are not a problem
	More reliable where there is a large difference between pre-existing groups	Where preliminary analysis of the two populations are undertaken using a different measure to that of the pre-test (the ANCOVA covariant) there is less bias. This allows for the estimation of group trends in the absence of an intervention	
<b>Cons</b>		Yields a greater F-Ratio and reduced Mean Squared error offers greater statistical power and the greater likelihood that the differences between the means are due to something other than chance alone, namely real effects and thereby less likely to make a Type 1 error and incorrect rejection of a true null hypothesis	
	Needs similar tests for both pre- and post-test	Used for RCTs (current design not an RCT) where treatment assignment is unbiased	Difficult to get confidence limits for SD

Less powerful if pre- and post-test correlations exceed 0.5 (Torgerson, 2008))	The larger the pre-test difference between pre-existing groups the worse the ANCOVA is on bias and efficiency (Van Breukelen, 2006)	representing individual responses
If pre-test scores are imbalanced this may amplify regression to the mean effects	Not good for small sample sizes	
Not good for small sample size		

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While a two-way mixed model ANOVA of change could be used to investigate how the intervention affected reading comprehension compared to the control group, this type of analysis can lead to less efficient analysis (Hopkins, 2003; Van Breukelen, 2006).

Mixed model ANCOVAs are utilized here where their assumptions are met, for example, where there is homogeneity of regression and pre and post-test correlations exceed 0.5. However if the pre-test and post-test correlations do not exceed 0.5 or if the basic assumptions of an ANCOVA are not met, ANOVAs will be conducted using change scores (Hopkins, 2003).

To provide an unbiased comparison potentially created by dropout effects an intention-to-treat approach was to be used (Hollis and Campbell, 1999). Here all participants were retained in the analysis, regardless of whether they were available for post-test assessment. Any missing post-intervention scores (caused by children's absence during the post-test assessment period) were to be replaced by inputting the pupils' pre-intervention scores. This approach was taken for all analysis unless otherwise stated.

#### 4.10.2. Qualitative - Implementation data

Fidelity measures, including the pre-intervention questionnaire, semi-structured interview and teacher's self-reported scales culminated into implementation information and were aimed to address the following research questions:

- What were the facilitators/barriers to implementing the reading comprehension intervention?
- What were the facilitators/barriers to sustaining the SHORS intervention after the completion of the quasi-experimental study?
- What is the feasibility of capacity building by training teachers to implement the SHORS intervention?

Measures are detailed in Section 4.8.3 above.

Consideration was given to the type of analysis that would be undertaken for the qualitative information. Two main approaches were identified: thematic analysis (TA) and interpretative phenomenological analysis (IPA). A comparison can be seen in Table 8 below.

Table 8: Comparison of approaches to qualitative analysis

	Thematic analysis (TA)	Interpretative Analysis (IPA)	Phenomenological
<b>Overview</b>	TA identifies pattern within data without the need to observe a specific theory of language or meaning framework	IPA approach has an idiographic focus concerned with how a person makes sense of their personal experience. It combines psychological, interpretative and idiographic factors (Gill, 2014).	
<b>Pros</b>	<ul style="list-style-type: none"> <li>• Data supports the interpretation of themes</li> <li>• Theoretical flexibility and allows for a variety of research questions (Braun &amp; Clarke, 2006)</li> <li>• Good for large amounts of different types of data (Guest, 2012)</li> <li>• Can be used for large and small amounts of data</li> <li>• Transcends personal experience (Guest, 2012)</li> <li>• Allows researchers to expand range of study past individual experiences (Guest, 2012)</li> <li>• Can be used when there are more than one researcher</li> <li>• Themes can be used to create categories (Saldaña, 2009)</li> <li>• Widely used in the investigation of facilitators and barriers towards successful implementation as transcends personal experience of individuals</li> </ul>	<ul style="list-style-type: none"> <li>• Used mainly to explore participant's interpretations</li> <li>• Allows an understanding of personal experience</li> <li>• Informed by the research question, there is flexibility in how a study can be written up</li> <li>• IPA would be an appropriate analysis to use for exploration of teacher's personal experience</li> </ul>	
<b>Cons</b>	<ul style="list-style-type: none"> <li>• Different interpretations that can be made reduce reliability (Guest, 2012)</li> <li>• Some data may be missed (Guest, 2012)</li> <li>• Due to its flexibility, there can be a variety of different ways to focus on the data</li> <li>• Reduces the impact of different use of language</li> <li>• It can be hard to keep themes discrete</li> <li>• Difficult for individual data to maintain their own uniqueness.</li> </ul>	<ul style="list-style-type: none"> <li>• There is less flexibility regarding the design of the questions which should be aimed at understanding the insiders world personal accounts and experiences</li> <li>• IPA is best for a large amount of very flexible data from only one or two people and looks at the connections between responses</li> <li>• Important quote can be missed</li> <li>• The depth of interviewing is best where there is a researcher with experience in this type of interviewing and analysis</li> <li>• Difficulty to remain objective during analysis</li> </ul>	

- No two researchers will analyse data in the same way and therefore is unreliable
  - Not cost effective for analysing group data, given the level of detail it would require (Conrad, 1987)
  - Understandings rely on both those created by the participant and those created by the researcher
  - It would be difficult for the researcher to remain objective regarding a research project that is of personal interest.
- 

Based upon this information, it was deemed preferable to use thematic analysis as this would allow for a broader understanding of the intervention than the teacher's personal experience and could also develop an understanding of implementation facilitators and barriers. Furthermore, this approach does not rely upon any specific philosophical or epistemological assumptions.

There are many thematic analysis research styles, for example, Grounded Theory which aims to create new theories from data rather than matching data to theory (Jin, 2010). However, given that the research questions are specific to concepts such as sustainability and implementation and their associated theories of implementation science and models of change, a more structured approach was preferable. Taking an audit approach and critical incident methodology was considered the most appropriate for the research questions. This was derived from the work of Flanagan, (1954) as a way of analyzing which aspects of a situation where the essential and core elements needed for success.

Thematic analysis was regarded as the best approach to synthesising the qualitative data and as such the following six phases of analysis were adhered to:

1. Familiarisation with each source of data
2. Coding



3. Searching for themes which codes were collated into
4. Reviewing themes
5. Defining and naming themes
6. Writing-up.

Therefore, once a theme was identified all sources of data pertaining to it were pooled together to reach overarching themes which ran throughout qualitative information to develop a wider understanding of implementation.

The same researcher completes the observation forms to enhance reliability consistency.

#### 4.11 Methodology - Conclusion

This chapter has considered the overarching methodology of the two part project. Each of the studies will be detailed further in the subsequent two chapters with rationales given for any adaptations to the initial design and methodology.

## Chapter 5: Study 1 (Pilot)

Chapter 4 has outlined the overarching aims and methodology of this two-part study. This chapter will detail pilot study 1.

### 5.1 Pilot Study 1 Research Questions and Specific predictions regarding reading intervention

Research questions are as described in Chapter 4.

Specific predictions were as follows:

- The SHORS approach can be successfully implemented within North Ayrshire Council.
- The measurement tools will be fit for purpose in measuring the impact of the main study.
- A population of 100 children will provide sufficient power to measure impact in the main study.
- Within the demographics, full opt in consent will be unobtainable.

### 5.2 Pilot Study 1 Design

This was a mixed-model, 2x2 factorial, quasi-experimental design with group (intervention versus control) and time-point (pre- versus post- intervention) as independent variables.

The unit of randomisation were the Primary 5 classes in the schools. Instrumentation to record children's outcomes are as per Chapter 4.8.2. Instrumentation to record the teacher's outcomes consisted of four components: ERC observations, fidelity observations, readiness questionnaires and teacher's survey (see 4.8.2. for details).

There was no missing data within the pilot and therefore an intention-to-treat analysis (Hollis and Campbell, 1999) was not necessary.

## 5.3 Pilot Study 1 Methods

### 5.3.1 Participants

Both children and teachers were participants in the study.

#### 5.3.1.1. Children

Participating pupils were from the Primary 5 stage in the two schools (intervention and control) that took part in this study were located within the same town with the same (low) SIMD rating of 2 and of the same ranked quartiles (NAC measure- see 5.3.1.1). The school selected a cross section of ability children from the class which meant that four males and two females took part in the control group and three males and three females took part in the intervention group. Of these, 92% were White Scottish and 8% were White Irish. 50% of the control had recorded additional support needs and 66% of the intervention group had recorded additional support needs. Recruitment is detailed in Chapter 4.

#### 5.3.1.2. Teachers

Two white female Scottish teachers took part in the study. The control teacher had been teaching for 5 years while the intervention teacher had been teaching for 11.5 years (however number of years service was not deemed as a confounding variable (Stronge, Ward, & Grant, 2011)).

### 5.3.2 Materials

Materials for both the intervention and control groups are as described in Chapter 4.

### 5.3.3 Measures

Measures for both the intervention and control groups are as described in Chapter 4. WIAT-II<sup>UK</sup> reading comprehension subtests took approximately 20 minutes per child and were conducted by the researcher and two research assistants who had received training by the author which incorporated both practical assessment elements and correct administration of the tools.

The MRQ and children’s self-reported strategy use questionnaires were conducted in small groups of  $\geq 6$  by the author.

### 5.3.4 Procedure

Procedures are as described in Chapter 4.

## 5.4 Pilot Study 1- Quantitative Results

### 5.4.1 WIAT-II<sup>UK</sup>

The descriptive statistics can be seen in Table 9 below:

*Table 9: Pilot WIAT-II<sup>UK</sup> descriptive statistics (based upon standard scores (SS) with a mean of 100 and SD of 15)*

	Control Group		Intervention Group	
	Mean	SD	Mean	SD
<b>Pre WIAT-II<sup>UK</sup></b>	91.50	13.52	82.50	10.52
<b>SS</b>				
<b>Post WIAT-II<sup>UK</sup></b>	97.00	13.37	95.17	15.55
<b>SS</b>				
<b>Change score</b>	5.50	5.09	12.67	7.15
<b>Post-Minus Pre</b>				
<b>SS</b>				

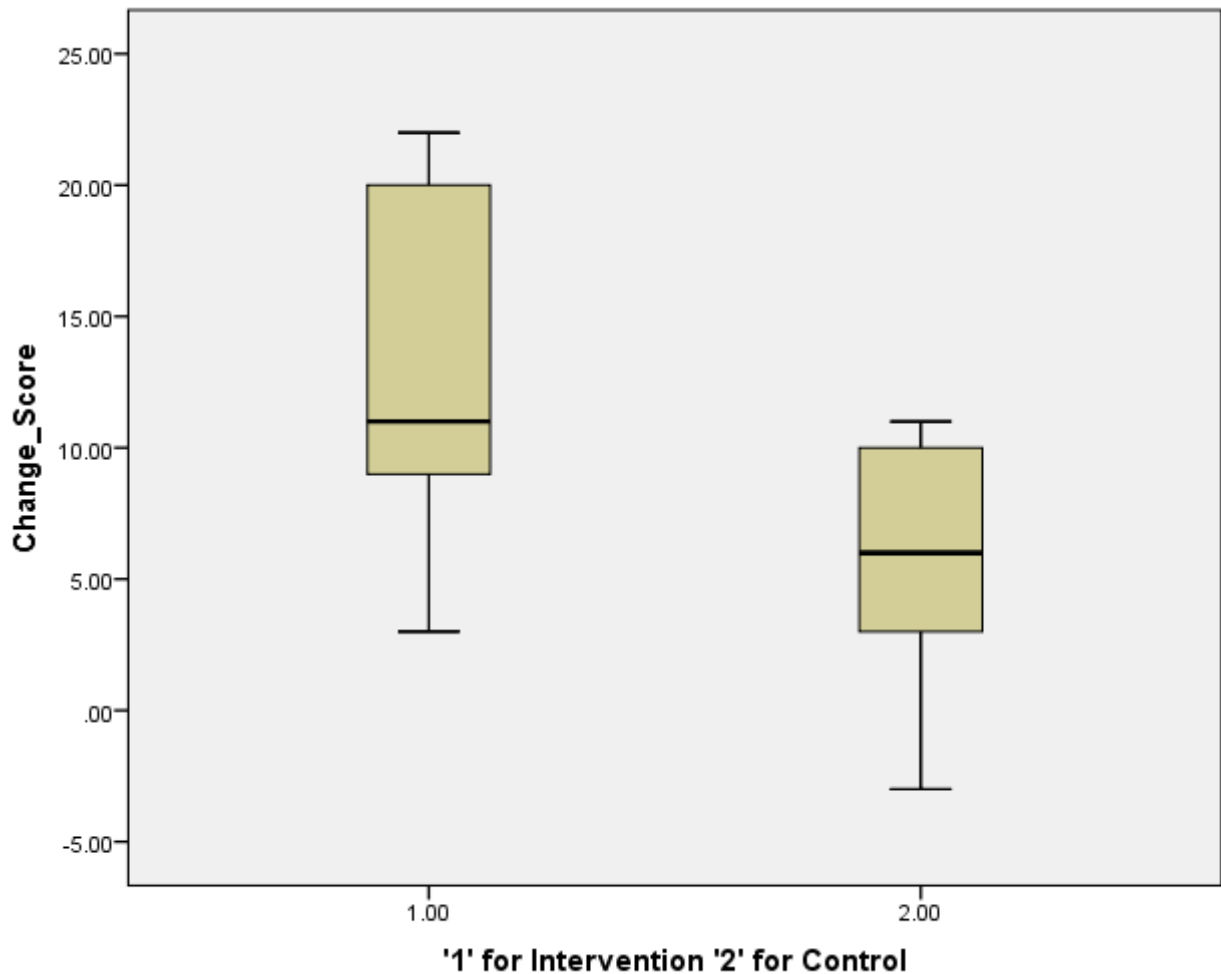


Figure 15: Box plot of Pilot Study change scores from intervention and control groups

The between-subjects factor comprised of two groups; intervention and control. Each of the groups' Change scores can be seen in Figure 15 above. The intervention group's change scores were larger than the control group (see Table 9).

The pre-test WIAT-II<sup>UK</sup> scores showed that the two groups were not equally matched at pre-test point with two-thirds of a standard deviation difference between groups. The pre-intervention scores of the intervention group showed extreme low scores and as such were vulnerable to a statistical phenomenon known as "regression to the mean" Zhang and Tomblin (2003). This suggests that follow up tests from those who initially have particularly high or low scores will most likely have a score closer to average. This indicates that components of the increase in the intervention group score could be attributed to regression to the mean effects.

Informed by an understanding of new statistical procedures (Dimitrov & Rumrill, 2003; Knapp & Schafer, 2009; Miller & Chapman, 2001) it was decided that a different statistical approach should be taken as ANCOVAs, while effective for well-matched group comparison is inappropriate for groups with large between group differences at pre-test. Furthermore, the sample within the pilot is insufficient for ANCOVA/ANOVA analysis. Indeed, the purpose of the pilot was to generate an effect size to power the main study. Therefore, a change score was constructed and a t-test showed that the observed reading score changes of the intervention group were greater than those of the control group, although not significantly different - most likely due to the small participant numbers with  $F(1,10) = 4.01, p = .07$ . The effect size from the between group t-test indicated a Cohen's  $d$  of 1.26, which exceeds the effect size equivalent of the MSD from the WIAT-II<sup>UK</sup> (0.67) confirming that the Wechsler test (2005) is sufficiently sensitive to determine the order of effect size likely to be observed in the main study. Interestingly, the results also revealed a higher within-group effect size for the intervention group (2.44) than for the control group (1.07).

#### 5.4.2 MRQ

The descriptive statistics for the MRQ are seen in Table 10 below.

*Table 10: Pilot MRQ descriptive statistics*

	<b>Control</b>		<b>Intervention</b>	
	Mean	SD	Mean	Std. deviation
<b>Efficacy</b>	2.78	0.58	3.39	0.67
<b>Challenge</b>	2.90	0.78	2.93	1.04
<b>Curiosity</b>	3.31	0.37	3.11	0.58
<b>Involvement</b>	3.31	0.46	2.94	0.93

One of the pilot study’s aims was to evaluate the effectiveness of measurement tools. It used only small participant numbers and therefore reliable analysis or interpretations cannot be made. However, the tool was appropriate for use within the primary setting. Discussion regarding the application of the MRQ can be seen in section 5.6.4.

### 5.4.3 Children’s self-rated scales

*Table 12: Pilot SRSU descriptive statistics*

	<b>Control</b>		<b>Intervention</b>	
	Mean	Std. Deviation	Mean	Std. deviation
<b>Pre SRSU</b>	25.10	3.00	25.30	4.60
<b>Post SRSU</b>	26.50	2.07	28.60	5.90
<b>Change score</b>	1.33	2.80	3.33	8.50

As can be seen from Table 12 above data, the control group has smaller standard deviation scores than the intervention group for pre- and post-SRSU.

The change scores (post-test rating minus pre-test rating) of self-reported SRSU questionnaire show the intervention group reported a greater increase in reading strategy use than the control group. However, large standard deviations indicate wide variability, and especially given the small sample size, it cannot be concluded that there was an increase in strategy use and any assumptions related to levels of change should be treated with caution. As stated in 5.4.2 the pilot study’s aims was to evaluate the effectiveness of measurement tools. It used only small participant numbers and therefore reliable analysis or interpretations cannot be made. However, the tool was appropriate for use within the primary setting. Discussion regarding the application of the SRSU can be seen in section 5.6.4.

## 5.5 Pilot Study 1- Qualitative Results

### 5.5.1 Fidelity Readiness Questionnaire

The teacher in the intervention condition confirmed all criteria on the pre-intervention readiness questionnaire.

### 5.5.2 Fidelity observation

The same researcher conducted both fidelity observations to enhance reliability and consistency. Data can be seen in Appendix 15. A total of 125 strategy references observed and 15 core component indicators and suggests that the intervention was implemented to a high degree.

The data suggests that the amount of prompt references increased as the intervention became more embedded. There continued to be opportunities for further use of gestures. Although the use of graphic organisers were not observed, the teacher provided evidence of their use during unobserved lessons. It could be concluded that the key features of the intervention were implemented as intended for the right amounts of time using appropriate resources.

### 5.5.3. Teacher Survey

Teacher surveys were used to identify any differences in teacher experience and school ethos prior to the intervention period. Both teacher's questionnaires had very comparable responses yet slightly varied in how they reported:

- Opportunities for conversations regarding goals of the school and the curriculum (control stated significantly more opportunities than the intervention teacher).
- Opportunities to work productively with teachers from other schools (control stated significantly more opportunities than the intervention teacher).
- Number of years teaching (intervention teacher had been teaching for 11.5 years, while control teacher had been teaching for 5 years).



- Number of years teaching at the current school (intervention teacher had been teaching 10 years, while the control teacher had been teaching for 3 years).

#### 5.5.4. RCV

This qualitative analyses assessed the pre-intervention practice by teachers at the classroom level. The guiding question for the RCV qualitative analyses was to identify any differences in teacher style prior to the intervention period, with consideration given to; strategy instruction, guidance, and opportunities to read and use skills.

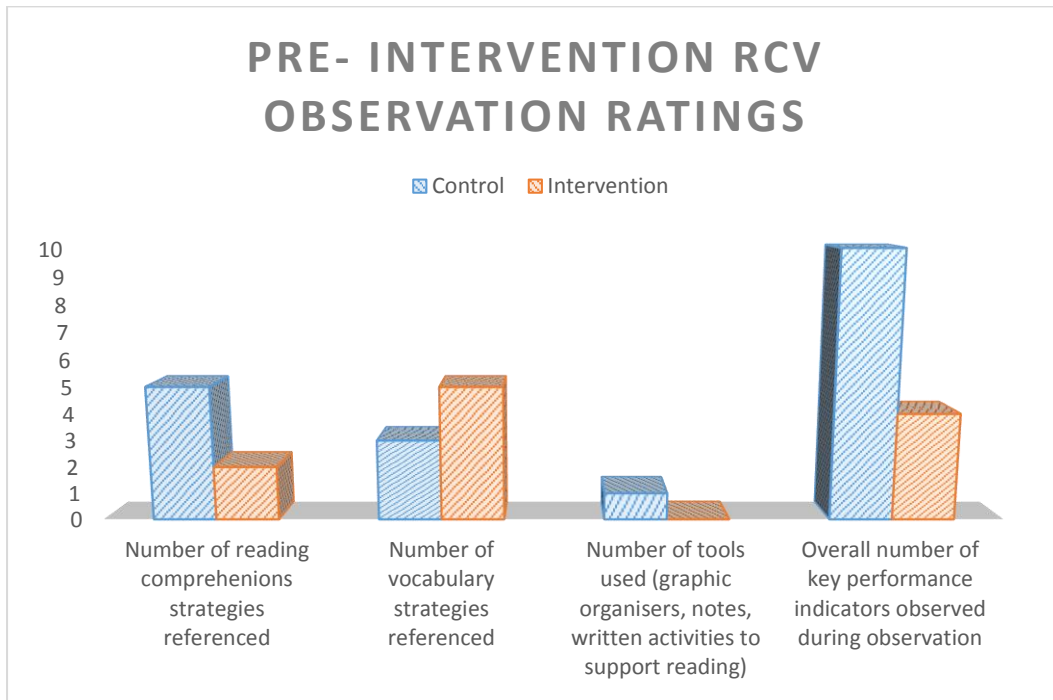
Both baseline observations took place over a 45-minute period. Complete data can be seen in Appendix 16, however Table 13 below offers a summary comparison of the observations.

*Table 13: Pilot RCV observational data summary*

	<b>Control</b>	<b>Intervention</b>
Number of reading comprehensions strategies referenced	5	2
Number of vocabulary strategies referenced	3	5
Number of tools used (graphic organisers, notes, written activities to support reading)	1	0
Overall number of key performance indicators observed during observation	10	4

This can be seen in Figure 16 below:

Figure 16: Pilot RCV comparison chart



Some aspects of teaching were of similar quality. However, overall, at pre-test point the teacher in the control group used more effective strategies for reading comprehension, whereas the teacher in the intervention group used more effective strategies for vocabulary.

#### 5.5.5. Post-intervention Teacher Qualitative discussion

The class teacher reported that she enjoyed the methodology within the SHORS intervention an important factor given that teacher enjoyment is linked to pupil enjoyment (Frenzel, Goetz, Lüdtke, Pekrun, & Sutton (2009) and this is linked to cognitive skills, problem solving and creativity (Ashby & Isen,1999). Furthermore, she enjoyed how the language pertaining to specific reading strategies could be built upon throughout the intervention period in a flexible way. She stated that the approach encouraged her to have time for class discussions. The teacher reported feeling more up-skilled regarding reading comprehension strategy use, and felt that the language of the strategies and their associated gestures could be adopted more

widely throughout the curriculum. Furthermore, the teacher felt that the children engaged well with the format and there was a perceived increased confidence in listening and talking skills.

The main challenge to using the approach was the noise level within the open-plan classroom. However, the teacher continued to recognise the benefits of quality discussions that SHORS facilitated.

The main themes were can be seen in Table 14 which shows the number of supporting quotes and as a percentage of the categorised data.

*Table 14 Pilot semi-structured interview themes*

Theme	Number of quotes	Percentage
SHORS could be used across CfE	3	20%
SHORS helped develop relationships	4	27%
SHORS Enjoyable	3	20%
SHORS allowed Flexibility	2	13%
Teacher felt upskilled	2	13%
Additional resources not really needed	1	7%

The prevalence of the themes can be seen in Figure 17 below.

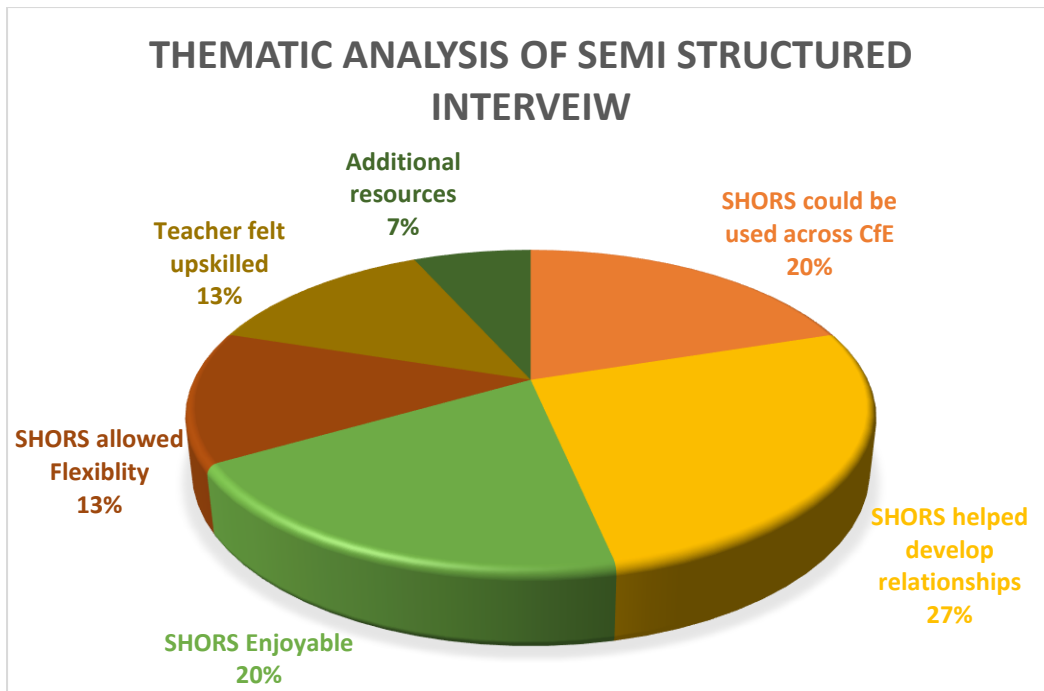


Figure 17: Pilot Semi structured interview themes

#### 5.6. Pilot Study 1- Critical incidents necessary for implementation

The data above could be consolidated into overarching themes which illustrated the critical elements necessary for the main study to be feasible. These can be seen in Figure 18 below and are then discussed in the following sections.

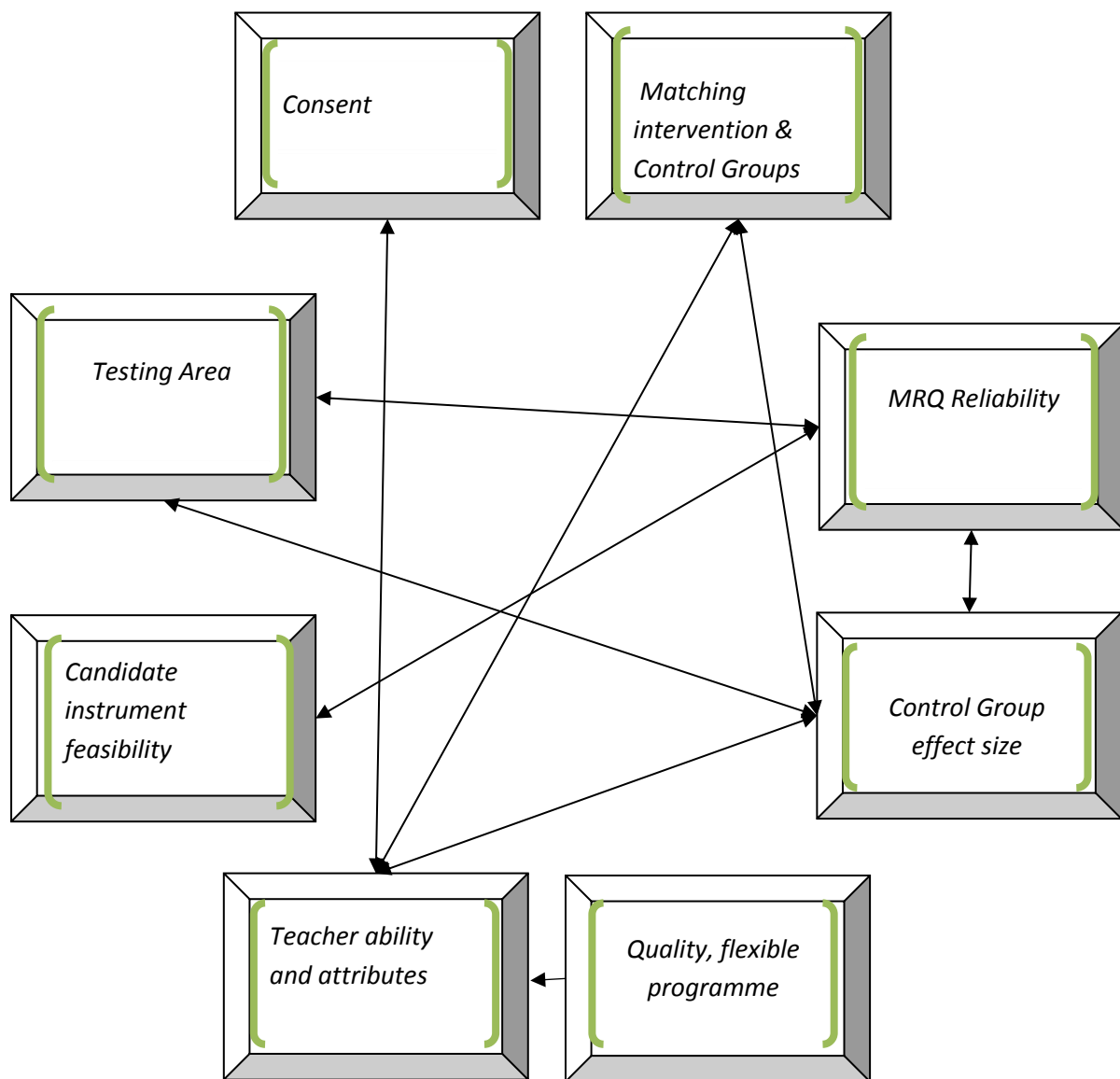


Figure 18. Critical Incidents identified to inform Main Study Feasibility

### 5.6.1. Testing area

The area for testing children was not ideal within either school. Therefore, greater planning for this should be allowed within the main study as it may influence reliability and between groups comparison.

### 5.6.2. Consent

While informed consent could be gained in the pilot due to its small numbers, it was acknowledged that the response rate for larger groups within the main study may be a barrier to implementation. Further discussion with school HTs confirmed that active consent from large groups of parents was not feasible, indicating that passive consent within the main study would be more realistic. In addition informed consent may yield a biased and non-representative population and therefore be a confounding variable.

### 5.6.3. Matching intervention and control groups

The schools had been selected due to their comparable SIMD and of the same ranked quartiles (see 5.3.1.1). However, the intervention school had three Primary 5 classes which were streamed into low, medium and high ability, with the low-ability class being the one selected for the project on the basis of teacher readiness. It is currently unusual for any school within NAC to operate a streaming system; therefore, this information was not shared with the researcher until after pre-assessments had indicated below-average scores. The intervention group, therefore, was not representative of the schools' abilities. Indeed, 66% of the intervention children were recorded as having additional support needs on either stage 2 (N=3) or stage 3 (N=1) interventions, as described in the Education (Additional Support for Learning) (Scotland) Act 2009. However, the control group, which was not organised by reading ability, also had a large proportion of children recorded as having staged intervention, with 50% (N=3) of participants on stage 2 of intervention. Yet the control class had a cross-section of abilities; therefore the two groups were not equally matched for reading ability. As stated above, the effect size of the intervention group may have been partly due to extreme low scores and regression to the mean (Shephard, 2003). Therefore, in order to ensure ANCOVA tests are reliable within the main study, more care was needed to ensure that candidate classes are equivalent in terms of pre-intervention reading skills. Furthermore, although the intervention

group was perhaps more homogenous due to their lower-ability class grouping, their self-reported measures had large standard deviations, perhaps indicating a large variability in their metacognitive knowledge (McNamara & Magliano, 2009; Moore, 1983).

The intervention group showed a wider range of values for all motivational components, yet the group were more homogeneous but of a lesser reading ability than the control. This is consistent with Baker and Wigfield (1999) who found correlations between reading achievement and motivation less strong than reading activity and motivation as scored on the MRQ. They also argue that the relationship is less strong for poorer readers. The intervention group although having lower reading ability, had a greater sense of efficacy which is contrary to theories of learned helplessness (Cooley & Ayres, 1988). However, reliability issues will be discussed in the next section.

#### 5.6.4. Self-reports reliability

Perhaps influenced by inadequate testing areas, some of the children in both groups appeared to answer the MRQ in a random way. Further investigation into the reliability of self-reported responses took place. This showed that test/re-test results were not stable over time (Baker & Wigfield, 1999), this is consistent with other self-report scales (Haeffel & Howard, 2010). Therefore, calculations were made using equations (Weir, 2005) to calculate using the MRQ reliability measures (Baker & Wigfield, 1999) to determine the effect sizes that would be necessary to see change beyond the instrument's standard error of measurement (see Table 15 below). With effect sizes necessary of 1.14 to 1.62 between pre- and post- MRQ, it was clear that the measurement could not be used as an outcome independent variable. Instead, this measure can be used as a covariant and therefore a candidate predictor. This is also consistent with reliability issues faced using any self-reported measure (Haeffel & Howard, 2010).

Table 15: MRQ technical data

Subscale	SD	Cronbach's alpha.	Standard Error of Measurement	Minimum Significant difference	Effect size needed
Reading Efficacy	0.65	0.66	0.38	1.05	1.62
Challenge	0.66	0.72	0.35	0.967	1.14
Curiosity	0.61	0.69	0.34	0.942	1.54
Involvement	0.62	0.66	0.36	1.00	1.61

#### 5.6.5. Candidate instrument for determining pre-intervention equivalence of reading skills across school classes

During the time between ethics was received and the pilot was underway, the authority had invested in the New Group Reading Test (NGRT) (2010) a reading assessment tool developed by GL Assessment and the National Foundation for Education Research. Given its accessibility and ease of use, it was considered as a replacement for the WIAT-II<sup>UK</sup> reading comprehension subtest. As the comparison in Table 16 below shows, the NGRT would be quicker and cheaper to use, and parallel forms are an advantage to prevent practice effects; however, it is a less precise instrument, hence it would have to evidence larger score change to be confident that measurement error could not account for the change. The effect sizes of 1.26 calculated within the pilot indicated sufficient change for the NGRT to be selected to be the candidate instrument. Initially, this was considered the more pragmatic choice; however, after discussions with teachers who had observed the NGRT in use continued to emphasise its lack of precision. Therefore, as in the pilot, the WIAT-II<sup>UK</sup> was to be used in the main study.



Table 16: Comparison of WIAT-II<sup>UK</sup> and NRQ technical data

Standardised Test	UK/Scotland standardised	Age appropriate for Population?	Standard error of measurement	Reliability	Validity	Parallel forms	Availability	Minimal Significant difference	Effect size required to be sure change is not due to instrumentation error
<b>WIAT-II<sup>UK</sup> Reading Comprehension subtest</b>	Yes	Yes- 4 years-16 years 11 months	3.67	Average stability coefficient ranging from .093-0.98 across the three age groups tested (6 to 9, 10 to 12 and 13 to 19 years).  Standard error of measurement for RC varies for age groups from 3.00 to 3.67	Adequately measure the achievement constructs that they were designed to measure.  Correlations with other achievement test scores are moderate to high  No correlations have been made with the WIAT-II <sup>UK</sup>	No	Record forms need purchased	10.17	0.67
<b>NGRT tests 2A and 2B</b>	Yes (10%)	Age 7-9 (Y2-Y4 / P3-P5)	4.74	Coefficient corrected R 0.94 Cronenbach's Alpha measuring internal consistency more than 0.9	Good construct validity  Score comparisons with TA levels GRT11, GCSE English	Yes	Available	12.00	0.877

### 5.6.6. Control group effect size

The effect size from the control group showed a Cohen's *d* of 1.07, indicating a higher than expected change score. Hypotheses of why this should be are:

1. The instrument of measurement had only one version of the test, therefore increased scores for both the intervention and control group would be subject to practice effects (Robson, 2011)
2. Given teacher effects has a large impact upon outcomes (Hattie, 2012; Terhart, 2011) and that the control teacher was enthusiastic about participation in the project, she therefore perhaps invested more time and planning into the teaching of reading comprehension than she would have, had she not been involved

3. The dynamic within the control group, being a cross-section of abilities, lent itself more to having increased outcomes than the intervention group, which incorporated lower reading ability children (Dills, 2005; Hattie, 2002).

#### 5.6.7. Teacher ability and attributes

A critical and highly influential factor was the individual teacher. The pre-intervention observations rated the teacher in the control group more favourably. This class also had greater reading ability in pre-test measures. This is consistent with other research (Finley, 1984; Gamoran & Berends, 1987; Oakes, 1985), which indicates that lower track classes are more likely to have lower-ability teachers.

The teacher survey highlights potential correlations between the amount of skills the teachers have, and opportunities for professional discussion (Zeegers, 2013), which can be attributed to the benefits of reflective practice (Hilton, Flores, & Niklasson, 2013). Also, the number of years that a teacher has been teaching does not correlate with their effectiveness (Rice, 2013).

#### 5.6.8. Feedback on the Programme

The teacher's semi-structured interview indicated several sub-themes which could be regarded as facilitators to successful implementation of the main study:

- SHORS could be used across CfE. It is debated within the literature how domain-specific the components of metacognition are. This will be influenced by the definitions and the model of metacognition that is being referred to and which domains are in question (Poitras & Lajoie, 2013). Studies have predominantly been conducted with adults whose metacognitive skills are domain-general (Schraw, Dunkle, Bendixen, & Debacker Roedel, 1995). However, metacognitive skills are domain-specific for children (Veenman & Spaans, 2005; Vo, Li, Kornell, Pouget, & Cantlon, 2014). There are questions around the development of metacognition and how students can be

supported in this development. Having a teaching methodology that supports metacognitive growth across the domains is beneficial (Baker, 1994)

- SHORS helped develop relationships both between (a) teacher and pupils and (b) between the pupils and their peers. This is consistent with the body of literature which widely supports by interventions using peer assisted approaches to develop comprehension skill (Fuchs, Fuchs, Mathes, & Simmons, 1997; Topping, 2005)
- The teacher reported that SHORS was enjoyable, which will have a positive impact upon motivation (Eccles, Wigfield, & Schiefele, 1998); enjoyment allows investment by the individual who will therefore in the programme (Fixsen et al., 2009)
- The teacher reported that the SHORS programme allowed for greater flexibility which can be regarded as one of the fundamental properties of a creative learning environment (Davies et al., 2013; Jeffrey, 2006)
- The teacher felt upskilled and therefore had a greater sense of self efficacy. With self-efficacy being correlated with teacher's thinking practices (Dilekli & Tezci, 2016), this allows greater opportunities for children to learn their metacognitive skills via the role model of the increasingly metacognitive-aware teacher.

## 5.7 Pilot Discussion

### 5.7.1. Reading habits

It was anticipated that the main study would yield information on a variety of pupil outcomes, the main one being reading comprehension as measured by the WIAT-II<sup>UK</sup> sub-test. Given the interaction between reading habits and reading ability, it was recognised that gathering information on the frequency of reading at home sessions and number of books read during the intervention period when compared to the pre-intervention period may add some explanatory understandings of levels of change. Therefore, two additional questions to children at pre- and post-assessment periods were to be incorporated, given the ease of implementation.

Therefore children would be asked:

- How often do you read at home per week?
- How many books have you read over the last two months?

#### 5.8. Pilot Study 1- Conclusions

The school, teacher and pupil feedback suggested the approach was acceptable. Also, as the process was considered positive and the pilot ran smoothly, it can be concluded that the SHORS approach can be successfully implemented within NAC. The measurement tools were feasibility and effective. However, the effect size of the pilot indicates that the number of participants should be recalculated. Furthermore, opt-in consent from all parents for a larger scale study would not be viable and discussion with the ethics board was necessary.

This chapter has detailed the pilot study and discussion has informed the main study 2. The main study 2 will be discussed in Chapter 6.

## Chapter 6: Empirical investigation on developing higher-order reading skills: a metacognitive approach

### 6.1 Study 2 introduction to the SHORS intervention

This study adds to existing literature in the following ways: firstly, it is a controlled study of an innovative approach to reading comprehension to determine the potential of SHORS as an intensive, high impact, short-term and feasible intervention at the key Primary 5 stage; secondly, it extends the literature with regard to the effects of intrinsic motivation, metacognitive knowledge of strategy use and intervention implementation upon reading outcomes; and thirdly, it takes account of the interactive variables of learner, teacher and learning environment (Bohn-Gettler & Kendeou, 2014) and through measurement of outcomes at each of these levels, will develop our understanding of their relative contributions to effective reading comprehension.

### 6.2 Study 2 Research questions Recap:

The research questions, hypothesis and measures can be seen in Chapter 4.

### 6.3 Study 2 Design

This is a mixed-model, 2x3x2 quasi-experimental design with group (intervention versus control), and reading ability (higher, average and lower reading ability) as between-group independent variables and time-point (pre-versus post-intervention) as a within-group independent variable. The unit of randomisation was the school. Instrumentation, materials, participants, dependent variables and analysis were as per Chapter 4 unless otherwise stated.

An intention-to-treat analysis (Hollis and Campbell, 1999) was undertaken in the event of missing data.

Effect sizes determined from the pilot indicated that 22 participants per variable would be needed to ensure a statistical effect of 0.80 (Cohen, 1988). Therefore, in order to explore

differences in groups of children with lower, average and higher-levels of reading comprehension at pre-test, 66 participants were required plus 10% to allow for attrition rates.

## 6.4 Study 2 Sample

### 6.4.1 Study 2 Schools sample

The pilot's intervention and control schools had not been sufficiently well matched at pre-test point and therefore are inappropriate for powerful statistical analysis; thus, additional checks needed to be undertaken prior to the main study to better match the intervention and control groups. The authority is an Attainment Challenge authority and had established a Professional Learning Academy (PLA) which aims to work across the authority to support learning and teaching and to improve attainment (see Chapter 1). The PLA were supporting the implementation of many initiatives within schools which potentially created performance or dilution biases (Torgerson, 2008; Torgerson & Torgerson, 2013) for the current study. Therefore, communication and negotiation with the PLA was necessary to ensure minimisation of these confounding variables. This informed the first phase of school selection, where schools that were not taking part in PLA initiatives could be matched by geographical area, SIMD and of the same ranked quartiles (see 5.3.1.1).

Informed by the pilot, 4 schools with Primary 5 classes were required and therefore potential schools were considered in a second phase of school selection scrutiny. All children within the authority had taken part in national reading comprehension tests using the New Group Reading Test (NGRT) (see Section 5.5.5) four months prior to the intervention period. This facilitated initial analysis to ensure that reading levels in the candidate intervention and control groups were equivalent (see Section 4.4).

The NGRT standard scores were analysed and candidate school's descriptive statistics of standard scores can be seen in Table 17 below. A one-way ANOVA was conducted and showed the school effect on standard scores was not significant  $F(3,108) = 0.60, p = .61$  (two-tailed

test) indicating that the null hypothesis of no group differences of pre-intervention reading levels could be accepted.

Table 17. Descriptive statistics of Standard Scores of NGRT

School Reference	N	Mean	SD	Std. Error
<b>A</b>	31	95.81	12.74	2.29
<b>B</b>	28	91.32	13.58	2.57
<b>C</b>	26	93.27	14.46	2.84
<b>D</b>	27	92.44	12.85	2.47
Total	112	93.29	13.32	1.26

Further sensitivity checks were then conducted and the ‘worst case scenario’ was modelled to examine the effects of randomisation of the two higher-performing schools (A and C) to the same condition and then compared with the two lower-performing schools (B and D). The results revealed the ‘worse-case scenario’ would result in a between-group difference of 2.78 standard score points, which was non-significant ( $t_{110} = 1.10$ ,  $p = .14$ , one-tailed test) and equates to a Cohen’s  $d$  of 0.21, a small effect size. Accordingly, the decision was made to randomise all schools to one of the two conditions.

Randomisation procedures allocated Schools A and B to the intervention group, and Schools C and D to the control group. This yielded a between-group difference of 0.83 standard score points, which was non-significant ( $t_{110} = 0.33$ ,  $p = .37$ , one-tailed test) and in turn equates to a Cohen’s  $d$  of 0.06, a negligible between-group effect size. This confirmed the equivalence of the two groups in terms of the pupil’s reading scores on the NGRT prior to the intervention.

The range of standard score (SS) for the NGRT was 58 and the scores were normally-distributed ( $M = 93.29$ ,  $SD = 13.32$ ) with non-significant coefficients for skewness and kurtosis, as shown in Figure 19,

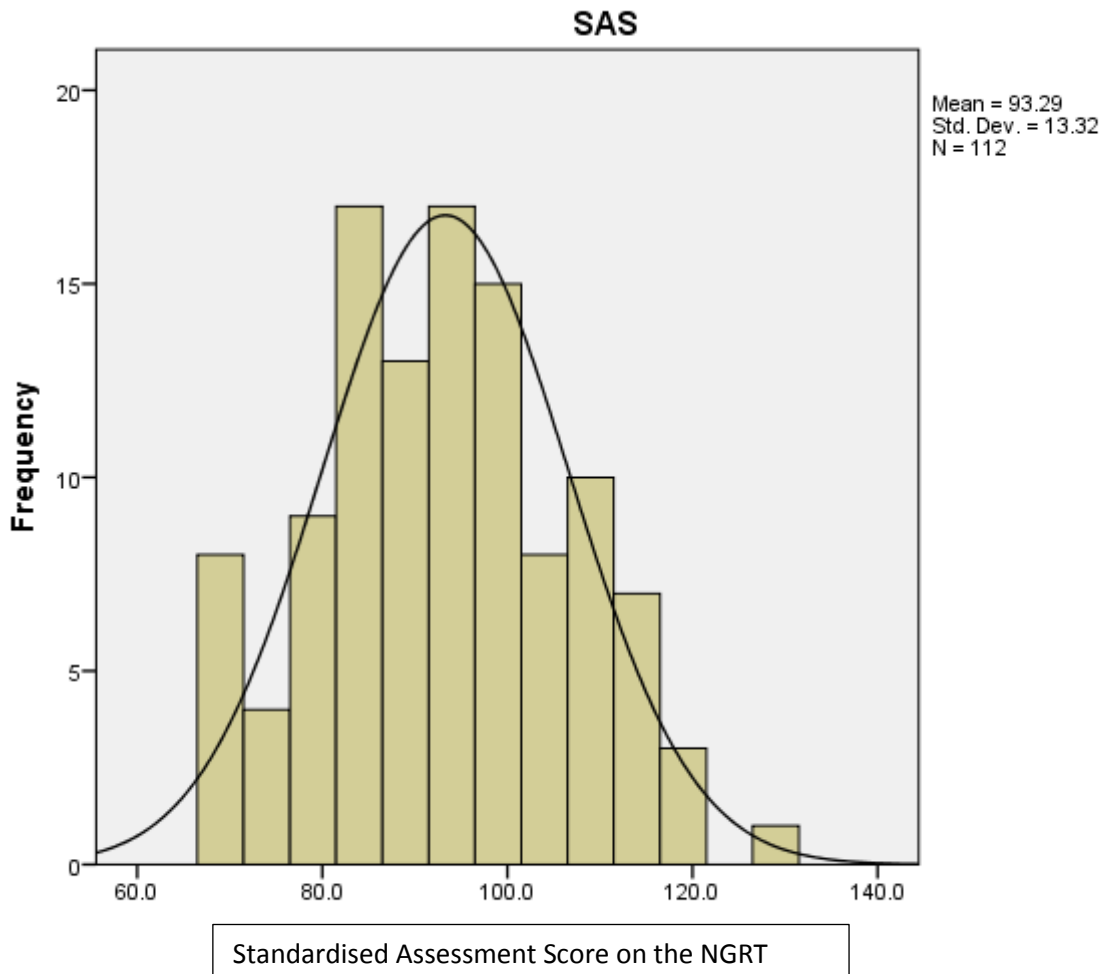


Figure 19 Distribution of NGRT standard scores

HTs of the four schools were then approached to request their participation.

#### 6.4.2 Study 2 Children sample

A sample of 74 children (39 females and 35 males) aged between 9 and 10 years old, from 5 classes of Primary 5 children were requested to take part. 64 children were White Scottish, 3



White non-Scottish, 2 Asian and 5 not known. Two children spoke English as a second language. Eight children were looked after children (LAC).

#### 6.4.3 Study 2 Teacher sample

Five teachers took part (3 in the intervention condition and 2 in the control condition). All were female and ages ranged from 24 to 62 with teaching experience ranged from 1- 19 years.

Descriptive information on group allocation can be seen in Table 18 below.

*Table 18: Group allocation data*

<b>School Reference</b>	<b>Condition</b>	<b>Teacher Codes</b>	<b>N. of children</b>
<b>A</b>	Intervention	Intervention 2 (CK)	18
<b>A</b>	Intervention	Intervention 3 (AW)	9
<b>B</b>	Intervention	Intervention 1 (PS)	9
<b>C</b>	Control	Control 1 (GH)	24
<b>D</b>	Control	Control 2 (WS)	14

#### 6.5 Study 2 measures

Assessment was the same as in chapter 4 with the addition of a pre-intervention measure of reading ability based upon the NGRT standard Scores outlined above.

As mentioned in Section 5.5.11, children were asked two additional questions at pre and post-test points. This was on an individual basis by the researcher/research assistant conducting the WIAT-II<sup>UK</sup> reading comprehension sub-test. The purpose was to ascertain whether there was any reported change to children's reading habits.

The questions were:

- 1) Per week, how often do you read at home?

2) How many books have you read in the last two months?

#### 6.6. Procedure

The study procedure was as described in Chapter 4 unless the pilot informed otherwise. The pilot had highlighted issues around allocated spaces for pupil assessments, therefore more explicit discussions took place and agreement was given by schools to better plan for this. Given the difficulty in gaining active consent within the pilot it was deemed unfeasible to expect this from the larger numbers of children necessary within the main study. Evidence from schools was gathered to support this and was forwarded to the University of Strathclyde's School of Psychological Sciences and Health ethics committee to request a change to passive consent, which was subsequently agreed to. Training for teachers and the delivery of the programme were as per Study 1 except that one of the intervention schools wanted all of their staff to be trained in the approach. Given the peer/management support and their associated implementation of core components, this was deemed an appropriate request which potentially could increase the level of implementation fidelity (Fixsen et al., 2009).

The timeline is described in Table 19 below.

Table 19: Revised Main Study time line

Week 1, (W/C 22nd August 2016) Teacher selection	As per Study 1
Week 2 (W/C 29th August) Getting consent	Passive consent gained from parents (see below
Weeks 3 Pre-test (W/C 5th September) Pre-test phase Assessments	As per Study 1 with additional questions regarding reading frequency.
Week 4- (W/C 12th September) Pre-intervention observations and In-service training of intervention	
Week 5 intervention programme- (W/C 19th September for 8 weeks until Friday 18th November).	As per Study 1 Fidelity observations took place during week 3 and 6.
(Although it is an 8-week programme the dates show a longer period to allow for October holidays)	
Weeks 13 (21st November) Post-test assessments and implementation assessment	As per Study 1 with additional question regarding reading frequency.
Weeks 14 and thereafter Analysis and write up phase	As per Study 1

## 6.7 Main Study 2- Quantitative Results

### 6.7.1 WIAT-II<sup>UK</sup> Reading Comprehension subtest

The descriptive statistics with means and standard deviations are seen in Table 20 below:

Table 20: WIAT-II<sup>UK</sup> Measure of Reading pre and post descriptive statistics

	Control Group		Intervention Group	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Pre WIAT-II <sup>UK</sup> RC SS	89.61	13.23	92.03	12.87
Post WIAT-II <sup>UK</sup> RC SS	91.97	12.39	102.00	15.17
WIAT-II <sup>UK</sup> RC SS change	2.37	9.67	9.97	8.97
Pre WIAT-II <sup>UK</sup> Fluency	66.94	28.91	61.54	29.77
Post WIAT-II <sup>UK</sup> Fluency	59.29	31.51	53.37	27.14
Fluency Change	-7.66	13.63	-8.17	23.06
Pre WIAT-II <sup>UK</sup> target words	22.55	3.96	22.28	3.45
Post WIAT-II <sup>UK</sup> target words	22.26	4.50	23.22	3.36
Target Word Change	-0.29	2.38	0.94	2.01

#### 6.7.1.1. WIAT-II<sup>UK</sup> RC subtest

Preliminary analysis of data was undertaken to ensure that the data met the test's basic assumptions. Informed by new approaches to statistical analysis, Torgerson & Torgerson (2013) argue that where pre-test and post-test correlations exceed 0.5 an ANCOVA offers more effective analysis; this was the case in the pilot (0.86) and in the main study (0.74), therefore, homogeneity of regression was ascertained (see 4.10.1). As such, an ANCOVA was conducted to test the effect of the between-subjects factor group (intervention or control conditions).

A one-way, between-subjects analysis of covariance, with the WIAT-II<sup>UK</sup> pre-test scores as covariate and the adjusted post-test WIAT-II<sup>UK</sup> reading comprehension sub-test as dependent variable, resulted in a statistically significant main effect of group (intervention versus control):  $F(1,71) = 14.63, p < .005$ , partial  $\eta^2 = .17$ . The adjusted mean score for the intervention group was 101.00 (upper and lower bounds with 95% confidence intervals of 97.99-104.01) compared to 92.92 (upper and lower bounds with 95% confidence intervals of 89.99-95.86) for

the control group. The unadjusted mean score for the intervention group was 102.00 compared to 91.97 for the control group.

Effect sizes within the McCartney et al., (2015) paper (based on pre/post-test for an intervention group only) were reported as Cohen's  $d$  and therefore further calculations of Cohen's  $d$  were made using the mean and standard deviation to allow for comparisons. Comparison of intervention and control groups change scores, using a comprehensive meta-analysis programme, indicated a large effect size of  $d = 0.81$  with CIs of 0.34-1.29. Preliminary calculations (see Section 4.7.3) had indicated that an effect size of Cohen's  $d$  of more than 0.67 would be necessary to attribute change to the intervention and not measurement error. The observed ES indicated that the mean reading comprehension score change for the intervention group cannot be attributed entirely to measurement error and that the null hypothesis (Hypothesis A- The children within the experimental group will have higher reading comprehension post-intervention scores after controlling for pre-test reading comprehension scores) of no group differences of post-intervention reading levels could be rejected. The within group effect size of the intervention group was 0.72 which is greater than the control group's within group effect size of 0.18.

Post-hoc tests showed the mean reading comprehension scores for the intervention group changed from 92.03 at pre-test to 102.00 at post-test with standard deviations of 12.87 and 15.17 respectively. An individually matched or paired t-test showed that the difference between conditions was statistically significant ( $t = 6.67$ ,  $df = 35$ ,  $p < .0005$  two-tailed). The magnitude of the differences in the means ( $M = 9.97$ ,  $SD = 8.97$  reading comprehension standard scores, 95% CI: 13.01 to 6.94) was large ( $d = 0.71$ ). This can be compared to the adjusted mean reading comprehension scores for the control group where means changed from 89.61 at pre-test to 91.97 at post-test, with standard deviations of 13.22 and 12.39 respectively. A paired t-test showed that the difference between pre- and post-test conditions for the control condition was

not statistically significant ( $t = 1.51$ ,  $df = 37$ ,  $p = .14$  two-tailed). The magnitude of the differences in the means for the control group ( $M = -2.37$   $SD = 9.67$  reading comprehension standard scores, 95% CI: -5.55 to 0.81) was small ( $d = 0.17$ ).

#### 6.7.1.2. Impact on reading comprehension for different reading ability groups as determined by *WIAT-II<sup>UK</sup>* RC SS pre-test

Within the McCartney et al., (2015) study, the SHORS intervention proved equally beneficial for Language Learning Impaired (LLI) and non-Language learning impaired (Non-LLI) which led to conclusions that the intervention was a universal approach. The current study tested for universality by assessing intervention impact on each of the reading ability subgroups as categorised by measurements of the *WIAT-II<sup>UK</sup>* pre-test (lower ability, average ability and higher ability).

For the intervention group, three reading sub-groups were defined using tertiles (with equal numbers in each group) based on the *WIAT-II<sup>UK</sup>* RC pre-test standard scores:

- High-average ability reading level: *WIAT-II<sup>UK</sup>* Pre-test SS of  $> 97$  ( $N = 12$ )
- Average-ability reading level: *WIAT-II<sup>UK</sup>* Pre-test SS of 88-96 ( $N = 12$ )
- Low-average ability reading level: *WIAT-II<sup>UK</sup>* Pre-test SS of  $< 87$  ( $N = 12$ )

A one-way between-subjects ANCOVA was conducted, with the covariant being the *WIAT-II<sup>UK</sup>* pre-test scores, the group factor being the reading ability subgroup and the dependant variable the post-test *WIAT-II<sup>UK</sup>* reading comprehension sub-test. This revealed the pre-test *WIAT-II<sup>UK</sup>* scores were significantly related to the post-test *WIAT-II<sup>UK</sup>* scores  $F(2,32) = 12.90$ ,  $p = .01$ ,  $\eta^2 = .29$ . Adjusting with the covariant resulted in a non-statistically significant effect of between-tertile factor group (lower, average, higher reading ability group)  $F(2,32) = 0.70$ ,  $p = .50$ , partial  $\eta^2 = .42$ . The adjusted mean scores with standard deviations and Cohen's  $d$  effect sizes can be seen in Table 21 below.

Table 21: Tertile WIAT-II<sup>UK</sup> descriptive data

Intervention		WIAT-II <sup>UK</sup> pre-test	WIAT-II <sup>UK</sup> post-test	Cohen's <i>d</i>
		standard score	standard score	
<b>Lowest tertile N=12</b>	Mean	78.08	90.33	1.15
	SD	5.73	13.94	
<b>Average tertile N=12</b>	Mean	91.17	99.08	1.01
	SD	3.19	10.65	
<b>Highest tertile N=12</b>	Mean	106.83	116.58	1.69
	SD	5.67	5.87	

As such, the null hypothesis (B) of no group interaction can be accepted as it stated: Of the children within the experimental condition, there will be no difference between the tertiles' change scores of children of lower, average and higher reading ability and as such the intervention can be described as a universal approach.

Figure 20 below illustrates equivalence between the tertiles in regard to pre- versus post-intervention scores and the equity of impact of the intervention across ability sub-groups.

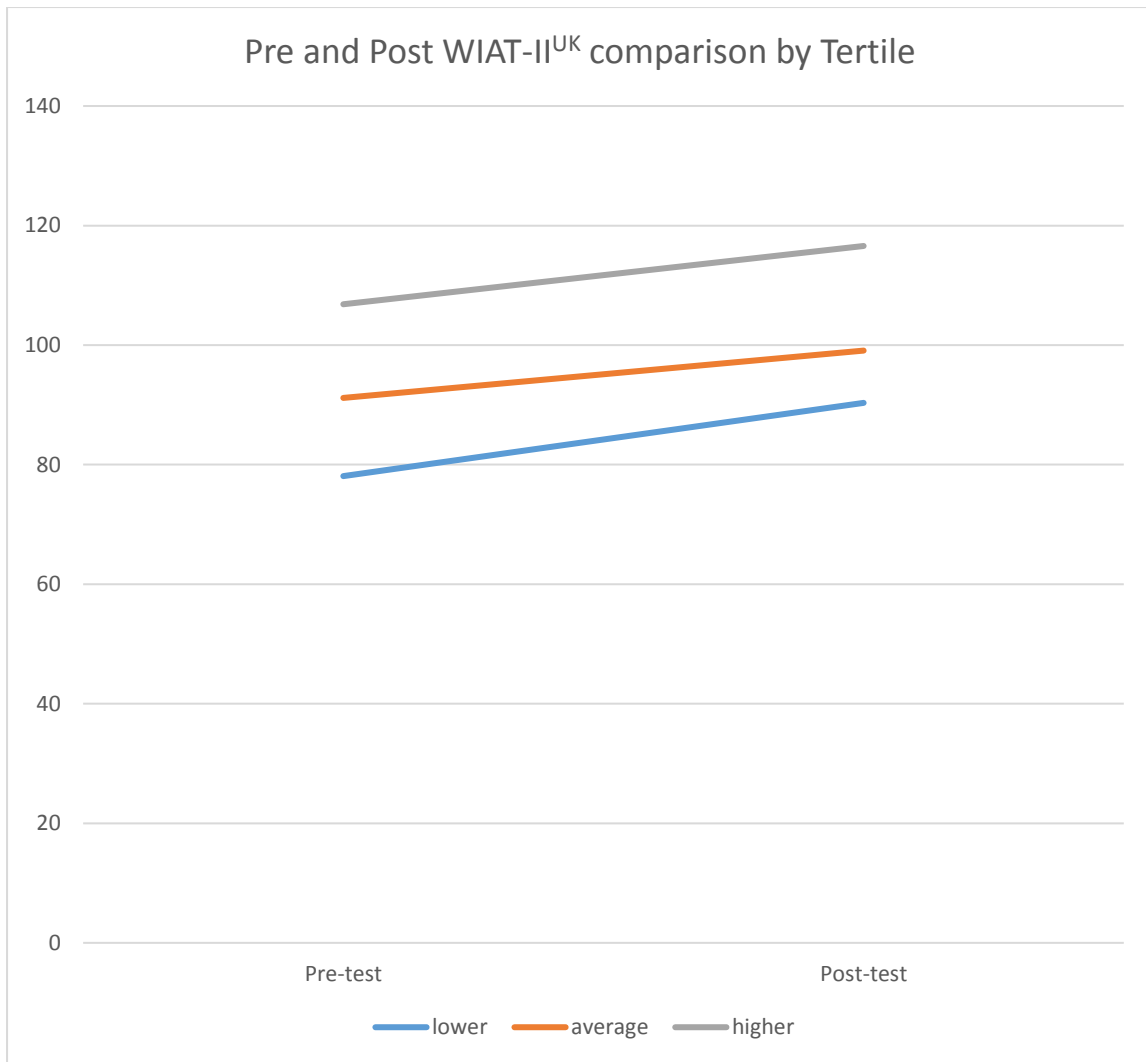


Figure 20 Pre- and post-test comparison by tertile

### 6.7.1.3. Impact on reading comprehension by teacher effect

Secondary analysis was undertaken to determine whether a between-groups teacher effect would have a statistically significant impact upon intervention outcomes. There were three teachers within the intervention condition and descriptive statistics for the teacher effect for the intervention children were as Table 22:



Table 22: Teacher effect

Teacher Codes	School Reference	Pre		Post		Effect
		Mean	St Dev	Mean	St Dev	Size- Cohen's <i>d</i>
<b>Intervention 1 (PS) (N=9)</b>	B	88.67	16.42	98.22	19.52	0.52
<b>Intervention 2 (CK) (N=18)</b>	A	93.89	9.85	102.33	14.47	0.68
<b>Intervention 3 (AW) (N=9)</b>	A	92.78	12.65	103.72	13.60	0.83
<b>Control 1 (GH) (N=24)</b>	C	92.83	13.60	94.83	11.11	0.16
<b>Control 2 (WS) (N=14)</b>	D	84.07	10.87	87.07	13.349	0.25

As can be seen, the mean scores for the different teachers ranged from 98.22 to 103.72. A one-way, between-subjects analysis of covariance was carried out to assess the impact of teacher effect on overall performance on the post-test WIAT-II<sup>UK</sup> scores. Checks were carried out to confirm homogeneity of regression and linear relationship between covariate and dependant variable. The between-subjects factor comprised of three groups: pupils of intervention teachers 1, 2 and 3. The covariate comprised of the pre-test WIAT-II<sup>UK</sup> reading comprehension scores and this was significantly related to the post-test WIAT-II<sup>UK</sup> reading comprehension scores:  $F(32,2) = 59.21, p < .0025$ , partial  $\eta^2 = 0.65$ . Adjusting for this covariate resulted in a non-statistically significant effect of between-subjects factor group:  $F(32,2) = 0.23, p = .79$  partial  $\eta^2 = .01$ . The adjusted mean post-test scores for the intervention teachers 1,2 and 3 were, 101.42, 103.01 and 100.56 respectively. However, lack of statistical significance may be attributable to the small sample sizes and the lack of statistical power.

#### 6.7.1.4. Impact on decoding target words.

In order to test Hypothesis C (the children within the experimental group will have increased decoding of target word post-intervention scores after controlling for pre-test decoding of target word) analysis was also undertaken using ANCOVA with the covariate being the WIAT-II<sup>UK</sup>

pre-test target words scores and the dependent variable the post-test WIAT-II<sup>UK</sup> target word score. This resulted in a statistically significant effect of group (intervention versus control):  $F(1,71) = 5.59, p = .02, \text{partial } \eta^2 = .07$ . The adjusted mean score for the intervention group was 23.35 compared to  $M = 22.14$  for the control group. To conform to the statistical approach, calculations of Cohen's  $d$  were made to allow for comparability, which indicated a medium effect size ( $d = 0.56$ ).

Post-hoc tests showed the mean reading target word scores for the intervention group changed from 22.28 at pre-test to 23.22 at post-test, with standard deviations of 3.45 and 3.36 respectively. A paired t-test showed that the difference between conditions was statistically significant ( $t = -2.81, df = 35, p < .01$  two-tailed). The magnitude of the differences in the means ( $M = -0.94, SD = 2.01$  reading comprehension standard scores, 95% CI: -1.63 to -0.26) was small ( $d = 0.27$ ). This can be compared to the mean reading target word scores for the control group where means changed from 22.55 at pre-test to 22.26 at post-test, with standard deviations of 3.96 and 4.50 respectively. A paired t-test showed that the difference between conditions was not statistically significant ( $t = 0.75, df = 37, p = .46$  two-tailed). The magnitude of the differences in the means ( $M = 0.29, SD = 2.38$ , reading target word standard scores, 95% CI: 0.49 to -1.07) was small ( $d = -0.07$ ).

This indicated that the mean target word score change for the intervention group cannot be attributed entirely to measurement error and that the hypothesis (Hypothesis C- The children within the experimental group will have increased decoding of target word post-intervention scores after controlling for pre-test decoding of target word) could be accepted.

#### 6.7.1.5. Impact on fluency

In a similar way the impact on fluency was to be calculated using ANCOVA with the covariate being the WIAT-II<sup>UK</sup> pre-test fluency scores and the dependant variable the post-test WIAT-

II<sup>UK</sup> fluency score was attempted. However, preliminary tests of homogeneity and regression to the mean did not meet the assumptions of a one-way, between-subjects analysis of covariance. Therefore, informed by an understanding of new statistical procedures (Dimitrov & Rumrill, 2003; Knapp & Schafer, 2009; Miller & Chapman, 2001) it was decided that a different statistical approach should be taken, since ANCOVAs, while effective for well-matched group comparison are inappropriate for groups with large between-group differences. A change score was constructed. While the speed of reading had increased, with reading time reducing more for the intervention condition ( $M = -8.17$ ,  $SD = 23.06$ ) than the control group ( $M = -7.66$ ,  $SD = 13.63$ ) a one-way between-subjects ANOVA of change showed that the difference between conditions was not significant ( $F(72,1) = 0.01$ ,  $p = .91$  one tailed) and yielded a small effect size ( $d = 0.03$ ).

This indicated that the mean fluency score change for the intervention group could be attributed to measurement error and that the hypothesis (Hypothesis D- The children within the experimental group will have increased fluency rate post-intervention scores after controlling for pre-test fluency rates) is rejected and the null hypothesis of no group differences of post-intervention reading levels is accepted.

#### 6.7.2 Children's self-rated scales of Strategies used (SRSU)

Preliminary analysis revealed that the pre-test self-reported strategy use scores (SRSU) were equally matched between the control and intervention groups. Therefore, an ANCOVA was conducted to test the effect of the between-subjects factor group, conditions of intervention and the control groups.

Using an intention-to-treat approach, all participants were included in the analysis regardless of whether or not they were available for post-test assessments. The dropout rate was 7 of the 74 children. The descriptive statistics with means and standard deviations are as Table 23:

Table 23: Main study SRSU descriptive data

	Control		Intervention	
	Mean	SD	Mean	SD
Pre SRSU	25.47	3.97	23.19	8.53
Post SRSU	24.79	3.50	27.75	9.11
SRSU change	-0.68	3.76	4.56	9.11

A one-way, between-subjects analysis of covariance, with the covariate being the SRSU pre-test scores and the dependant variable the post-test SRSU, resulted in a statistically significant effect of group (intervention versus control):  $F(1,71) = 8.48, p = .005$ , partial  $\eta^2 = 0.11$ . The adjusted mean score for the intervention group was 28.17 compared to 24.39 for the control group. Conversions from Partial Eta Squared to Cohen's  $d$  were made to allow for comparability and resulted in a medium effect size ( $d = 0.75$ ).

A paired t-test showed that the difference between conditions was statistically significant ( $t = -3.00, df = 35, p = .005$  two-tailed). The magnitude of the differences in the means (mean difference =  $-4.56$  SRSU scores, 95% CI:  $-7.64$  to  $-1.47$ ) was a medium ES ( $d = 0.52$ ). This can be compared to the adjusted mean reading comprehension scores for the control group where means changed from 25.47 ( $SD = 3.97$ ) at pre-test to 24.79 ( $SD = 3.75$ ) at post-test. A paired t-test showed that the difference between pre- and post-test conditions for the control condition was not statistically significant ( $t = 1.12, df = 37, p = .27$  two-tailed). The magnitude of the differences in the means (mean difference =  $0.68$  SRSU scores, 95% CI:  $-.55$  to  $1.92$ ) was small ( $d = 0.18$ ).

This indicated that the mean self-reported use of reading comprehension strategies score change for the intervention group cannot be attributed entirely to measurement error and that the hypothesis (Hypothesis E  $\neg$  The children within the experimental group will have higher self-reported use of reading comprehension strategies post-intervention scores after controlling

for pre-test self-reported use of reading comprehension strategies) is accepted and the null hypothesis of no group differences of post-intervention reading levels could be rejected. Yet, given the reliability of this measure, such assumption should be treated with caution.

Further calculations took place to identify whether there was a between-groups teacher effect when comparing the 3 teachers. Descriptive statistics for the teacher effect for the intervention children were as Table 24:

Table 24: Main study, SRSU descriptive data by teacher

Teacher Codes	School Reference	Adjusted Mean	SD
Intervention 1 (PS)	B	26.22	2.99
Intervention 2 (CK)	A	27.89	10.16
Intervention 3 (AW)	A	29.00	7.75

The adjusted mean scores for teachers 1, 2 and 3 were 26.36, 27.95 and 28.73 respectively. A one-way, between-subjects analysis of covariance was carried out to assess the impact of teacher effect on overall performance on the post-test SRSU scores. Checks were carried out to confirm homogeneity of regression and linear relationship between covariate and dependant variable. The between-subjects factor comprised of three groups: Intervention teachers 1, 2 and 3. The covariate comprised of the pre-test SRSU scores. Adjusting for this covariate resulted in a non-statistically significant effect of between-subjects factor group:  $F(32,2) = 0.24$ ,  $p = .79$  partial  $\eta^2 = 0.01$ . However, the lack of statistical significance may be attributable to small sample sizes.

### 6.7.3 MRQ

Of the participants, 66 completed and returned the MRQ, used as measures of motivation for reading. These were gathered at the pre-intervention point and were used to determine the homogeneity of the group. Means and standard deviations can be seen in Table 25 below:

Table 25: Main study MRQ descriptive data

<b>Group Statistics</b>						
Motivation for reading component	Group (Intervention, Control)	N	Mean	SD	Std. Error Mean	
EFFICACY	Intervention	32	3.02	0.72	0.13	
	Control	34	2.97	1.04	0.18	
CHALLENGE	Intervention	32	3.10	0.60	0.11	
	Control	34	2.97	0.59	0.10	
CURIOSITY	Intervention	32	3.05	0.64	0.11	
	Control	34	3.05	0.69	0.12	
INVOLVEMENT	Intervention	32	3.57	1.97	0.35	
	Control	34	3.02	0.53	0.09	

The differences between the control and intervention conditions were calculated using independent groups t-tests, which indicated no statistically significant differences in efficacy ( $t = 0.23, df = 64, p = .82$ ) challenge ( $t = 0.88, df = 64, p = .38$ ) curiosity ( $t = 0.01, df = 64, p = .99$ ) or involvement ( $t = 1.56, df = 64, p = .12$ ).

#### 6.7.4 Frequency of reading at home as reported by the children.

Descriptive statistics can be seen in Table 26 below.

Table 26: Main study Reading Frequency descriptive data

	Control		Intervention	
	Mean	SD	Mean	SD
Pre-reading frequency	2.66	1.05	2.25	1.25
Post-reading frequency	2.50	0.98	2.94	1.02
Reading Frequency Change score	-0.16	1.03	0.69	0.89

An ANCOVA, with the covariate being the reported frequency of reading at home pre-test scores and the dependant variable the post-test reported frequency of reading at home, resulted

in a statistically significant effect of group (intervention versus control) with  $F(1,71) = 11.96$ ,  $p < .001$ , partial  $\eta^2 = 0.14$ . The adjusted mean score for the intervention group was 3.06 (upper and lower bounds with 95% confidence intervals of 2.79-3.34) compared to 2.39 (upper and lower bounds with 95% confidence intervals of 2.12-2.66) for the control group. As before further calculations were made to identify the Cohen's  $d$ , which was large ( $d=0.88$ ).

Post-hoc tests showed the adjusted mean reported frequency of reading at home for the intervention group was 3.06 which can be compared to the control 2.39. A paired t-test showed that the difference between conditions was statistically significant ( $t = -4.69$ ,  $df = 35$ ,  $p < .0005$  two-tailed). The magnitude of the differences in the means (mean difference =  $-0.69$  reported frequency of reading at home, 95% CI:  $-0.99$  to  $-0.39$ ) was medium ( $d = 0.60$ ). This can be compared to the control where a paired t-test showed that the difference between pre- and post-test conditions for the control condition was not statistically significant ( $t = 0.95$ ,  $df = 37$ ,  $p = .35$ , two-tailed) and the magnitude of the differences in the means (mean difference =  $0.16$  reading comprehension standard scores, 95% CI:  $0.17$  to  $0.50$ ) was small ( $d = 0.16$ ).

This indicated that the mean self-reported frequency of reading score change for the intervention group cannot be attributed entirely to measurement error and that the hypothesis (Hypothesis F The children within the experimental group will report an increased amount of time spent reading at home post-intervention scores after controlling for pre-test self-reports of the same?) can be accepted. Yet, given the reliability of this measure, such assumption should be treated with caution.

It can be seen that the intervention group reported reading more frequently during the intervention period than prior to the intervention period. However, the control group reported reading less frequently during the intervention period than prior to the intervention period. The box plot in Figure 21 below illustrates the change scores of the intervention group and the control group.

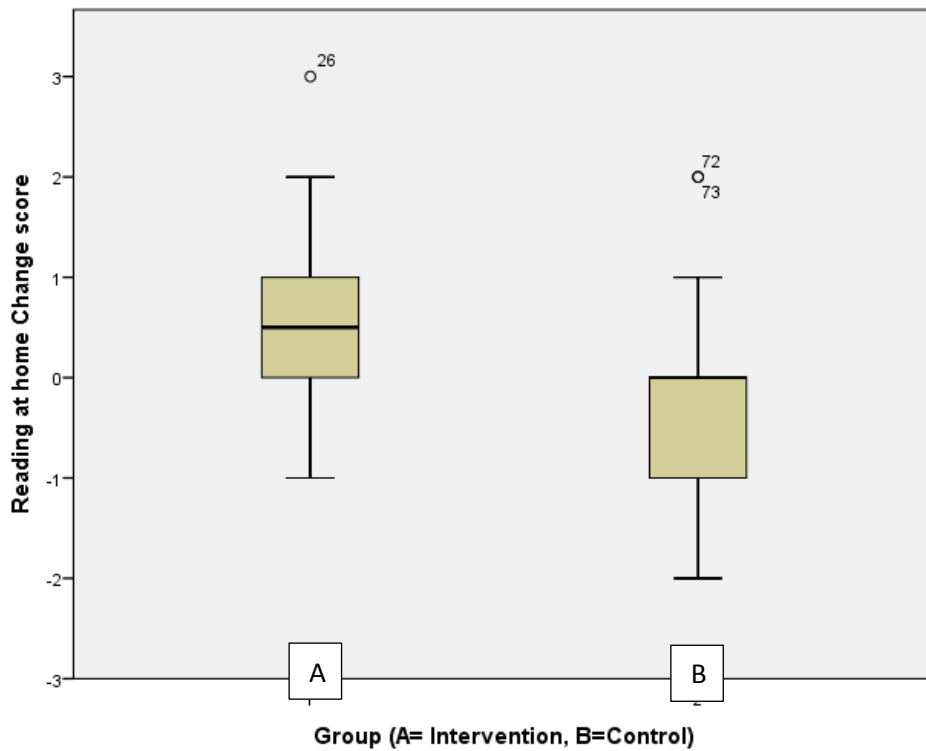


Figure 21: Box plot of Main study pre and post-test change score comparison of reading frequency for intervention and control groups

### 6.7.5 Number of books read

The descriptive statistics with adjusted means and standard deviations are as Table 27 below:

Table 27: Main study number of books read descriptive data

	Control		Intervention	
	Mean	SD	Mean	SD
Pre-reading frequency	2.26	1.04	2.25	1.13
Post-reading frequency	2.37	1.26	2.58	1.02
Reading frequency change score	0.11	1.20	0.33	0.93

A one-way, between-subjects analysis of covariance, with the covariate being the reported number of books read pre-test scores and the dependant variable the post-test reported number of books read post-test, resulted in a non-statistically significant effect of group (intervention versus control):  $F(1,71) = 1.04$ ,  $p = .31$ , partial  $\eta^2 = 0.01$ . The adjusted mean score for the



intervention group was 2.59 (upper and lower bounds with 95% confidence intervals of 2.28-2.90) compared to 2.37 (upper and lower bounds with 95% confidence intervals of 2.06-2.67) for the control group. Similarly to other results, a Cohen's  $d$  was calculated, which showed a small effect ( $d = 0.20$ ).

This indicated that the mean self-reported number of books read score change for the intervention group could be attributed to measurement error and that the hypothesis should be rejected and the null hypothesis accepted (Hypothesis G- The children within the experimental group will report an increased amount of books read at home post-intervention scores after controlling for pre-test self-reports of the same?) Yet, given the reliability of this measure, assumptions should be treated with caution.

#### 6.8 Relationships between variables

A Pearson's  $r$  parametric test of correlations was conducted on each of the outcome variables at the pre-test stage. Only data acquired at the pre-test points were correlated to reduce confounding variables. Some children chose not to complete and return the questionnaires and therefore their WIAT-II<sup>UK</sup> data could not be used for analysis of correlations. The direction and strength of the correlations reported as Pearson's  $r$  are reported within Table 28 below with significances highlighted.

Table 28: Correlational data

	WIAT-II <sup>UK</sup> pre-test standard score	Pre-Self-Reported Use of strategies	Efficacy	Challenge	Curiosity	Involvement	WIAT-II <sup>UK</sup> target words pre	WIAT-II <sup>UK</sup> pre-test fluency average	No of books pre-test code	Reading at Home Pre-test coded
WIAT-II <sup>UK</sup> pre-test standard score R	1									
N	74									
Pre-test Self- Reported strategy Use	0.08	1								
N	69	69								
Efficacy	0.23	0.19	1							
N	66	63	66							
Challenge	0.05	0.36**	0.16	1						
N	66	63	66	66						
Curiosity	-0.10	0.29*	0.43**	0.32**	1					
N	66	63	66	66	66					
Involvement	0.21	0.46**	0.18	0.36**	0.34**	1				
N	66	63	66	66	66	66				
WIAT-II <sup>UK</sup> target words pre-test	0.59**	0.05	0.08	0.12	0.001	0.10	1			
N	74	69	66	66	66	66	74			
WIAT-II <sup>UK</sup> pre-test fluency average	-0.43**	-0.34**	-0.27*	-0.22	-0.01	-0.08	-0.58**	1		
N	73	68	65	65	65	65	73	73		
No of books pre-test coded	0.10	0.23	0.35**	0.24*	0.18	0.19	-0.06	-0.07	1	
N	74	69	66	66	66	66	74	73	74	
Reading at Home Pre-test coded	0.32**	0.18	0.24	0.19	0.11	0.27*	0.11	-0.13	0.41**	1
N	74	69	66	66	66	66	74	73	74	74

\*\* . Correlation is significant at the 0.01 level (2-tailed).

\* . Correlation is significant at the 0.05 level (2-tailed).

The Pearson's r parametric test of correlations showed statistically significant positive, moderate correlations between the sub-components of the WIAT-II<sup>UK</sup> Reading Comprehension

Subtests:

- WIAT-II<sup>UK</sup> reading comprehension subtest and WIAT-II<sup>UK</sup> target words explaining 34% of the variation

- WIAT-II<sup>UK</sup> reading comprehension subtest and WIAT-II<sup>UK</sup> fluency average explaining 18% of the variation

There was also a moderate correlation between the WIAT-II<sup>UK</sup> reading comprehension subtest and the reported frequency of reading at home explaining 10% of the variation. There were no statistically significant correlations between the WIAT-II<sup>UK</sup> reading comprehension subtest and either the MRQ subscales or levels of self-reported strategy use.

The Pearson's *r* parametric test of correlations showed four statistically significant positive, moderate correlations between the sub-components of the MRQ scores:

- Efficacy and curiosity explaining 18% of the variation
- Challenge and curiosity explaining 10 % of the variation
- Challenge and involvement explaining 13% of the variation
- Curiosity and involvement explaining 12% of the variation.

Reading habits as measured by the number of books read and the frequency of reading at homes showed six correlations:

- Number of books reportedly read and Efficacy explaining 12% of the variation
- Number of books reportedly read and Challenge explaining 6% of the variation
- Frequency of reading and home and WIAT-II<sup>UK</sup> reading comprehension subtest explaining 10% of the variation
- Frequency of reading and home and Involvement subtest explaining 7% of the variation
- Frequency of reading and home and Number of books reportedly read explaining 17% of the variation.

This indicated that Hypothesis H (Positive correlations will be observed between the variables of reading comprehension, intrinsic motivation and self-reported use of reading strategies) should be rejected and a null hypothesis of no interaction accepted.

Those variables that were significantly correlated with the criterion variable, post-test WIAT-II<sup>UK</sup> standard scores (SS) were entered as predictors into a multiple regression using the standard method. A significant model emerged:  $F(3,70) = 40.72, p < .005$ . The adjusted  $R^2$  for this model explains 62% of the variance in post-test WIAT-II<sup>UK</sup> SS. Table 29 below gives information about regression coefficients for the predictor variables entered into the model. WIAT-II<sup>UK</sup> pre-test SS and group (intervention or control) were significant predictors (with WIAT-II<sup>UK</sup> pre-test SS as a positive predictor and group being a negative predictor). The reading at home pre-test was not a significant predictor.

Table 29: Test of mediating effect of reading frequency

Model	Unstandardised		Standardised	Sig.
	Coefficients		Coefficients	
	B	Std. Error	Beta	
Reading at Home Pre-test	1.204	.984	.096	.226
WIAT-II <sup>UK</sup> pre-test standard score	.767	.087	.684	.00
Group (A= Intervention, B=Control)	-8.659	2.158	-.298	.000

## 6.9 Summary and Conclusions

The main aim of this study was to add to the evidence base for the SHORS approach by conducting an empirical investigation with a control and in so doing determine its potential impact as an intensive, short-term and feasible intervention within the primary setting. The quantitative results from this study confirm the findings that the condition (control or intervention) resulted in differential effects on the children's reading comprehension outcomes, children's self-reported use of reading comprehension strategies, target word reading and reading habits at home. Furthermore, this study supported the findings of McCartney et al., (2015) that the current methodology results in more positive outcomes for all children and can be described as a universal approach.

An additional aim of the study was to extend the literature regarding the effects of self-efficacy, intrinsic motivation, metacognitive knowledge of strategy use and intervention implementation upon reading outcomes. While there were no statistically significant correlations between pre-test reading comprehension scores and self-reported levels of intrinsic motivation, there were statistically significant correlations between children's self-reported strategy use and the subscales on the MRQ.

Chapter 7 will report the qualitative results of the study.

## Chapter 7: Study 2 Qualitative results

Quantitative analysis has been reported in Chapter 6 while this chapter is concerned with qualitative data. It aims to develop our understanding of teacher and environmental variables which are potentially facilitatory or barrier factors to implementation, sustainability and the capacity-building potential of the SHORS intervention.

As mentioned in Chapter 4, critical incident analysis was used to explore the data, however some data merited analysis in isolation, therefore analysis took place at two levels: the individual instrument level and then combined content analysis across measurement tools. This was for the following reasons:

- Each measurement tool was looked at initially as a mechanism for gathering a coherent picture of the data
- The teacher survey and RCV baseline observations were needed to analyse pre-teacher differences between intervention and control groups; therefore, this merits unit analysis before being incorporated into a wider understanding of overarching theme
- Implementation considerations, a measure using the readiness questionnaire and fidelity observations, also benefited from unit analysis given that they identified any within-group differences in the intervention teachers' sub-group.

Thereafter, a thematic analysis was undertaken which facilitated the identification of initial themes. The data initially used to inform the themes was the post-intervention semi-structured interview, given that this yielded the richest and least structured information which would potentially indicate themes that may otherwise be difficult to identify.

## 7.1 Teacher Survey

The teacher questionnaire was completed prior to beginning the intervention period. It assessed the comparability of teachers within the intervention and control conditions.

There are 8 sub-components of the teacher survey, which rate how optimal conditions are regarding:

- Professional discussion
- Respect and trust
- Access to new ideas
- Support in times of change
- Quality of CLPD
- Support by leaders
- Self-efficacy in teaching reading
- Self- efficacy in teaching

Responses are detailed in Appendix 17. Cumulative scores for 8 subcategories for each of the teachers can be seen in Figure 22 below, alongside their number of years teaching.

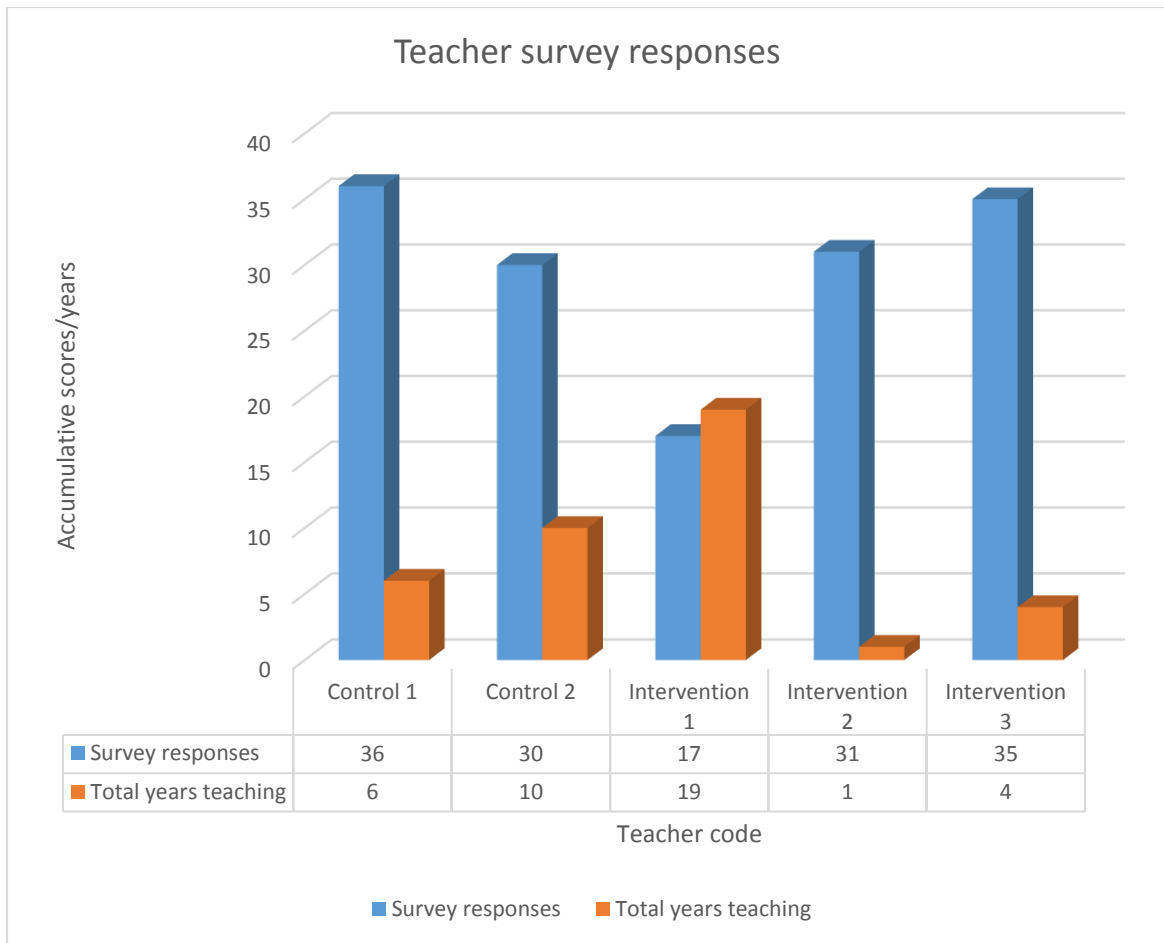


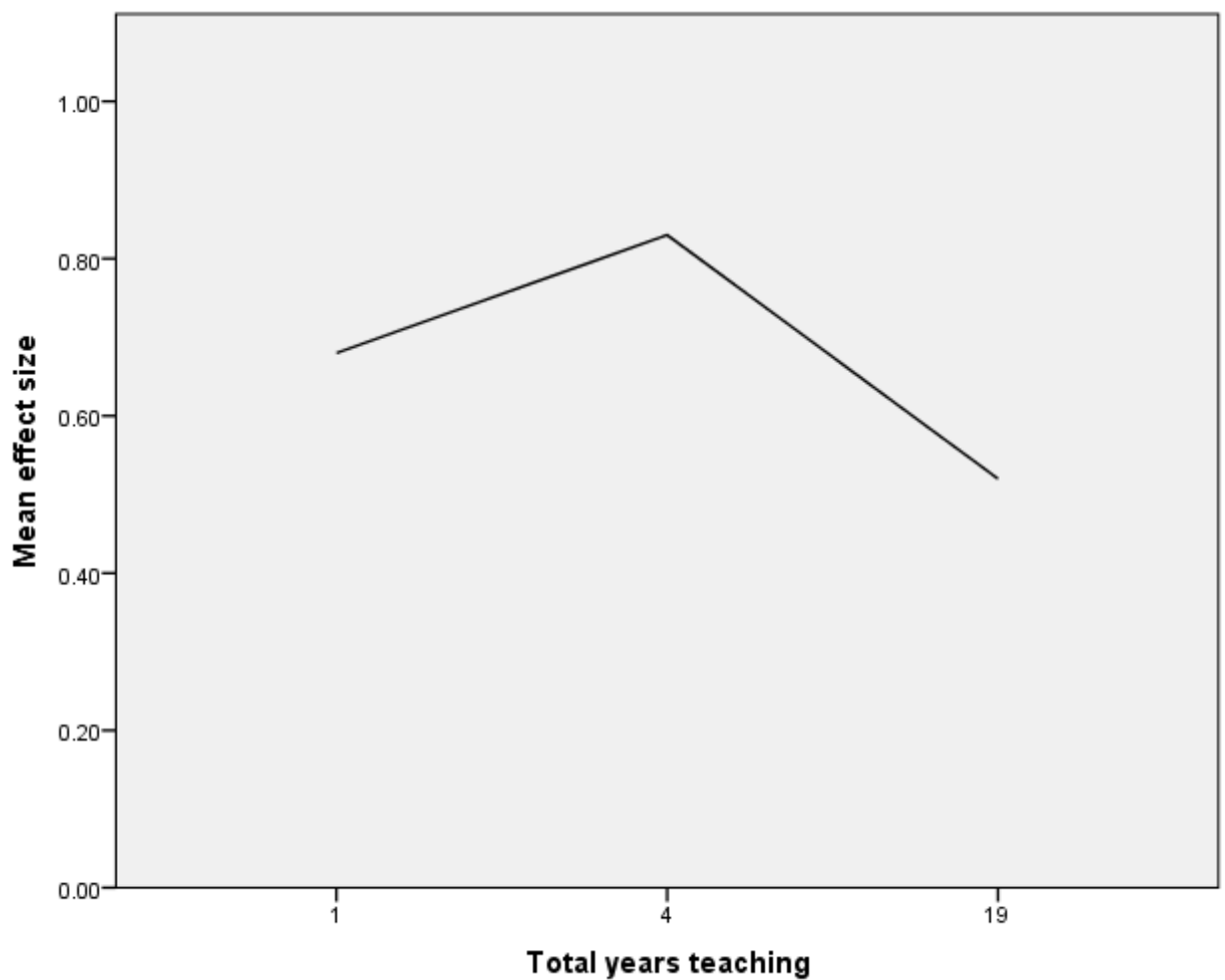
Figure 22: Main study teacher survey responses

While there were some similarities in results, points worthy of note were:

- Most of the ratings were comparable, with the exception of Intervention 1 teacher who rated the school lower than other teachers when asked about:
  - Levels of respect and trust within the school
  - Access to new ideas within the school
  - Support in times of change
  - Quality of CLPD provided
  - Support by leaders within the school.



- Given the small sample size, correlation tests would not be reliable, however, although the years of service varied this did not appear to correlate with the mean WIAT-II<sup>UK</sup> change scores of the children within they taught (see Figure 23 below)
- Control 2 teacher had recently moved to Scotland from England and so did not yet feel able to answer some questions around change and leadership
- All felt a high level of self-efficacy in teaching and in teaching literacy



*Figure 23: Main study, number of years teaching compared to intervention impact as measured by WIAT-II<sup>UK</sup> change scores*

## 7.2 RCV observation

The guiding question for the RCV qualitative analyses was to identify any differences in teacher style prior to the intervention period, with consideration given to strategy instruction, guidance, and opportunities to read and use skills.

As Chapter 4 states, both baseline observations took place over a 45-minute period. Appendix 18 gives a complete data comparison of the observations for which a summary is seen in Table 30 below.

*Table 30: Main study RCV observation summary comparison*

	Control 1	Control 2	Intervention 1	Intervention 2	Intervention 3
<b>Number of reading comprehensions strategies referenced</b>	4	5	0	4	4
<b>The number of vocabulary strategies referenced</b>	1	0	4	1	1
<b>Number of tools used (graphic organisers, notes, written activities to support reading)</b>	1	1	0	0	1
<b>The overall number of key performance indicators observed during the observation</b>	11	8	6	6	7

Given that this pre-intervention statistical information was limited to only 5 teachers there was insufficient data to conduct statistical tests of homogeneity; however, there were tentative indications from the RCV performance indicators that teachers in the control groups outperformed those in the intervention groups. Some additional points to note include:

- Control 1 teacher demonstrated more performance indicators than others
- Intervention 1 teacher demonstrated more vocabulary techniques than other teachers

### 7.3 Readiness Questionnaire

Readiness questionnaires (Appendix 2) were completed by the teachers in the intervention condition prior to taking part in the study. All teachers had been identified by the HT of the school and all agreed to all the readiness criteria. Individual motivations of teachers were not explored. All stated they were willing to take part in the project, felt that they had enough information about the intervention and agreed necessary time commitments. Intervention teachers 2 and 3 taught within the school where the HT requested all staff to attend the training. Tentative observations by the researchers suggested they appeared particularly motivated to implement the intervention. They made use of opportunities to discuss and share ideas regarding implementation both between each other and other colleagues and their HT. They reported valuing the support that the HT and colleagues provided.

At the end of the intervention period, teachers were asked if they had adhered to the agreed time commitments. Intervention teacher 1 stated that the time commitment was unrealistic and while she had tried to stay committed to the programme, this had not been without difficulties. Intervention teachers 2 and 3 stated that they had adhered to all the intervention criteria.

### 7.4 Fidelity Observations

Each intervention teacher was observed twice during the intervention period (weeks 3 and 6) and scored in relation to their implementation of the core components of the intervention. This data can be seen in Appendix 19 and summarised in Table 31.

Table 31: Main study summary of fidelity observation

	Observation 1			Observation 2			Total			Effect size
	Strategies Used	Gestures used	Other indicators	Strategies Used	Gestures used	Other indicators	Overall strategies used	Gestures used	Other core component	
<b>T1</b>	11	0	3	8	0	3	19	0	6	0.52
<b>T2</b>	28	4	6	74	4	5	102	8	11	0.68
<b>T3</b>	37	3	6	24	5	7	61	8	13	0.83

This reports:

- The overall reading comprehension strategy references made by each teacher during fidelity observations
- The overall number of intervention core components observed during fidelity observations
- For each intervention teachers a Cohen's *d* effect size was calculated for the outcomes of the pupils in each intervention teacher's class using pre and post means and standard deviations.

There was variation in the level of implementation, yet while on a continuum of higher to lower implementation, the intervention was implemented as intended. The data suggest that the amount of prompt references increased as the intervention became more embedded. Furthermore, there continued to be opportunities for increased use of gestures. Although the use of graphic organisers was not observed during fidelity observations, the teachers provided evidence of their use during unobserved lessons and is therefore represented within fidelity data measurement.

Figure 24 shows the relationship between the teachers' effect sizes and the number of core components observed. Figure 25 shows the relationship between the teachers' effect sizes and the number of strategy references observed. The sample size of 3 teachers was too small to calculate any correlations between teacher effect sizes and levels of fidelity; however, this may be possible with larger populations.

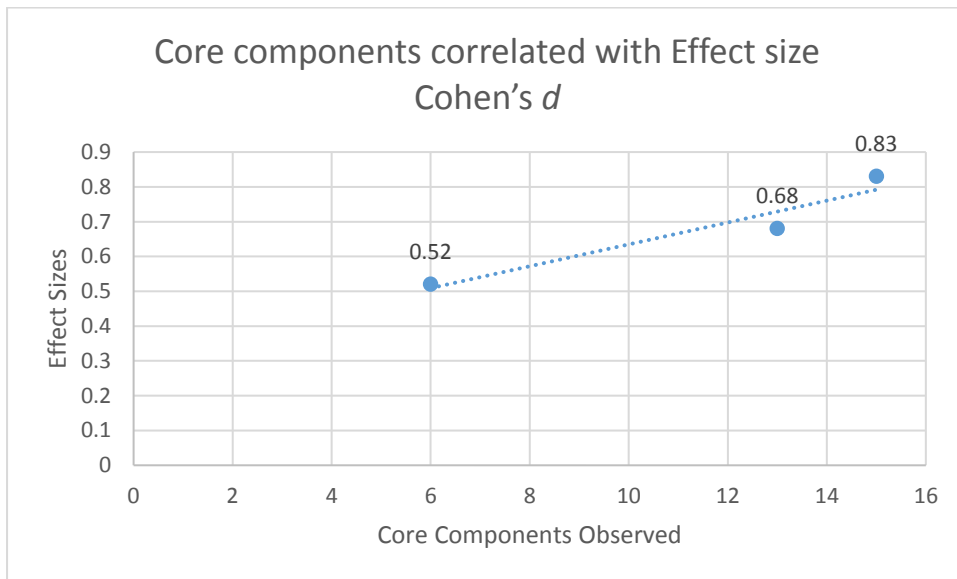


Figure 24: Main study correlations between teacher effect size and core components observed

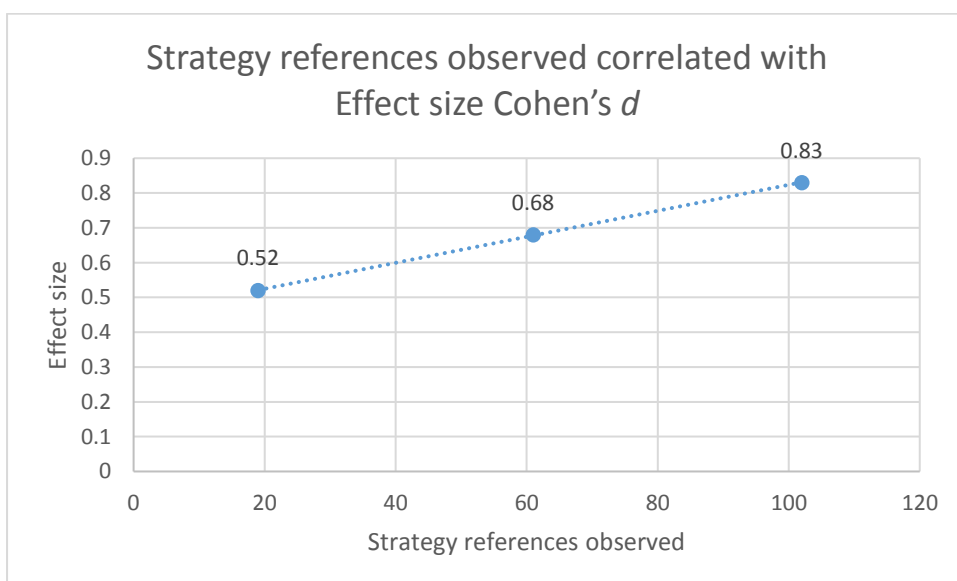


Figure 25: Main study correlations between teacher effect size and strategy references observed

To summarise levels implementation fidelity varied and tentative conclusions could be made that if larger sample sizes were evident there may be a statistical correlation between implementation fidelity and effect sizes. Therefore, on the basis of the data it is recommended that fidelity checks are included and rigorously attended to in the intervention as the data suggests that there is a relationship here.

### 7.5 Post-intervention Teacher Qualitative discussion

As can be seen in Table 32 below not all implementation teachers were similar.

*Table 32: Intervention teacher comparison*

<b>Teacher</b>	<b>Confirmed adherence to all criteria on the readiness questionnaire</b>	<b>Scored In the upper quartile of the fidelity questionnaire</b>
<b>Intervention 1 (PS) (N=9)</b>	No	No
<b>Intervention 2 (CK) (N=18)</b>	Yes	Yes
<b>Intervention 3 (AW) (N=9)</b>	Yes	Yes

It can be cautiously concluded that while all teachers implemented the intervention, they did so to different degrees. Therefore, the teachers were categorised into one of two distinct groups: those with higher fidelity in the programme and those with lower fidelity. This trend continued as these two groups reported different rhetoric's during the post-intervention semi-structured interviews.

Semi-structured interviews took place between the researcher and each of the three intervention teachers following the intervention period.

The similarities and differences can be seen in Table 33.

Table 33: Main study semi structured interview themes

Codes	% of Quotes	
	Higher Fidelity teachers	Lower Fidelity teachers
SHORS could be used across CfE	13	0
Pupils were more empowered	7	8
SHORS Enjoyable for all	7	0
Allowed for teacher reflection	7	0
Teacher/ staff felt upskilled	27	23
Additional resources not needed	10	0
Quality training and good support given.	7	15
Flexibility	7	0
There was more visible learning	17	0
The literacy knowledge was not new to me	0	38
Evidence of use of alternative teaching methods to that within the intervention	0	8
Time a challenge	0	8

The feedback for the two higher fidelity teachers elicited quotes regarding SHORS which were 100% positive. Quotes which illustrate this include:

*“The approach was different in that it was a methodology rather than something that was bought in, another resource”*

*“It is more explicit in the use of strategies and I found myself asking questions that I wouldn’t otherwise have asked.”*

*“It was very child friendly.”*

*“Children throughout the school were better at articulating what they imagined”*

*“It enabled children to really get in a text where they had never had the opportunities to do that before.”*

*“Also the strategies for vocabulary were very useful, far better than just putting the word in a sentence.”*

*“All the teachers have taken this on board and all are very positive.”*

*“They enjoyed hearing about the different strategies and children liked using the symbols which helped them to reinforce their understanding.”*

*“When the children were working with classroom assistants that the children knew more about strategies that the Classroom Assistants and so X (one of the “intervention” teachers) did some training with them.”*

*“It helped discussion skills for even a short piece of text children can understand it and talk about it with far greater depth”.*

*“The discussion is far more pupil led.”*

*“The strategies helped the children to really develop higher order thinking instead of rushing through a task.”*

They reported their school had implemented the intervention at a whole-school level.



Furthermore, classroom assistants were trained in the approach by the intervention teachers once a need for this upskilling was identified by the children.

The teacher for whom there was less evidence of implementation fidelity was also positive about SHORS but indicated strongly that many of its core components were already evident in her teaching practice. Quotes which illustrate this include:

*“I already knew what to do although it did put a new slant on things and perhaps made me more explicit when discussing strategies.”*

*“I would always have talked about things like visualising but perhaps was not as direct in how I taught it.”*

*“I used similar strategies so they probably were not that aware of anything different.”*

While both categories of intervention teacher agreed the study had extended their teaching skill to become more explicit in directly teaching reading comprehension strategies, the overarching value and merits of the programme were not equally weighted. Both teacher sub-groups offered comment regarding the children feeling empowered as a result of taking part in the study; however, further analysis showed that this was for quite different reasons. The lower fidelity teacher said children felt empowered as they were a part of the research, while high fidelity teachers said children became empowered as they became more active in their learning and this developed their resilience given the new bank of metacognitive strategies that they now had.

## 7.6 Qualitative data collection and critical incident analysis of overarching themes

### 7.6.1 Data Collection

Semi-structured interviews took place within the teachers' own schools. Responses were recorded in writing by the researcher. These notes were shared and agreed as being true

representations of the discussions. Readiness questionnaires and the teacher survey had been given to the teachers to complete in their own time and were returned to the researcher in sealed envelopes. Observations were carried out by the researcher at agreed times. Data was subject to thematic analysis coding structures informed by implementation science principles.

#### 7.6.2 Developing and revising themes

An initial start list of codes was created based upon implementation science core components, the researcher's knowledge of best practice teaching and learning of reading comprehension and an understanding of the Curriculum for Excellence, as this was the context of the study. This list of codes was examined alongside the data and revision of codes emersion and the reduction was a dynamic process towards ensuring that the final codes were fit for analytical purposes. The initial themes were structured showing both overarching and sub-themes (see Appendix 20) based upon principles of implementation science. The data initially matched against the codes was the semi-structured interviews, given that this information was richer than other questionnaire type formats.

The researcher asked a research assistant to identify research codes (Robson, 2011) and changes and adaptations were made as a result of this exercise to increase validity and increase the level of scrutiny placed upon the data.

The finalised CIT codes can be seen in Figure 26 below. It was noted that many of the overarching and sub-themes were interconnected.

Illustrative quotes included:

*"It could be used across learning not just literacy lessons."*

*"Having the support of the Head Teacher helped"*

*“It developed my skills in being very explicit and the language was about use of strategies rather than resources.”*

*“The training had the theory and also all teacher left with very practical ideas of how to put it into practice”*

*“It built their resilience by giving children a bank of strategies to help them understand.”*

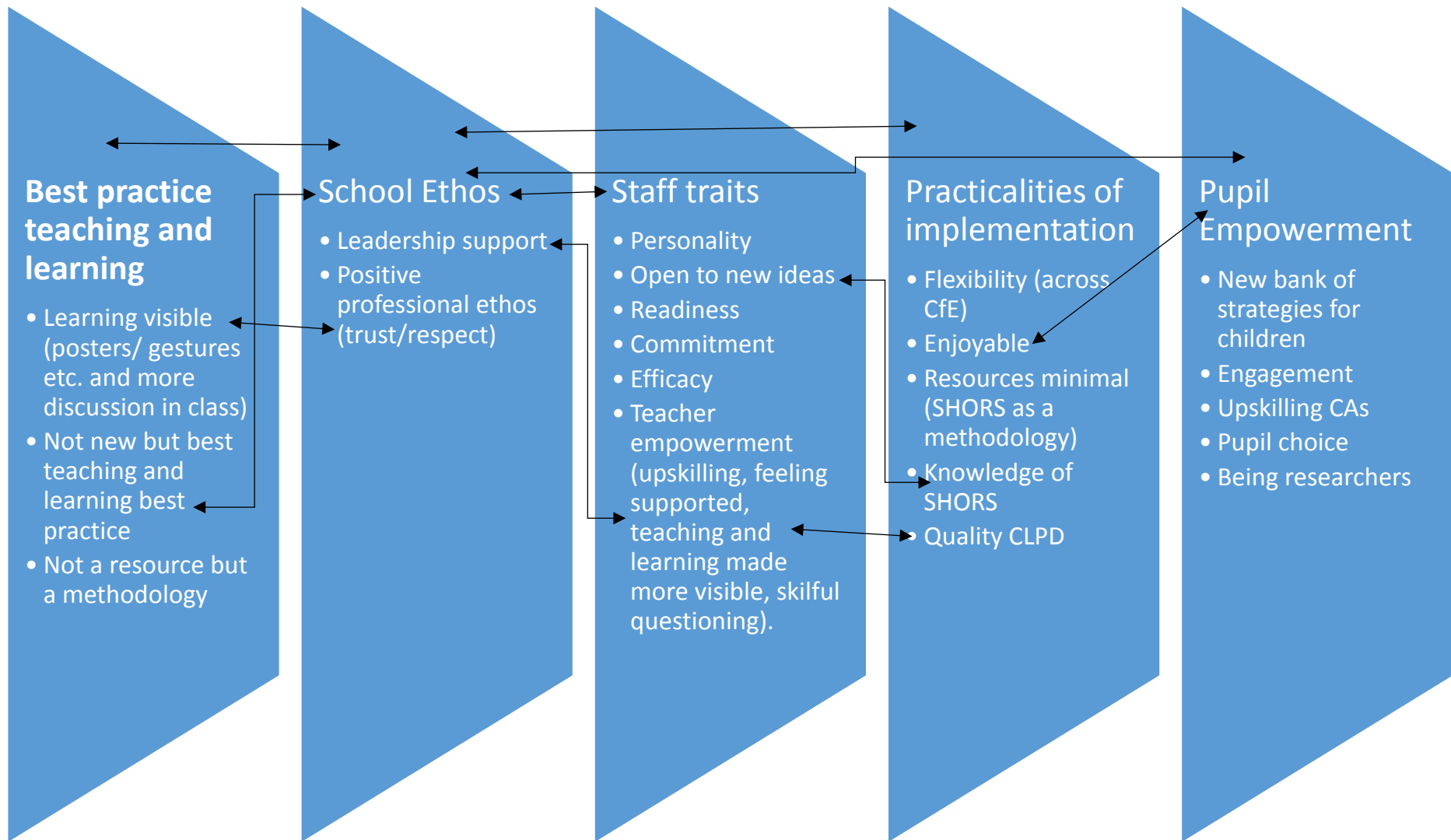


Figure 26 Critical Incident themes for consideration to ensure effective implementation

## 7.7 Key themes

### 7.7.1. Staff traits

Consistent with the findings of Klimes-Dougan (Klimes-Dougan et al., 2009) teachers who were most open to new ideas and were in an environment conducive to new ideas, implemented the intervention most fully and with a higher level of commitment and fidelity to the programme. Those who engaged felt empowered and upskilled by taking part in the project as it had made the teaching and learning in the classroom more visible. However, staff will engage to varying degrees and this will be influenced by their personality and the school environment.

### 7.7.2. School ethos

Where there were opportunities for greater discussion between teachers and their SMT, there was greater investment in the project. Levels of respect and positive rapport felt throughout the school has an impact upon everyone's wellbeing and on the professional ethos that this creates.

### 7.7.3. Practicalities of implementation

SHORS was deemed easy to implement, especially given its flexibility of use which was evident in the way that it could be incorporated across the CfE. While time was identified as an issue for the lower fidelity subgroup, the higher fidelity subgroup did not see this as a barrier, especially given the opportunities for literacy across learning. Teachers who invested in the approach found it enjoyable, given the increased opportunities for discussion which SHORS advocated for. Minimal resources were required and of these, ones considered best were those created by the children themselves as this increased their ownership. Also, staff considered the intervention easy to implement given that it represented good teaching practices. The flexibility of the approach also made it attractive as many MRCS approaches required lesson plans to be strictly followed.

#### 7.7.4. Pupil Empowerment

An unexpected theme of the analysis was around pupil empowerment. This was attributed to the increase in skills children had learned. By giving the children a new bank of strategies there was an increase in their level of ownership and they became more autonomous learners. As stated, often, when comprehension breaks down, children did not employ “fix up” strategies automatically even when they might know how to do so (García-Rodicio & Sánchez, 2014). However, the direct teaching of strategies and modelling provided within the SHORS methodology encouraged children to become more active in the process of learning. This has the capacity to encourage and develop creativity (Davies et al., 2013).

#### 7.7.5. Best practice teaching and learning

In general the teaching strategies were not considered new, but the emphasis upon how to explicitly teach the strategies, and how to make them more visible in the classroom differed from previous practice. The training was considered by all to be of high quality and consistent with Joyce and Showers (2002) teachers reported their appreciation for the depth of reading research within the session as this offered reassurance that the SHORS approach was best practice and evidence based.

#### 7.8 Implementation Science links

It can be concluded that the main facilitators/barriers to implementing and sustaining the reading comprehension intervention were in line with current implementation research (Fixsen, et al., 2009). These are related to:

- Staff selection - Where the staff showed an openness to the intervention and the ability to overcome any challenges that may arise during an implementation period.

- Pre-service/ INSET Training - Where intervention teachers took part in the training alongside their colleagues and with overt support from the HT, intervention teachers reported most positively
- Consultation and coaching - All intervention staff used the modelled examples given within the training to enhance their practice and this was evident during fidelity observations. Teachers were given access to the researcher throughout the intervention period if they had any questions relating to the study; however, they reported that the training session had been sufficient for them to confidently take the intervention forward
- Staff performance evaluation- Evaluations of performance were given after each fidelity session. These were aimed at supporting the positives of what was working but also, using the core components of the intervention as a tool for discussion, to enhance fidelity. Fidelity observation measured criteria increase as the intervention continued which illustrates the process involved in change
- Decision support data systems - Fidelity was monitored throughout the intervention period however it is recognised that to ensure sustainability support should be ongoing
- Facilitative administrative support - School policy and systems were all in line with the intervention methodology. In addition, some teachers used a numeracy program (known within the LA as “chatty numbers”) with very similar core components. This increased teachers’ trust in the approach and made it easy to implement
- Systems interventions - LA and national policy and systems were all in line with the intervention methodology.

## 7.9 Feasibility

The feasibility to build capacity through teacher training in the SHORS intervention is very good. The LA's attainment challenge advisor and PLA have indicated that there is an identified need for upskilling teachers on evidence-based, good learning and teaching approaches pertaining to reading comprehension. The impact of the study has been communicated to authority senior managers who are keen for the SHORS approach to be rolled out with the support of EPS and the PLA. Furthermore, higher fidelity intervention teachers have agreed to take part in subsequent training to share the approach from a practitioner's perspective.

## 7.10 Conclusions

While implementation of the SHORS approach to reading comprehension can be easy and feasible, there were indications from observation fidelity checks and teacher feedback that levels of implementation fidelity varied. Although not statistically significant, perhaps due to small samples, effect sizes indicate that levels of implementation fidelity were an influencing factor in study outcomes and where implementation science was most closely adhered to, there occurred the most significant impact on both reading comprehension and implementation fidelity.

Chapter 8 will consider how these results take account of the interactive variables of learner, teacher and learning environment (Bohn-Gettler & Kendeou, 2014) and will develop our understanding of each of their relative contributions.



Chapter 8: Consolidating an understanding of teacher, pupil and environment variables through the use of SHORS

### 8.1 Impact of SHORS on Reading Comprehension the Primary Outcome

This intervention study yielded several important findings in the field of reading comprehension research. The most notable is that the intervention had a positive, statistically significant impact upon WIAT-II<sup>UK</sup> reading comprehension subtest scores with effect sizes out-with measurement error.

The current study extended existing literature. In the McCartney et al., (2015), study universality was tested by comparing lower language versus higher language levels, while here subgroups of ability were split according to their reading ability, as measured by the WIAT-II<sup>UK</sup> pre-test. Similarly, no between-ability tertile interactions were observed. Current research, therefore, concurs with previous research that deemed the SHORS methodology of equal impact to all reading ability groups, thereby being a universal approach, when comparing each tertile intervention subgroup (McCartney, et al., 2015). As such, this highlights that the relationship between components of language and reading skills has been well evidenced (Aarnoutse, van Den Bos, & Brand-Gruwel, 1998).

This chapter will continue to explore the outcomes of the SHORS methodology with reference to the previously mentioned learning triangle (see Section 2.5) and will consider each of the three variables; reader, teacher and environment in detail.

### 8.2 Reading comprehension- Reader variables

As stated, the primary outcome variable for change was the WIAT-II<sup>UK</sup> reading comprehension subtest. However, secondary outcome variables also achieved statistically significant results. Word reading skills, as measured by the amount of target words children could read, increased with statistical significance for those within the intervention group. Furthermore, these children

reported both an increase in their reported use of reading comprehension strategies, thereby increasing their metacognitive knowledge. There was also an increase in frequency of reading at home, indicating a positive impact upon reading habits. These outcomes reinforce the inextricable links between the different factors of reading (Chan, 1994; Ruddell & Unrau, 2004) and is in line with research regarding the benefits of strategy training on metacognition (Baker, 1994; Boulware-Gooden et al, 2007; Carr & Borkowski, 1989).

It was observed during baseline tests that, when children's comprehension broke down they did not employ fix up strategies automatically. This indicated a misunderstanding surrounding the purpose of reading and was consistent with Myres and Paris (1978), whose research showed that children perceive decoding as the purpose of reading, not reading for meaning. It was evident that when comprehension is lost, repair strategies are not automatically employed by all readers (García-Rodicio & Sánchez, 2014). Monitoring comprehension can be linked with attributions by the reader that the problem is their understanding of the text and that the problem is not within the text (Wagoner, 1983). It is therefore beneficial for children to be critical of, and question, text. Knowing that it is not only acceptable to stop and reread when comprehension breaks down, but that it is what good readers do to improve reading accuracy in general (Rawson , 2000) will aid reading independence (Short, Yeates, & Feagans, 1992). These are areas where classroom discussions can be highly beneficial; therefore, SHORS strategies encourages children to monitor their comprehension and:

- If you don't understand: Stop. Re-read.
- If you STILL don't understand- find the problem word. Does it remind me of other words or parts of words? Can I guess a bit from the context? Who can I ask? If not, LOOK IT UP

The SHORS strategies also included many evidence-based strategies including summarising and rephrasing in your own words (Thiede & Anderson, 2003), visualisation (Gambrell &

Jawitz, 1993; McTigue, 2010) and preparing before reading (Spires, Gallini, & Riggsbee, 1992; van Loon, de Bruin, van Gog, & van Merriënboer, 2013). SHORS strategies also encouraged local and global coherence of the text using:

- Questioning and wondering
- Linking to the wider world
- Considering “crunch points” in the story where things could have gone very differently.

Thus, it allows for inference generation and opportunities to consider different perspectives or positions which support effective inference generation (Graesser, Singer, & Trabasso, 1994). An additional component of the SHORS approach is the explicit vocabulary teaching as it is a basic building block of comprehension, linked to inference skills (Cain, Oakhill, & Lemmon, 2004) comprehension monitoring and story grammar (Oakhill, 2017). Furthermore the use of visual and verbal cues support the elaboration of mental models of the text (Woolley, 2010) with gestures to encourage deeper learning (Courtney & Gleeson, 2010).

The theoretical models of reading comprehension clearly link to the core components of the SHORS intervention approach.

This chapter will continue by considering some of the readers’ more evident intrinsic variables that can influence reading comprehension outcomes. While there have been attempts to organise these variables discreetly, this has not always been possible due to the dynamic interaction between components.

### 8.2.1. Motivation for reading

Contrary to other research findings (Guthrie, Wigfield, Metsala, & Cox, 1999), there were no statistically significant correlations between MRQ components and reading comprehension. Furthermore, MRQ subsets of curiosity, involvement and challenge did not correlate with the children’s reported reading frequency. As mentioned in Section 5.5.4 the MRQ could not be

reliably used to measure change between pre- and post-test points, and a more reliable mechanism for measuring MRQ components of this for this age group would be advantageous (Baker & Wigfield, 1999).

Some of the expected correlations were not statistically related, e.g. self-efficacy and challenge (Bandura, 1976; Carr & Borkowski, 1989) (see Section 2.3.10). However this was where pre-test results were at baseline points with less skilled readers. Better readers are more likely to correlate with the MRQ (Guthrie & Wigfield, 1997). Therefore, had this measure been used at the post-test point when reading ability had increased, there may have been more or different correlations.

Each of the four sub-tests within the MRQ will be considered in turn:

#### 8.2.1.1 Efficacy

Efficacy statistically correlated with curiosity but did not with any other MRQ sub-set, WIAT-II<sup>UK</sup> scores or self-reported strategies. This is contrary to other research which has been cited as a major predictor of reading achievement (Schunk, 1991). Indeed, Chan (1994) reported that perceived cognitive competence or efficacy was correlated to reported use of reading strategies. Her studies show correlations between both knowledge of reading strategies and use of reading strategies, with efficacy. Furthermore, interventions aimed at developing efficacy have little impact on reading comprehension outcomes without also targeting strategy instruction (Craske, 1988). That is, in order to feel efficacy, one must have both knowledge of strategies and the perceived cognitive competence to use them. Therefore, given that the intervention under consideration provided knowledge of strategy use, it could be hypothesised that at post-intervention point there would be an increase in efficacy. This may be an area for further investigation.

#### 8.2.1.2 Challenge

Challenge scores statistically correlated with curiosity, involvement and self-reported use of strategies. Good readers take on bigger reading challenges (Wigfield & Wentzel, 2007) and in so doing will require use of reading comprehension strategies. Furthermore, excessive reading challenge tasks can be mediated by high interest topic selection (Fulmer & Frijters, 2011). SHORS advocates for personal choice from a variety of reading texts and therefore, after the intervention, there could be an increase in levels of challenge.

#### 8.2.1.3 Curiosity

Curiosity scores were statistically correlated with self-reported strategy use and all other components of the MRQ. Related to the use of reading comprehension strategies is curiosity, which is a key element of intrinsic motivation and has been described as “the students' disposition to learn about the world around them and gain conceptual knowledge through reading” (Guthrie & Wigfield, 1997). This curiosity entices the reader to become ever more involved in the reading process and, therefore, more likely to overcome the potential challenges of difficult texts, thereby increasing the levels of efficacy. In her study, McTigue (2010) made the links between visualising during story-telling sessions and the creation of curiosity, which then laid foundations for effective and enhanced discussion sessions. This is consistent with the SHORS approach and therefore, again, at post-intervention points there may have been increased levels of curiosity.

#### 8.2.1.4 Involvement

Involvement statistically correlated with self-reported strategy use, curiosity and challenge. Giving the reader the option to take part in the dynamic interchange of meaning negotiation with the author will enliven their curiosity (Rosenblatt, 1978), which potentially increases the level of challenge (Fulmer & Frijters, 2011). This involvement may further increase through

the selection of personal reading materials, which was advocated for within SHORS. Indeed, personal selection may contribute to the increased pupil empowerment which was reported (see Section 7.5).

### 8.2.2 Metacognitive knowledge

Although measurement errors requires consideration, the intervention had a positive statically significant impact upon self-reported strategy use scores. Metacognitive knowledge has been defined as “memory-retrieved declarative knowledge about the interplay between person, task and strategy characteristics” (Flavell, 1979) and therefore it can be argued that children’s metacognitive knowledge increased.

This could be attributed to their reported increased positive reading habits, which may have increased their exposure to different reading formats and consolidated their understanding of strategy preferences (Adams, 1994). An alternative hypothesis may be that metacognitive knowledge increased due to the bank of newly-learned metacognitive strategies which they could employ (Craske, 1988). This was captured in the teachers’ feedback, which stated that the children had new found resilience given their new tool bag of explicitly-taught skills. This would be consistent with research around the autonomy that is created through the transference of new strategies (O’Shea & O’Shea, 1994). This type of metacognitive knowledge of strategies have also been referred to as “universals” and are useful throughout a variety of contexts (Garner, 1987; Paris, et al., 1984) and concurs with teachers’ feedback that the SHORS approaches could be used throughout the curriculum.

Interestingly, there was not a significant relationship between efficacy and self-reported strategy use. Use of metacognitive strategies requires a degree of self-efficacy that the task is achievable in terms of challenge, otherwise time will not be invested in the reading process (Law, 2009) including use of strategies or engaging in a process to learn them (Bandura, 1976).

In addition, knowing a metacognitive strategy does not necessarily mean that it will be used (Baker, Zeliger-Kandasamy, & DeWyngaert, 2014).

While research has provided evidence that the better the reader is, the more metacognitively aware they are (Moore, 1983) there was no correlation between reading ability (as measured by the WIAT-II<sup>UK</sup>) and the self-reported use of strategy knowledge, although this could be attributed to the fact that judgements regarding metacognitive knowledge can be poor (van Loon et al., 2013). However, some studies have shown that there is an increase in an individual's reliability of judgements of knowledge when there has been increased opportunities to activate prior knowledge before starting the task (van Loon et al., 2013). Therefore, discussion about what had occurred within the literacy classroom may have served to increase the reliability of judgements of metacognitive knowledge (Eodanable, & Lauchlan, 2009).

The relationships observed between reported strategy use and aspects of intrinsic motivation (challenge, curiosity and involvement) provide empirical support for recent metacognitive theories which emphasis correlations between motivation and metacognition (Puustinen & Pulkkinen, 2001). The children taking part were developing readers and as such it could be hypothesised that older participants with associated increased levels of personal control (Chan, 1994) would have perceived greater intrinsic motivation. How these components of motivation for reading correlate with metacognitive knowledge over time as skill and age increase was beyond the scope of the current study. Different correlations may be evident as the reliability of older children's self-reported motivation and metacognition increases (Chan, 1994; McNamara & Magliano, 2009).

### 8.2.3. Reading habits

Given that the current study offered statistically significant results regarding the frequency of reading at home, it can be argued that the intervention has the potential to positively change reading habits and perpetuate increased reading ability (Guthrie et al., 1999; Leppänen, Aunola, & Nurmi, 2005; McBride-Chang, Manis, Seidenberg, Custodio, & Doi, 1993; Mol & Bus, 2011). There was a moderate positive statistically significant relationship between the WIAT-II<sup>UK</sup> pre-test scores and the frequency of reading at home which is consistent with existing literature (Baker & Wigfield, 1999). The two measures of reading frequency showed a moderate positive statistically significant relationship which supports the hypothesis that these two questions were both indicative of the same concept, i.e. reading habits.

### 8.2.4 Decoding skills

Although not a primary outcome measure, decoding abilities increased significantly in the intervention group. This underlines the dynamic interactions between the component reading skills, which has been well documented within the research, e.g. (Adams, 1994; Perfetti et al; Rumelhart, 2004; Samuels, 2004; Snowling, 1998). Furthermore, this is consistent with other research which has shown evidence of impact upon untargeted component parts of reading skill. For example, a synthetic phonics programme increased word reading skills by 3 years but also had a much lesser, but still significant, impact on reading comprehension (Johnston & Watson, 2003).

### 8.2.5. Reading fluency

Fluency levels improved for the intervention group beyond that of the control group, although without statistical significance. Interventions aimed at developing fluency have in some cases resulted in moderated gains in reading comprehension (RAND, 2004) and the link between reading comprehension and fluency has been widely cited (Lai, George Benjamin, Schwanenflugel, & Kuhn, 2014; Samuels, 2004). However, increased fluency does not



necessarily bring about increased reading comprehension (Fleisher, Jenkins, & Pany, 1979). This is perhaps due to the cognitive resources being used up in the decoding task, leaving no resources for comprehension. As the level of difficulty of text increases or where topic knowledge becomes less familiar, a reader would most likely slow their reading down, indicating that the relationship between reading comprehension and fluency is dynamic and reciprocal (Lai et al., 2014) and subject to text characteristics.

Fluency was related to reading efficacy. Given that fluency could be described as the reader's ability to read quickly, accurately and with expression, it is not surprising that the experience of doing so has the ability to increase their feelings of being an effective reader.

### 8.3 Teacher variables

#### 8.3.1. Teacher's implementation fidelity.

The teacher variable is hugely influential regarding the fidelity of implementation and as such upon intervention outcomes. Although, not statistically significant, this is reflected in the different effect sizes of the children within each of the teachers' groups, which varied from 0.52-0.83. The lack of statistical significance could potentially be attributed to small participant numbers in the "lower fidelity" group.

Implementation was measured via the readiness contract and the fidelity observations. During fidelity observation visit checks were made to ensure teachers felt adequately supported in taking forward the intervention and ongoing support was available as and when necessary. All intervention teachers confirmed that they understood the SHORS approach and felt sufficiently skilled to implement it. However, two of the intervention teachers had greater opportunities to discuss progress with their peers and this potentially impacted positively upon their levels of fidelity (Hattie, 2012; Maher et al., 2009).

As stated in Section 7.5 post-intervention teacher interviews indicated that the approach was easy to implement however, degrees of fidelity varied thereby allowing teachers to be classified as being part of one of two subgroups: lower fidelity implementation or high fidelity implementation.

When the results of the main study are compared with the pilot (Table 34) it can be seen that effect sizes continue to be in line with levels of fidelity, suggesting that the more the teacher adopts the intervention’s core components, the greater the impact. This is also illustrated within Figure 27 below.

Table 34: Fidelity and impact across 2 part study

	<b>Overall strategies references during observations</b>	<b>Total core components observed</b>	<b>Effect size Cohen’s <i>d</i></b>	<b>Fidelity group</b>
<b>Main Study- T1</b>	19	6	0.52	Lower
<b>Main Study- T2</b>	102	13	0.68	Higher
<b>Main Study- T3</b>	61	15	0.83	Higher
<b>Pilot Study</b>	125	15	1.26	As pilot N/A- but meets criteria for Higher

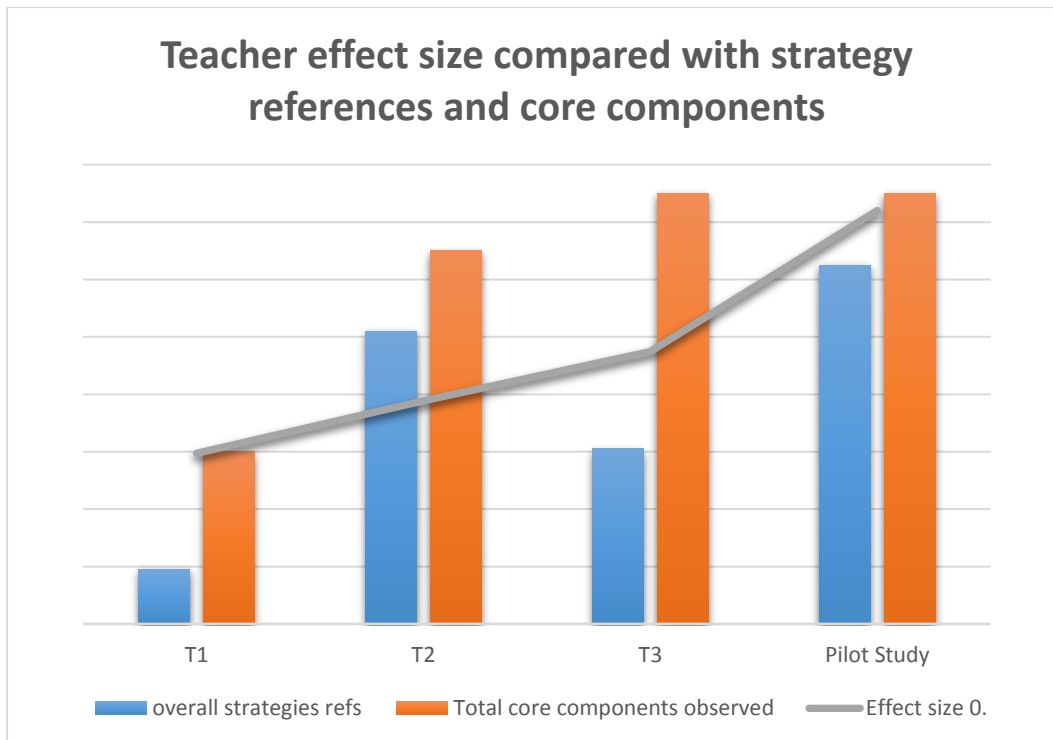


Figure 27: Fidelity and impact across two part study

This quasi-experimental study has therefore illustrated the importance of effective implementation. Having the correct climate for change is crucial to the success of any intervention (Fixsen et al., 2009). The framework for implementation discussed in Section 3.4.3 (Fixsen et al., 2009) and has been used to interpret results (see Chapter 7). This study was consistent with previous findings that staff ethos and their beliefs and values (as measured in the teacher survey) impacts greatly upon the fidelity with which an intervention is employed (Klimes-Dougan et al., 2009).

It can be concluded that where school context and climate meets the criteria for intervention readiness, implementation was considered feasible.

### 8.3.2. Teacher characteristics

The number of years teaching did not positively correlate with the ratings of performance indicators and concurs with existing research stating that it is the level of skill that makes the difference, not the number of years' service (Stronge et al., 2011). Indeed, similarly to learners, the motivation of the teacher has a huge influencing factor upon children's outcomes. Motivation to be committed to teaching (Heinz, 2015) and to implementation interventions (Fixsen et al., 2009) both have capacity to affect outcomes. One teacher who had lower intervention fidelity stated she was not equipped to comment on whether the school had a culture of trust and respect. While some research has found negative correlations between school culture and implementation fidelity (Klimes-Dougan et al., 2009), this study was consistent with research that outlines that perceptions of facilitative and constructive environments yield greater levels of implementation fidelity (Glisson & Hemmelgarn, 1998). Furthermore, it is consistent with Ruddell and Unrau's (2004) model of reading which emphasises teacher variables. Indeed, the teacher's style should be of facilitatory (advocated for within SHORS), rather than a delegator style for optimal learning (Dilekli & Tezci, 2016). Interestingly, the lower intervention teacher stated that the time commitment to the intervention was unrealistic; however, those within the higher fidelity group said the approaches could be used more broadly across the curriculum. Furthermore, literacy across the curriculum is an essential to the design of the CfE (Scottish Government, 2002).

For the teachers in the higher fidelity group, the main themes were similar to those within the pilot study. One theme was feeling upskilled in the SHORS approaches which more explicitly taught reading comprehension strategies. This increased teacher efficacy interacts with their thinking approaches (Dilekli & Tezci, 2016) and will lead to the dynamic interaction with all other teacher (and subsequently all child) variables (Ruddell & Unrau, 2004). For example, teachers were encouraged to model "thinking aloud" or what was going through their minds

while reading and this modelling was deemed successful by intervention teachers and researchers (Bereiter & Bird, 1985; Loxterman, Beck, & McKeown, 1994). This modelling enhances the transference of strategy use (Kymes, 2005; Silvén & Vauras, 1992), assists in more strategic reading (Şen, 2009) and supports reasoning and problem-solving (Gillies, Nichols, & Burgh, 2011). In addition, higher fidelity teachers indicated that the questions they used within lessons changed, moving away from being requests for facts and individual memory tests; for example, “What did the man do?”

towards:

- Questions about where the book might lead, e.g. “I wonder what will happen?”
- Becoming more critical of the text, e.g. “Could this really happen?” “How could that have happened differently?”

The latter type of question falls more in line with metacognitive theory and schema theory which support the processing of text (Wong, 1985) allowing for great comprehension. Indeed, children of all reading abilities benefit from being taught (Graham & Wong, 1993) and need to be encouraged to use these techniques (Davey & McBride, 1986).

An additional teacher variable which was mentioned was the development of more positive relationships within class. This links with Ruddell and Unrau’s Sociocognitive Model (2004) which emphasises the impact of teacher variables and their role in the creation of optimum socially-mediated environments (Gersten et al., 2001). The SHORS methodology created a mechanism for additional self-reflection and joint pupil/teacher collaborative discussion, creating depth of understanding and motivation (Ruddell & Unrau, 2004) and subsequent use of metacognitive strategies (Haller et al., 1988). Furthermore, the teacher being in tune with the pupils and adapting their instruction to suit the child may result in enhanced levels of motivation and comprehension (Wigfield & Wentzel, 2007).

#### 8.4 Environment variables

The intervention did not necessitate expensive and new resources. Consistent with the approach of MacKay (2005), the current research was concerned less with products but more with effective mediation and teaching skills. It supports explicit direct teaching approaches within the flexibility of the curriculum (Loizidou & Koutselini, 2007). Therefore, how the environment facilitated the project was an area for consideration.

The environment within which the teacher taught is a variable which cannot be underestimated (Ruddell & Unrau, 2004). While data is limited to only a small number of teachers, it can be noted that those practicing within schools which offered opportunities for professional discussion could also be rated more highly in terms of skill. These teacher effects can have a powerful influence on peer effects, thereby having the potential to enhance learning outcomes (Wilkinson, Parr, Fung, Hattie, & Townsend, 2002). The discussions that SHORS created within the classroom cannot be underestimated in terms of the potential impact on embedding strategy use (Rojas-Drummond, Hernández, Vélez, & Villagrán, 1998), modelling (Palincsar, et al., 1987) and effective scaffolding of questioning (King, 1997) for learners of all abilities (Fuchs et al., 1997).

##### 8.4.1. School Leadership

Consistent with the literature, where there was strong leadership in supporting the intervention there was greater levels of fidelity and this is also consistent with existing research (Fixsen et al, 2007). While there is some conflicting literature (Marcus, 2016) many studies (mainly qualitative in approach) evidence that leadership can have a large, although indirect, impact upon student outcomes (Robinson, 2007) and perhaps because of this has priority status within the National Improvement Framework (Scottish Government, 2016). It is argued that good leaders create the optimum ethos (Marcus, 2016); however, it is recognised that this is a

difficult concept to quantify. Where school leadership provides a culture of trust and respect, there are greater attainment outcomes (Hattie, 2012).

#### 8.4.2 School support and climate

Results tentatively suggest that how supported the teacher feels within their school and the opportunities for peer discussion will influence outcomes. In their synthesis of reading comprehension intervention studies, Berkeley et al., (1997) found that when researchers implemented the interventions they generally yielded better results. This indicates that having the right person to implement any new approach is essential to both the fidelity of the programme and the associated outcomes. This highlights that personal investment, interest and involvement influence fidelity measures and therefore outcomes.

Creating a safe environment in order to make mistakes has often been cited as fundamental to success (Autin & Croizet, 2012; Dweck & Leggett, 1988). Given that the teachers stated within the semi-structured interviews that children became empowered and that different types of questions were being asked and answered by all, this appears to show that the intervention lends itself to the creation of a safe, yet inquisitive environment. Furthermore the teachers reported that children's responses within a creative discussion dynamic led to teachers relating to their pupils in a more positive way.

#### 8.4.3 Choice of text

One of the key components of the intervention was that children should have greater autonomy in selecting reading materials. This allows for development of reading for pleasure instead of reading for purpose, and has the potential to motivate children to read more extensively (Rosenblatt, 2004). Teachers reported that children were given these opportunities and stated that the children appeared to greatly enjoy the SHORS approach to reading. Given that the frequency of reading reported to have taken place at home increased for the intervention group,

this transformation could be attributed to a change in understanding around the purpose of reading -from reading for purpose towards reading for pleasure (Paris et al., 1984).

#### 8.4.4 Reading comprehension programme

The effect size of the SHORS intervention has now been observed within the current study and can be compared to other interventions previously mentioned within Chapter 3. Table 35 collates this information now including findings from the current study.

*Table 35: MSCI comparison post intervention*

<b>MSCI</b>	<b>Effect size using standardised measures</b>	<b>Statistical Significance</b>	<b>Out-with Measurement error</b>
<b>Strathclyde Higher Order Reading Skills Approach</b>	0.81	YES	YES
<b>Informed Strategies for Learning</b>	0.81	NO	NO
<b>Transactional Strategies Instruction</b>	0.67	YES	Insufficient data
<b>Concept-Oriented Reading Instruction</b>	0.62	NO	NO
<b>Peer Assisted Learning Strategies</b>	0.43	NO	NO
<b>Think-Aloud Instruction</b>	0.37	YES	Insufficient data
<b>Reciprocal Teaching</b>	0.32	YES	Insufficient data
<b>Collaborative Strategic Reading</b>	0.28	YES	Insufficient data

It can be seen:

- SHORS has yielded the largest effect size



- SHORS can be compared favorably in terms of statistical significance
- SHORS can be compared favorably in terms of measurement error.

Furthermore, SHORS has proved to be more desirable regarding intervention implementation ease, accessibility and capacity to bring about positive outcomes for children of all abilities.

### 8.5 Summary and conclusions

The current research reinforces previous works that suggest that explicit instruction in metacognitive strategies are significantly beneficial in aiding pupil reading comprehension (Baker, 1994). Where there is optimal school climate and teacher readiness, the maximum impact can be made.

## CHAPTER 9. General discussion and conclusions

### 9.1 Introduction

Chapters 5, 6 and 7 have reported how the SHORS intervention is a high impact, easily implemented, approach to developing reading comprehension, which benefits all abilities. Chapter 8 has used the framework of the learning triangle to discuss the impact of the SHORS intervention in association with the diverse contributing factors of successful reading i.e. reader factors, teacher factors and environment/task factors. The current chapter will consider areas for further research, limitations of the study and the role of the EP as researcher before making final conclusions.

### 9.2 Areas for further research

#### 9.2.1. Building upon the work within the current thesis

One of the core elements of the current intervention was its explicit direct teaching of metacognitive reading strategies which has been proven to be beneficial in previous studies (Bensley & Spero, 2014; Haller, Child, & Walberg, 1988). The impact of direct teaching cannot be underestimated and further opportunities to extend modelling between teacher/child to children peer groups within this context could be explored in greater depth, given the value of opportunities to talk in consolidating understanding (Wilson & Haugh, 2009). The intervention has currently shown that it impacts positively upon all reading ability groups, and therefore is likely to also support instruction for wider groups, e.g. English as a foreign language learners Ahmadi, et al., (2013).

Within one of the intervention schools all teachers took part in the intervention training although only P5 children were assessed as part of the research study. This confirms the desire for upskilling in the area of reading comprehension (Ness, 2009) and taking the intervention to earlier and older age groups are areas for further research. The HT spontaneously gave some

qualitative feedback regarding the implementation across the school and stated that all teachers spoke highly of the intervention. Furthermore she stated that even pupils within the Primary 1 setting were able to access texts in a more meaningful way and discuss at least one reading comprehension strategy and that this was evident even for books without graphics. Her quotes included:

*“Even Primary 1s were confident in talking about strategies and would use visualising for non-picture books. I’ve never seen such high quality awareness of learning”*

*“I am now really confident that the strategies were really being taught and not just practiced.”*

*“It really helped teachers think about what they were asking.”*

There is recognition that teaching metacognitive approaches early are hugely beneficial to young learners (Vauras, Kinnunen, & Rauhanummi, 1999) and given the link between pre-school language skills predicting reading comprehension (Catts, Nielsen, Bridges, & Liu, 2016) how could early years use of SHORS affect language ability? These are all interesting next steps given the potential to use SHORS across wider age groups, which would concur with the research of Shanahan (2010) who studied younger children up to Primary 5 ages, McCartney et al., (2015) who studied Primary 4 children and James-Burdumy et al., (2009) who studied the age equivalent of Primary 5 children and older.

There are a great many variables interacting within the process of reading and some of the correlations between these variables have been discussed. However, further untangling the exact dynamics between these variables could be an area for further research. For example, reading frequency at home increased and this has an impact on reading ability. Further research may seek to identify what percentages of change scores can be attributed to reading frequency and how much to other aspects of the SHORS intervention (Baker & Wigfield, 1999).

Furthermore, should this research be conducted with older age groups and therefore more advanced readers, there is more likely to be more reliable correlations (Baker & Wigfield, 1999).

### 9.2.2. SHORS and Peer Learning

Pedagogical approaches based upon peer learning have been described in different ways such as in research by Damon (1984) and Wilkinson et al., (2002) where peer collaboration is often referred to as “cooperative learning” or “collaborative learning” and these terms are often used interchangeably. However, peer learning requires the act of sharing and receiving dialogue. Peer approaches have been used extensively and successfully throughout learning and within reading (Calhoon, 2005; Fuchs, Fuchs, Mathes, & Simmons, 1997; King, 1997; Manion & Alexander, 1997; Palincsar, Brown, & Martin, 1987). In addition, learning buddies and partners of the same or different ages and abilities have been used across learning in a variety of ways (Sosu & Ellis, 2014; Topping, 2005).

Peer dynamics in learning have led to increased comprehension (Vaughn, Klingner, & Bryant, 2001), feelings of reading efficacy (Van Keer & Verhaeghe, 2005), topic content (Vaughn et al., 2001) and strategy knowledge (Rojas-Drummond et al., 1998). In addition, there is evidence that peer learning affects influence class and school effects (Wilkinson et al., 2002). However, within the current study the impact of peer learning was not studied, although feedback from intervention teachers indicated that SHORS increased positive relationships, was enjoyable for all, and empowered children. Indeed, these teachers scored positively on fidelity measures:

- Focused and quality discussion about the text
- Interesting and varied reading materials

- Establish an engaging motivational context and reading opportunities within the class.

Yet, while these indicators could suggest positive peer interactions could be at play, this component was not measured. Therefore extending the current study to measure peer learning types/opportunities would be an interesting area for further research.

### 9.2.3. SHORS and teacher/pupil attunement

Intervention teachers cited instances where the quality of discussion during literacy lessons were of greater depth and that they now asked questions they previously would not have considered. This was also observed during fidelity observations which highlighted the benefits of conversation (Ketch, 2005). These comments could be indicative of both greater levels of teachers' metacognition (Manning & Payne, 1993) and the development of attunement with pupils. Being more in tune with children's answers perhaps increased the time devoted to text discussion with pupils, thereby improving outcomes. Neither teacher metacognition nor teacher/pupil attunement outcomes were measured and this could be an area for further investigation. Greater understanding of these variables would be interesting given the impact teacher metacognition can have on; outcomes (Prytula, 2012), promoting more positive relationships (Driscoll & Pianta, 2010) and developing respect and trust, thereby enhancing creativity (Marcus, 2016).

### 9.2.4. Parental Perspective

The current study did not include parents as partners throughout the study. Although engaged to ensure consent, as appropriate, additional involvement would have been beneficial, especially given that children reported more positive reading habits at home. The parent voice would have added a new dimension to the conceptual understanding of the SHORS impact. In a Scottish Government review of 51 studies, parental input had a positive impact upon literacy

attainment (Topping, 2014). The review found many interventions had the aim of influencing parental behaviour towards subsequently changing child behaviour. Therefore, further research might consider: (1) how the SHORS methodology could best be communicated to parents so they too can support its implementation and; (2) how this would impact upon outcomes. This would be topical research since the parental voice is of priority status within the National Improvement Framework (Scottish Government, 2016) given its potential impact (Sosu & Ellis, 2014).

#### 9.2.5. SHORS across the curriculum

Teachers who implemented the SHORS approach with higher fidelity agreed that, although SHORS was designed with the development of reading comprehension in mind, there was scope to use this methodological approach across the curriculum (Scottish Government, 2010). This is consistent with the CfE which states that literacy should be across learning (Scottish Government, 2002). This is especially important, given that as we develop our reading skills the emphasis moves from learning to read towards reading to learn. Therefore, the use of metacognitive strategies for deeper understanding becomes an increasingly important influencing factor across subjects. Within the SHORS study, teachers developed their skills of questioning, re-evaluation and creating meaning through metacognitive strategy use, which are abilities that could transcend the contexts of literacy instruction towards construction of meaning across learning contexts within time (Gillies, Nichols, & Burgh, 2011) and potentially further developing creativity (Davies et al., 2013).

#### 9.2.6. The dimension of vocabulary

Direct instruction of vocabulary relates to the development of metacognitive strategies and has the potential to optimise comprehension skills (Boulware-Gooden et al., 2007; Cain & Oakhill, 2014), especially for those with language learning deficits (Woolley, 2010). Therefore, in line with McCartney et al., (2015), one core component of the intervention was direct vocabulary

instruction. However, while vocabulary, being reading comprehension at its most fundamental level, will most likely have an impact upon outcomes, the magnitude of this variable was not assessed as a broader definition of reading comprehension was the focus of this study. Further research may consider, what the impact of the metacognitive vocabulary instruction is as a component on reading comprehension ability. Also, what is the impact of the metacognitive reading comprehension on vocabulary outcomes or development? Yet, neither the frequency of vocabulary instruction nor the change scores in vocabulary were measured and this is an area for further development. However, given that the SHORS methodology yields positive outcomes it may be difficult to design a study analysing the component parts while still being ethical.

#### 9.2.7. Dose-response

This intervention took place over an 8 week period and calculations indicated there would be no dose-response relationship between effect size and instructional duration (see 4.9.1 for details/references). Additional assessment at a later date could potentially add to the research findings by ascertaining whether there would have been increased effect sizes if intervention implementation period had further increased (see 7.4). This would also offer opportunities to measure sustainability of impact.

### 9.3 Limitations of the study

#### 9.3.1. Between groups difference

Effort was made to have equal groups at the pre-test point; however, was a slight indication that teachers of the control condition were more highly skilled than intervention teachers. This could have led to regression to the mean for intervention teachers.

### 9.3.2. The balance of data within a mixed-method model

Primary data within the current study was quantitative data. Additional qualitative data came from surveys and questionnaires (employed to answer specific research questions), which lent themselves to numerical forms of collation, without having the statistical power to interpret them through quantitative analytical means. This approach may have increased the research reliability of the interpretation of the questionnaires, yet the highly-structured qualitative data was less open to varying interpretations or participant's individual and unique perspectives than more fluid data forms of data collection (e.g. unstructured interviews or diary accounts) would have provided. Indeed, the least standardised way of gathering information was the semi-structured teachers' interview, and here questions were still context bound. As discussed in Section 4.10.2 this left the analysis short of experiential data which if had been included may have enriched overarching interpretations. This experiential data pertaining to teacher, child or parent experience of SHORS may be area for further investigation.

Even although qualitative data was structured throughout the coding process, it became increasingly difficult to distinguish between the descriptive and interpretative information, and alternative theme and subtheme headings could have been equally justifiable given the dynamic links between information.

### 9.3.3. Implementation Science, Impact and Population Size

Teacher perceptions of effective reading comprehension instruction can influence their level of acceptance regarding new intervention approaches (Rich & Pressley, 1990). Within the current study, there was evidence to suggest that there was variation in the degree of implementation and there are tentative indications that this had an impact upon individual intervention teachers' effect sizes. However, given the low sample sizes of children who took part in the study that were within the "lower fidelity," this was not statistically significant. While no researcher would want their intervention to be implemented with low fidelity, it



would have been interesting to see if increased numbers within this group would have had statistical significance when comparing lower fidelity and higher fidelity sub-group outcomes. Implementation levels may have increased with more teacher peer support (Fixsen et al., 2009; Hattie, 2012; Scottish Government, 2016), increased opportunities for coaching and consultation (Blasé et al., 2009; Rich & Pressley, 1990), and consistently supportive leadership creating a positive school ethos (Robinson, 2007; Smith, 2015) within the framework of implementation science (Fixsen et al., 2009).

#### 9.3.4. Measurement error

##### *9.3.4.1 Measuring metacognition*

This study used self-reported strategy use scales in a similar way to the McCartney et al., (2015) study and, in so doing, measured children's metacognitive knowledge of strategy use. However, there are methodological issues in reliably measuring metacognition given the differences in metacognitive bias (the difference between a participant's confidence in strategy use and their actual use - even when task performance is constant), metacognitive sensitivity (how self-aware a participant is regarding correct and incorrect judgements) and metacognitive efficiency (participant's metacognitive sensitivity when task levels and expectations change) (Dunlosky & Lipko, 2007; Dunlosky, Rawson, & Middleton, 2005; Stephen & Hakwan, 2014). In order to increase accuracy coaching aimed at over recognition of monitoring strategies may be beneficial (Dunlosky & Lipko, 2007) but was not undertaken as part of this study. As such, SRSU findings can be considered as a measure of awareness, which, while related to sensitivity of judgement, is a different concept.

However, standardised measures of metacognitive awareness have low reliability (Garner, 1987; McNamara & Magliano, 2009), especially for unskilled readers (Artelt & Schneider, 2015) and self-reporting methods are in general subject to bias (Haefel & Howard, 2010).

#### 9.3.4.2 Observation reliability

Observational data was obtained at various stages of the process for either baseline information or fidelity checks. It was observed on several occasions that teachers who emphasised vocabulary skills did so at the expense of other explicit reading comprehension instruction. There is no evidence to suggest that the fidelity observed was comparable with levels of fidelity when not observed. Observation data should be interpreted with caution as it is only a snapshot of practice and open to bias (Hattie, 2012; Torgerson, 2008). It was recognised that effectively teaching vocabulary techniques alongside reading comprehension instruction and strategy use would be difficult to do so effectively within one lesson. Therefore, given the small number of fidelity observations, one lesson with a vocabulary focus had the potential to influence the fidelity ratings of the SHORS reading comprehension strategy instruction. Therefore, ideally, additional data would be effective in ensuring triangulation of evidence.

#### 9.3.4.3 Number of books read

When asking the children how many books they had read within the previous two months, researcher observations noticed that some of the higher ability readers stated only one or two books, but were also keen to point out that these were complex or longer than potential alternatives. The question asked within this study could have been better worded to more reliably capture the volume of text read. The ambiguity within the question used will have affected the validity of this answers, which are therefore open to greater interpretation. For example, the number of books that a child reads may drop as skill increases due to growing levels of confidence to read more challenging books of longer length.

#### 9.3.4.4 Correlations between levels of implementation and effect size

While descriptive data has indicated that levels of fidelity to implementation correlate with effect size, these results were not statistically significant and should be treated with caution.

Studies with greater population numbers may further enhance understandings of these relationships.

#### 9.3.5. School factors

Within schools, identifying appropriate assessment spaces has been an issue and may have negatively impacted upon technical bias and therefore test outcomes (Torgerson, 2008). However, arguably, this could be the case in most educational research settings and therefore (although worthy of note) should not negatively impact upon the interpretations of the study.

#### 9.3.6. Additional factors

- The current study was concerned with the short-term impact of an intensive intervention. However, it did not build into the design the opportunity to measure long-term impact
- Outliers were left in the study given the intention-to-treat approach; however, this may have affected data analysis. The decision was made to include outliers in the study given the normal distribution of the population (see 6.3).

### 9.4 Reflections on the role of the Educational Psychologist/researcher

#### 9.4.1. Support evidence based practice within the climate of change

The role of the EP has historically been heavily influenced by the Warnock Report (Warnock, 1978) and its emphasis upon Special Educational Needs. While it promotes more inclusive practice within the mainstream setting, there remains perceptions that the EP role is predominantly around ASN; yet this project illustrates the impact EPs can have across the curriculum for all children.

Teachers are not trained to critique the quality of evidence in the same way as EPs. It takes skilled practitioners to undertake robust research within schools, which do not offer the scientifically controlled environments that would be most desired. Working within education

requires the understanding of these contexts of unique structures, incorporating powerful dynamics, e.g. relationships, teacher/child/parental beliefs, social pressures, leadership styles and cultural diversity. Each of these components potentially enhance or limit research reliability and intervention's effectiveness. The EP is trained to understand these complex interacting variables and through the lens of implementation science EPs can support the complex ongoing process of change (Kelly & Perkins, 2012).

EPs are scientific practitioners engaged in the ongoing evaluation of impact and outcomes. It is not sufficient to use any evidence based approach, given that most of what teachers do has a positive impact (Hattie, 2012). Education requires a critical lens to be cast over qualitative and quantitative information and to compare and contrast intervention approaches to identify that which has the greatest impact. No longer should teaching be considered an art; instead it should be considered a science, where a research culture is integrated into practice to optimise ongoing improvement and effective evaluation (Eodanable & Lauchlan, 2009). EPs can support this change in ethos.

#### 9.4.2. Informing best practice assessment procedures

##### 9.4.2.1 Reliable assessment

In recent years within education departments there has been an increasing realisation regarding the importance of evidence-based practice. Without additional training to upskill teachers in effective research or reliable assessment, teachers may continue to do what they have always done regardless of how scientifically reliable their approaches are.

Within this study, robust analysis was undertaken to ensure that the instrument for measurement could be compared favourably to other available alternatives. Yet many tools are used within both education and research contexts which vary in their psychometric properties (Bowyer-Crane & Snowling, 2005). For example the NGRT is widely used within Scotland yet has a high SEM of 4.74. (see Section 5.5.5). Reliable measurement of reading

comprehension continues to be a difficult task (Block, 2008). However, as schools within Scotland increasingly value the merits of standardised tests (MacNabb, 2016), having the most valid and reliable tools becomes even more essential. While research into accessible and easy to implement tools continues, there is a role for EPS to raise awareness about measurement error to ensure that unfounded conclusions are not made (Weir, 2005). Furthermore, in the absence of reliable tools, EPS are in a position to support the triangulation of assessment information (ASPEP, 2014), taking a multi-dimensional rather than uni-dimensional approach. While an area for further investigation into the beliefs of teachers, when they are faced with contradictory evidence from both ecological assessment and standardised scores, many could believe the latter without further investigation. EPS are trained in the use of robust executive assessment frameworks linking epistemology to methodology to inform practice -namely ecological systems theory (Bronfenbrenner, 2009) that can support better interpretations.

#### 9.4.2.2 Appropriate assessment approach

Within large-scale research projects some form of standardised assessment is necessary (Boyle & Fisher, 2006) and the purpose of the assessment needs to be linked to the correct type of assessment. For example, an alternative approach to assessing reading comprehension is Dynamic Assessment (DA), which differs markedly from the typical standardised assessment procedures (Lidz, 1991). While considered reliable and valid when predicting reading skills (Burton & Watkins, 2007) and has been deemed especially useful for the aspect of reading comprehension (Dorfler, Golke, & Artelt, 2009) of individual children's skills, it is not yet designed to be used as a pre- and post-within a research study (Boyle & Fisher, 2006) although this is an area of promising research (Poehner & Lantolf, 2005). As such, there is a role for EPs to support practitioners in their selection of assessment type and tools to identify the most appropriate mechanism for answering their question of enquiry.

#### 9.4.3. Supporting Implementation

Although not statistically significant, the SHORS study brought about different effect sizes depending upon the teacher, which has a tentative link to the fidelity of implementation. Therefore, given EPS knowledge and understanding of implementation science, there is a clear role in their sharing of these understandings.

#### 9.5. Political pressures

The pilot had indicated that there may be potential biases created by poorly-matched schools and this highlighted the need for a more robust planning approach within the main study. Thus, negotiations with the LA PLA were required to ensure that: (1) schools could be identified from a large pool of potential candidates; and (2) that the schools taking part were not involved in any other PLA activity or project which may serve as a confounding variable. Discussions around SHORS took place and PLA representatives who were keen to find out more about the intervention. However, the researcher was aware that information specific to the intervention could not be shared because: (1) it could serve as a confounding variable as representatives from the PLA were working with the control and other schools thereby potentially creating a contamination effect; and (2) SHORS did not have a sufficient evidence base to be rolled out within the authority until completion of the study. This was perhaps influenced by strict timescales imposed upon the PLA by external political forces to evidence impact. Therefore, the PLA representatives placed pressure upon the researcher to share and roll out the intervention prior to the study's completion, potentially jeopardising the project. Careful negotiations were required to communicate the rationale for waiting until the effects of the project were ascertained.

LAs have received a huge investment from the Scottish Government to raise attainment throughout Scotland. Many have established PLAs similar to that within NAC. As such there is a high level of accountability that LAs are having the desired impact with short timescales

and therefore, there is little time to make informed decisions and plan effectively. There is also the temptation for personnel not fully trained in research and evidence-based practice to make ill-informed decisions based upon personal perceptions of impact rather than through investigation of the evidence base, which requires time. This highlights a role for the EP being a researcher and a supporter of effective research (see Section 9.4.1 above). Further discussion around how LAs can deliver effective outcomes within politically-determined timescales would be welcomed, particularly when implementation of any intervention is a long process over several years (Fixsen et al., 2005). Activity should not substitute quality.

#### 9.6 NAC next steps

NAC are keen to roll out SHORS. EPS are to do so in partnership with the PLA given the benefits of working collaboratively (Scottish Government, 2010). Ongoing CLPL will be provided in a systematic and ongoing way (within a framework of implementation science) in order to meet the requirements of the national agenda (Scottish Government, 2010, 2016; Sosu & Ellis, 2014). More specific next steps and areas for research are currently being negotiated.

#### 9.7 Conclusions

The results from the current study suggest that SHORS offers a high impact and easily implemented methodology for raising attainment for all ability levels in reading comprehension. There is also supporting evidence that the approach positively enhances reading habits, word reading ability, metacognitive knowledge of reading comprehension, strategy use and teacher skill. There are some exciting areas for further research around reading comprehension components, peer learning and parental involvement across broader populations. These areas should be informed by the current study's limitations. Next steps within NAC are to roll out SHORS implementation across the authority and to identify avenues for sharing SHORS out-with the LA.

This study has highlighted the impact that EPS can have on outcomes through rigorous research. There is a clear role for EPS to both upskill education staff in SHORS and the fundamentals of evidence-based research, assessment, design and implementation science. There is also a role in developing an understanding of effective assessment procedures and scientific comparisons of intervention options.



## References

- Aarnoutse, C., van Den Bos, K., & Brand-Gruwel, S. (1998). Effects of listening comprehension training on listening and reading. *Journal of Special Education, 32*(2), 115-126.
- Aaron, P. G., Joshi, M., & Williams, K. A. (1999). Not all reading disabilities are alike. *Journal of Learning Disabilities, 32*(2), 120-37.
- Adams, M. J. (1994). *Beginning to read: thinking and learning about print*. Cambridge, Mass.: Cambridge, Mass: MIT Press.
- Adams, M., J., (2004) Modeling the connections between word recognition and reading In R. Ruddell & N. Unrau (Eds.), *Theoretical models and processes of reading* (Fifth ed., pp. 594-606). Newark, Del: International Reading Association.
- Ahmadi, M. R., & Gilakjani, A. P. (2012). *Reciprocal teaching strategies and their impacts on English reading comprehension*. Theory and Practice in language studies, *2*(10), 2053.
- Ahmadi, M. R., Ismail, H. N., & Abdullah, M. K. K. (2013). *The importance of metacognitive reading strategy awareness in reading comprehension*. English Language Teaching, *6*(10), 235.
- Akhondi, M., Malayeri, F. A., & Samad, A. A. (2011). How to Teach Expository Text Structure to Facilitate Reading Comprehension. *The Reading Teacher, 64*(5) 368-372.
- Alderson, C., & Wall, D. (1993). Does Washback Exist? *Applied Linguistic, 14*(2), 115-129.
- Alvermann, D. E. (1988). Effects of Spontaneous and Induced Lookbacks on Self-Perceived High- and Low-Ability Comprehenders. *Journal of Educational Research, 81*(6), 325-331.
- Anderson-Cook, C. M. (2005). Experimental and Quasi-Experimental Designs for Generalized Causal Inference. In Shadish, W.R., Cook, T.D. & Campbell. D.T. *Journal of the American Statistical Association, 100*, (pp708-708). Massachusetts
- Anderson, M., & Thiede, K. (2008). Why do delayed summaries improve metacomprehension accuracy? *Acta Psychologica, 128*(1), 110-118.
- Anderson, R. (2004). Role of the reader's schema in comprehension, learning and memory. In R. Ruddell & N. Unrau (Eds.), *Theoretical models and processes of reading* (Fifth ed., pp. 594-606). Newark, Del: International Reading Association.
- Anderson, R. C., & Pearson, P. D. (1984). A schema-theoretic view of basic processes in reading comprehension. *Handbook of reading research, 1*, 255-291.
- Anderson, V., & Roit, M. (1993). Planning and implementing collaborative strategy instruction for delayed readers in grades 6-10. *The Elementary School Journal, 94*(2), 121-137.

- Armbruster, B. (2010). *Put reading first: the research building blocks for teaching children to read: kindergarten through grade 3*. Retrieved from <https://lincs.ed.gov/publications/pdf/PRFbooklet.pdf>
- Armenakis, A. (1993). Creating readiness for organizational change. *Human Relations*, 46(6), 381-703.
- Artelt, C., & Schneider, W. (2015). Cross-country generalizability of the role of metacognitive knowledge in students' strategy use and reading competence. *Teachers College Record*, 117(1), 1-32.
- Ashby, F. G., & Isen, A. M. (1999). A neuropsychological theory of positive affect and its influence on cognition. *Psychological review*, 106(3), 529.
- ASPEP (2014). *Educational psychology assessment in Scotland*. Leicester: British Psychological Society
- ASPEP (2013). *Assessing literacy and dyslexia. Where are we now?* Leicester: British Psychological Society
- Atkins, J. G. (2013). *The effect of explicit teaching of comprehension strategies on reading comprehension in elementary school*. Unpublished PhD Thesis, Columbia University.
- Autin, F., & Croizet, J.C. (2012). Improving working memory efficiency by reframing metacognitive interpretation of task difficulty. *Journal of Experimental Psychology*, 141(4), 610-618
- Axford, N., & Morpeth, L. (2012). The common language service-development method from strategy development to implementation of evidence based practice. In B. Kelly & D. Perkins (Eds.), *Handbook of Implementation Science for Psychology in Education*. Cambridge: Cambridge: Cambridge University Press.
- Baddeley, A. (2000). The episodic buffer: a new component of working memory? *Trends in Cognitive Sciences*, 4(11), 417-423.
- Baddeley, A., & Hitch, G. (1974). Working memory. In G. Bower (Ed.) *The psychology of learning and motivation* (pp. 47–89). New York: Academic Press.
- Baker, L. (1994). Fostering metacognitive development. *Advances in Child Development and Behavior*, 25, 201-239.
- Baker, L., & Wigfield, A. (1999). Dimensions of children's motivation for reading and their relations to reading activity and reading achievement. *Reading Research Quarterly*, 34(4), 452-477.
- Baker, L., Zeliger-Kandasamy, A., & DeWyngaert, L. U. (2014). Neuroimaging evidence of comprehension monitoring. *Psihologijske Teme (Psihologijske Teme)*, 23(1), 167-181.

- Bandura, A. (1976). Self-reinforcement: theoretical and methodological considerations. *Behaviorism*, 4(2), 135-155.
- Barnett, S. (1995). Long-term effects of early childhood programs on cognitive and school outcomes. *The Future of Children*, 5(3), 25-50.
- Baumann, J. (1984). The effectiveness of a direct instruction paradigm for teaching main idea comprehension. *Reading Research Quarterly*, 20(1), 93-115.
- Baumann, J. F., Hooten, H., & White, P. (1999). Teaching comprehension through literature: a teacher-research project to develop fifth graders' reading strategies and motivation. *The Reading Teacher*, 53(1), 38-51.
- Beck, I., & McKeown, M. (1983). Vocabulary development: all contexts are not created equal. *The Elementary School Journal*, 83(3), 177-181.
- Bensley, A., & Spero, R. (2014). Improving critical thinking skills and metacognitive monitoring through direct infusion. *Thinking Skills and Creativity*, 12, 55-68.
- Bereiter, C., & Bird, M. (1985). Use of Thinking aloud in identification and teaching of reading comprehension strategies. *Cognition and Instruction*, 2(2), 131-156.
- Berkeley, S., & Riccomini, P. J. (2013). QRAC-the-Code: a comprehension monitoring strategy for middle school social studies textbooks. *Journal of learning disabilities*, 46(2), 154-165.
- Berkeley, S., Scruggs, T., & Mastropieri, M. (2010). Reading comprehension instruction for students with learning disabilities, 1995—2006: a Meta-Analysis. *Remedial and Special Education*, 31(6), 423-436.
- Blasé, K., Fixsen, D., Van Dyke, M., & Duda, M. (2009). Implementation drivers: best practices for coaching. *Chapel Hill, NC: National Implementation Research Network*.
- Block, C. (2008). Michael Pressley's educational legacy and directionshe identified for future research in reading instruction. *Educational Psychologist*, 43(2), 97-106.
- Block, C., & Duffy, G. (2008). Research on teaching comprehension. In C. C. Block & S. R. Parris (Eds.), *Comprehension Instruction: Research-Based Best Practices. Solving Problems in the Teaching of Literacy*. Second Edition (Vol. 2). (pp. 262-281)New York: Guilford Press.
- Block, C., Oakar, M., & Hurt, N. (2002). The expertise of literacy teachers: a continuum from preschool to Grade 5. *Reading Research Quarterly*, 37(2), 178-206.
- Block, C. C., & Pressley, M. (2007). Best practices in teaching comprehension. In L. B. Gambrell, L. M. Morrow, & M. Pressley (Eds.), *Best practices in literacy instruction* (3rd ed., pp. 220–242). New York: Guilford.

- Block, C., Paris, S., & Whiteley, C. (2008). CPMs: a kinaesthetic comprehension strategy. *Reading Teacher, 61*(6), 460-470.
- Bohn-Gettler, C. M., & Kendeou, P. (2014). The interplay of reader goals, working memory, and text structure during reading. *Contemporary Educational Psychology, 39*(3), 206-219.
- Boothby, P., & Alvermann, D. (1984). A classroom training study: the effects of graphic organizer instruction on fourth graders' comprehension. *Reading World, 23*(4), 352-339.
- Boulware-Gooden, R., Carreker, S., Thornhill, A., & Joshi, M. (2007). Instruction of metacognitive strategies enhances reading comprehension and vocabulary Achievement of Third-Grade Students. *Reading Teacher, 61*(1), 70-77.
- Bowyer-Crane, C., & Snowling, M. (2005). Assessing children's inference generation: what do tests of reading comprehension measure? *British Journal of Educational Psychology, 75*(2), 189-201.
- Boyle, J., & Fisher, S. (2006). *Educational testing: a competence-based approach text for the British Psychological Society's certificate of competence in educational testing (Level A)*: Oxford: BPS Blackwell.
- Boyle, J., McCartney, E., O'hare, A., & Law, J. (2010). Intervention for mixed receptive–expressive language impairment: a review. *Developmental Medicine & Child Neurology, 52*(11), 994-999.
- Bransford, J., & Johnson, M. (1972). Contextual prerequisites for understanding: some investigations of comprehension and recall. *Journal of Verbal Learning and Verbal Behavior, 11*(6), 717-726.
- Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative Research in Psychology, 3*(2), 77-101.
- Brenna, B. (2013). How graphic novels support reading comprehension strategy development in children. *Literacy, 47*(2), 88-94.
- Brighouse, T. (2003). *Local Authorities and the London Challenge*. Retrieved from <http://www.londoncouncils.gov.uk/our-key-themes/children-and-young-people/education-and-school-places/lessons-london/tim-brighouse>
- British Psychological Society (1999). Dyslexia, literacy and psychological assessment. Report of a working party of the Division of Educational and Child Psychology. Leicester: British Psychological Society
- Britton, B., & Graesser, A. (1996). *Models of understanding text*. Mahwah, N.J.: Lawrence Erlbaum Associates.

- Bronfenbrenner, U. (2009). *The ecology of human development*: United States: Harvard University Press.
- Brookes, G. (2013). *What works for children and young people with literacy difficulties?* The effectiveness of intervention schemes. Retrieved from [http://www.interventionsforliteracy.org.uk/widgets\\_GregBrooks/What\\_works\\_for\\_children\\_fourth\\_ed.pdf](http://www.interventionsforliteracy.org.uk/widgets_GregBrooks/What_works_for_children_fourth_ed.pdf)
- Brown, A., & Day, J. (1983). Macrorules for summarizing texts: the development of expertise. *Journal of Verbal Learning and Verbal Behavior*, 22(1), 1-14.
- Brown, R., Pressley, M., Van Meter, P., & Schuder, T. (1996). A quasi-experimental validation of Transactional Strategies Instruction with low-achieving second-Grade readers. *Journal of Educational Psychology*, 88(1), 18-37.
- Burge, B., Styles, B., Brzyska, B., Cooper, L., Shamsan, Y., Saltini, F., & Twist, L. (2010). *New Group Reading Test (NGRT)*.
- Burgess, S. (2014). *Understanding the success of London's schools*. Retrieved from <http://www.bristol.ac.uk/media-library/sites/cmpo/migrated/documents/wp333.pdf>
- Burton, V. J., & Watkins, R. V. (2007). Measuring word learning: dynamic versus static assessment of kindergarten vocabulary. *Journal of Communication Disorders*, 40(5), 335-356.
- Caccamise, D., Snyder, L., & Kintsch, E. (2008). Constructivist theory and the Situation Model: Relevance to future assessment of reading comprehension. In C. Block & S. Parris (Eds.), *Comprehension instruction; Research based best practices* (pp. 80-97). London: The Guilford Press.
- Cain, K. (2010). *Reading Development and Difficulties*. Chichester: The British Psychological Society and Blackwell Publishing Ltd.
- Cain, K., & Bignell, S. (2014). Reading and listening comprehension and their relation to inattention and hyperactivity. *British Journal of Educational Psychology*, 84(1), 108-124.
- Cain, K., & Oakhill, J. (2006). Assessment matters: issues in the measurement of reading comprehension. *British Journal of Educational Psychology*, 76(4), 697-708.
- Cain, K., & Oakhill, J. (2014). Reading Comprehension and vocabulary: is vocabulary more important for some aspects of comprehension. *L'annee psychologique* (Topics in Cognitive psychology), 144, 647-662.
- Cain, K., Oakhill, J., & Lemmon, K. (2004). Individual differences in the inference of word meanings from context: the influence of reading comprehension, vocabulary

- knowledge, and memory capacity. *Journal of Educational Psychology*, 96(4), 671-681.
- Calhoon, M. B. (2005). Effects of a peer-mediated phonological skill and reading comprehension program on reading skill acquisition for middle school students with reading disabilities. *Journal of Learning Disabilities*, 38(5), 424-433.
- Cameron, R. J. (2006). Educational Psychology: the distinctive contribution. *Educational Psychology in Practice*, 22(4), 289-304.
- Carlo, M., August, D., McLaughlin, B., Snow, C., Dressler, C., Lippman, D., . . . White, C. (2004). Closing the Gap: addressing the vocabulary needs of English-language learners in bilingual and mainstream classrooms. *Reading Research Quarterly*, 39(2), 188-215.
- Carr, M., & Borkowski, J. (1989). Attributional training and the generalization of reading strategies with underachieving children. *Learning and Individual Differences*, 1(3), 327-341.
- Carretti, B., Caldarola, N., Tencati, C., & Cornoldi, C. (2014). Improving reading comprehension in reading and listening settings: the effect of two training programmes focusing on metacognition and working memory. *British Journal of Educational Psychology*, 84(2), 194-210.
- Carroll, C, Paterson, M., Wood, S., Booth, A., Rick, J., & Balain, S. (2007). A conceptual Framework for implementation fidelity. *Implementation Science*, 2(40). doi:10.1186/1748-5908-2-40 .
- Catts, H. W., Nielsen, D. C., Bridges, M. S., & Liu, Y.-S. (2016). Early identification of reading comprehension difficulties. *Journal of Learning Disabilities*, 49(5), 451-465.
- Chall, J. S., Jacobs, V. A., & Baldwin, L. E. (2009). *The reading crisis: why poor children fall behind*. Cambridge, MA: Harvard University Press.
- Chan, L. (1994). Relationship of motivation, strategic learning and reading-achievement in grade5, grade 7 and grade 9. *Journal of Experimental Education*, 62(4), 319-339.
- Chapman, P.F., Crane, M., Wiles, J.A., Noppert, F., McIndoe, E.C. (Eds.), (1995). Asking the right questions: ecotoxicology and statistics. In: *Report of a Workshop Held at Royal Holloway* University of London, Egham, Surrey, United Kingdom, SETAC, (pp.32).
- Chiesi, H., Spilich, G., & Voss, J. (1979). Acquisition of domain-related information in relation to high and low domain knowledge. *Journal of Verbal Learning and Verbal Behavior*, 18(3), 257-273.
- Chrysochoou, E., Bablekou, Z., & Tsigilis, N. (2011). Working Memory contributions to reading comprehension components in middle childhood children. *The American Journal of Psychology*, 124(3), 275-289.

- Clark, K., & Graves, M. (2005). Scaffolding students' comprehension of text. *Reading Teacher, 58*(6), 570-580.
- Clarke, P., Snowling, M., Truelove, E., & Hulme, C. (2010). Ameliorating children's reading-comprehension difficulties: a randomized controlled trial. *Psychological science, 21*(8), 1106-1116.
- Clarke, P., Truelove, E., Hulme, C., & Snowling, M. (2014). *Developing reading comprehension*. Chichester, West Sussex, UK : Wiley Blackwell.
- Cleverdon, J. (2014). *Read on. Get on*. Retrieved from <http://www.literacytrust.org.uk/campaigns/rogo/about-read-on-get-on>
- Cohen, J. (1988). *Statistical power analysis for the behavioral sciences* (2nd ed). Hillsdale, N.J.: L. Erlbaum Associates.
- Conrad, P. (1987). The experience of illness. *Social Science & Medicine, 24*(8), 700-701.
- Consortium on Chicago School Research (1999). Improving Chicago's schools: the teachers' turn, 1999; *Elementary School Teacher Survey*. In. Chicago: CCSR. Retrieved from <http://consortium.uchicago.edu/downloads/5581999-hs-teacher.pdf>
- Cooley, E., & Ayres, R. (1988). Self-concept and success-failure attributions of nonhandicapped students and students with learning disabilities. *Journal of Learning Disabilities, 21*(3), 174-178.
- Courtney, A., & Gleeson, M. (2010). *Building bridges of understanding: a whole school approach to children's comprehension development*. Retrieved from <http://www.sess.ie/resources/>
- Craske, M. (1988). Learned helplessness, self-worth motivation and attribution retraining for primary school children. *British Journal of Educational Psychology (58)*, 152-164.
- Crawford, L.W., C.E. Martin, and M.M. Philbin. (2005) *Read for real: nonfiction strategies for reading results*. Columbus, OH: Zaner-Bloser.
- Cromley, J. (2000). *Learning to think, learning to learn: what the science of thinking and learning has to offer adult Education*. NIFL Literacy Leader Fellowship, Program Reports 4(1).
- Cross, D. R., & Paris, S. G. (1988). Developmental and instructional analyses of children's metacognition and reading comprehension. *Journal of Educational Psychology, 80*(2), 131-142.
- Currie, N. K., & Cain, K. (2015). Children's inference generation: the role of vocabulary and working memory. *Journal of Experimental Child Psychology, 137*, 57-75.
- Dabarera, C., Renandya, W. A., & Zhang, L. J. (2014). The impact of metacognitive scaffolding and monitoring on reading comprehension. *System, 42*, 462-473.

- Damon, W. (1984). Peer education: the untapped potential. *Journal of Applied Developmental Psychology, 5*(4), 331-343.
- Dane, A., & Schneider, B. (1998). Program integrity in primary and early secondary prevention: are implementation effects out of control. *Clinical Psychology Review, 18*(1), 23-45.
- Davey, B., & McBride, S. (1986). Generating self-questions after reading: a comprehension assist for elementary students. *The Journal of Educational Research, 80*(1), 43-46.
- Davies, D. Jindal - Snape, D., Collier, C., Digby, R., Hay, P., & Howe, A. (2013). Creative learning environments in Education--A systematic literature review. *Thinking Skills and Creativity, 8*, 80-91.
- Davis, D. (2010). *A meta-analysis of comprehension strategy instruction for upper elementary and middle school students*. Unpublished PhD dissertation: Nashville, TN: Vanderbilt University.
- Deci, E., & Ryan, R. (1985). *Intrinsic motivation and self-determination in human behavior*. New York: Plenum.
- Deci, E. L., & Ryan, R. M. (2002). The paradox of achievement: the harder you push, the worse it gets. In J. Aronson (Ed.), *Improving academic achievement: impact of Psychological Factors on Education* (pp. 61-87). San Diego: Academic Press.
- Demachkie, M., & Oweini, A. (2011). Using the collaborative strategic reading strategy to improve seventh graders' reading comprehension in Arabic: a pilot study. *International Journal of Pedagogies and Learning, 6*(3), 219-231.
- DfES. (2008). City Challenge: for world Class Education. Retrieved from <http://webarchive.nationalarchives.gov.uk/20130401151715/http://education.gov.uk/publications/eorderingdownload/worldclasseducation.pdf>
- Diamond, A. (2013). Executive functions. *Annual review of psychology, 64*, 135-168.
- Dilekli, Y., & Tezci, E. (2016). The relationship among teachers' classroom practices for teaching thinking skills, teachers' self-efficacy towards teaching thinking skills and teaching styles. *Thinking Skills and Creativity, 21*, 144-151.
- Dills, A. (2005). Does cream-skimming curdle the milk? A study of peer effects. *Economics of Education Review, 24*(1), 19-28.
- Dimitrov, D. M., & Rumrill, P. D. (2003). Pretest- posttest designs and measurement of change. *Work, 20*(2), 159-165.
- Donaldson, M. (1978). *Children's minds*. London: Fontana Press.
- Dorfler, T., Golke, S., & Artelt, C. (2009). Dynamic Assessment and its potential for the assessment of reading competence. *Studies in Educational Evaluation, 35*(2), 77-82.



- Dowhower, S., & Speidel, G. (1988). Let's teach unskilled readers like skilled readers: a closer look at meaning-based instruction. *Reading Research and Instruction*, 28(2), 50-60.
- Driscoll, K. C., & Pianta, R. C. (2010). Banking time in head start: Early efficacy of an intervention designed to promote supportive teacher-child relationships. *Early Education and Development*, 21(1), 38-64.
- Duffy, G. (1993). Rethinking strategy instruction: four teachers' development and their low achievers' understandings. *Elementary School Journal*, 93(3), 231-247.
- Duffy, G., Roehler, L. R., Meloth, M. S., Vavrus, L. G., Book, C., Putnam, J., & Wesselman, R. (1986). The relationship between explicit verbal explanations during reading skill instruction and student awareness and achievement: a Study of Reading Teacher Effects. *Reading Research Quarterly*, 21(3), 237-252.
- Duffy, G., Roehler, L., Sivan, E., Rackliffe, G., Book, C., Meloth, M., . . . Bassiri, D. (1987). Effects of explaining the reasoning associated with using reading strategies. *Reading Research Quarterly*, 22(3), 347-368.
- Dunlosky, J., & Lipko, A. R. (2007). Metacomprehension: a brief history and how to improve its accuracy. *Current Directions in Psychological Science*, 16(4), 228-232.
- Dunlosky, J., Rawson, K., & Middleton, E. (2005). What constrains the accuracy of metacomprehension judgments? Testing the transfer-appropriate-monitoring and accessibility hypotheses. *Journal of Memory And Language*, 52(4), 51-565.
- Durkin, D. (1978). What classroom observations reveal about reading comprehension instruction. *Reading Research Quarterly*, 14(4), 481-533.
- Dweck, C. S., & Leggett, E. L. (1988). A Social-Cognitive approach to motivation and personality. *Psychological Review*, 95(2), 256-273.
- Eccles, J., Wigfield, A., & Schiefele, U. (1998). Motivation to succeed. In N. Eisenberg (Ed.), *Handbook of child psychology: Volume 3 -- Social, emotional, and personality development* (Vol. 5). (pp. 1017-1095) New York: Wiley.
- Edmonds, M., Vaughn, S., Wexler, J., Reutebuch, C., Cable, A., Tackett, K. K., & Schnakenberg, J. W. (2009). A synthesis of reading interventions and effects on reading comprehension outcomes for older struggling readers. *Review of Educational Research*, 79(1), 262-300.
- Education Scotland, (2016). *Informing what works... Raising attainment and reducing inequity*. Retrieved from [https://education.gov.scot/improvement/Documents/SAC/SAC1\\_11/KIABriefing2\\_tc\\_m4-873016.pdf](https://education.gov.scot/improvement/Documents/SAC/SAC1_11/KIABriefing2_tc_m4-873016.pdf)

- Elbaum, B., Vaughn, S., Tejero Hughes, M., & Watson Moody, S. (2000). How effective are one-to-one tutoring programs in reading for elementary students at risk for reading failure? A meta-analysis of the intervention research. *Journal of Educational Psychology, 92*(4), 605-619.
- El-Dinary, P. (2002). Challenges of implementing transactional strategies instruction for reading comprehension. In C. Block & M. Pressley (Eds.), *Comprehension instruction: research-based best practices* (pp.201-215.) New York: Guilford Press.
- Ellis, A., Denton, D., & Bond, J. (2014). An analysis of research on metacognitive teaching strategies. *Procedia - Social and Behavioral Sciences, 116*, 4015-4024.
- Eme, E., Puustinen, M., & Coutelet, B. (2006). Individual and developmental differences in reading monitoring: when and how do children evaluate their comprehension? *European Journal of Psychology of Education, 21*(1), 91-115.
- Eodanable, M., & Lauchlan, F. (2009). The advance of research and evaluation skills by EPs: implications for training and professional development. *Educational Psychology in Practice, 25*(2), 113-124.
- Feldman, K., & Kinsella, K. (2005). *Narrowing the language gap: the case for explicit vocabulary instruction*. New York: ReadAbout Scholastic Professional Paper.
- Ferguson, N., Currie, L., Paul, M., & Topping, K. (2011). The longitudinal impact of a comprehensive literacy intervention. *Educational Research, 53*(3), 237-256.
- Ferro - Almeida, S. (1993). Teachers' initial perceptions of Transactional Strategies Instruction. *Elementary School Journal, 94*(2), 201-205.
- Feuerstein, R., Klein, P., & Tannenbaum, A. (1991). *Mediated learning experience (MLE): theoretical, psychosocial and learning implications*. London: Freund Publishing House Ltd.
- Finley, M. K. (1984). Teachers and tracking in a comprehensive High School. *Sociology of Education, 57*(4), 233-243.
- Fixsen, D., Blase, K., Naoom, S., & Wallace, F. (2009). Core implementation components. *Research on Social Work Practice, 19*(5), 531-540.
- Fixsen, D., Blase, K., Timbers, G., & Wolf, M. (2007). In search of program implementation: 792 replications of the teaching-family model. *Behavior Analyst Today, 8*(1), 96-110.
- Fixsen, D., Naoom, S., Blase, K., Friedman, R., & Wallace, F. (2005). *Implementation research: a synthesis of the literature*. Tampa, FL: University of South Florida.
- Flanagan, J. C. (1954). The critical incident technique. *Psychological Bulletin, 51*(4), 327-358.

- Flavell, J. H. (1971). First discussant's comments: what is memory development the development of? *Human Development*, *14*(4), 272-278.
- Flavell, J. H. (1979). Metacognition and cognitive monitoring: a new area of cognitive-developmental inquiry. *American Psychologist*, *34*(10), 906-11.
- Fleisher, L. S., Jenkins, J. R., & Pany, D. (1979). Effects on poor readers; comprehension of training in rapid decoding. *Reading Research Quarterly*, *15*(1), 30-48.
- Fox, E., & Alexander, P. (2009). Text comprehension: a retrospective, perspective and prospective. In S. Israel & G. Duffy (Eds.), *Handbook of research on reading comprehension* (pp. 227-239). New York, NY: Routledge.
- Frenzel, A. C., Goetz, T., Lüdtke, O., Pekrun, R., & Sutton, R. E. (2009). Emotional transmission in the classroom: exploring the relationship between teacher and student enjoyment. *Journal of educational psychology*, *101*(3), 705.
- Frith, U. (1985). Beneath the surface of developmental dyslexia. In K. E. Patterson, J. C. Marshall, & M. Coltheart (Eds.), *Surface Dyslexia* (pp. 301-330). London: Routledge & Kegan Paul.
- Fuchs, D., Compton, D. L., Fuchs, L. S., Bouton, B., & Caffrey, E. (2011). The construct and predictive validity of a Dynamic Assessment of young children learning to read: implications for RTI Frameworks. *Journal of Learning Disabilities*, *44*(4), 339-347.
- Fuchs, D., Fuchs, L., Mathes, P., & Simmons, D. (1997). Peer-Assisted Learning Strategies: making classrooms more responsive to diversity. *American Educational Research Journal*, *34*(1), 174-206.
- Fukkink, R. G., & de Glopper, K. (1998). Effects of instruction in deriving word meaning from context: a meta-analysis. *Review of Educational Research*, *68*(4), 450-469.
- Fulmer, S. M., & Frijters, J. C. (2011). Motivation during an eExcessively challenging reading task: the buffering role of relative topic interest. *Journal of Experimental Education*, *79*(2), 185-208.
- Furaidah, Saukah, A., & Widiati, U. (2015). Washback of English National examination in the Indonesian context. *TEFLIN Journal*, *26*(1), 36-56.
- Gajria, M., Jitendra, A. K., Sood, S., & Sacks, G. (2007). Improving comprehension of expository text in students with ld a research synthesis. *Journal of Learning Disabilities*, *40*(3), 210-225.
- Gambrell, L., & Jawitz, P. (1993). Mental Imagery, text illustrations, and children's story comprehension and recall. *Reading Research Quarterly*, *28*(3), 265-276.

- Gamoran, A., & Berends, M. (1987). The Effects of stratification in Secondary Schools: synthesis of survey and ethnographic research. *Review of Educational Research*, 57(4), 415-435.
- García, G., Pearson, D., Taylor, B., Bauer, E., & Stahl, K. (2011). Socio-Constructivist and political views on teachers' implementation of two types of reading comprehension approaches in low-income schools. *Theory into Practice*, 50(2), 149-156.
- García-Rodicio, H., & Sánchez, E. (2014). Does the detection of misunderstanding lead to its revision? *Metacognition and Learning*, 9(3), 265-286.
- Gardner, H. (1999). The disciplined mind: what all students should understand? *Choice Reviews Online*, 37(10). ISBN: 0-684-84324-2
- Gardner, K. (1986). *Reading in today's schools*: London: Oliver & Boyd.
- Garner, R. (1987). *Metacognition and reading comprehension*. New Jersey: Ablex.
- Gellert, A. S., & Elbro, C. (2013). Cloze tests may be quick, but are they dirty? Development and preliminary validation of a cloze test of reading Comprehension. *Journal of Psychoeducational Assessment*, 31(1), 16-28.
- Gersten, R., Dimino, J., Jayanthi, M., & Newman - Gonchar, R. (2009). *The development of a classroom observational system for studying the quality of reading comprehension and vocabulary instruction in first grade classrooms*. Evanston, IL: Society for Research on Educational Effectiveness.
- Gersten, R., Fuchs, L. S., Williams, J. P., & Baker, S. (2001). Teaching reading comprehension strategies to students with learning disabilities: a Review of Research. *Review of Educational Research*, 71(2), 279-320.
- Gill, M. J. (2014). The possibilities of phenomenology for organizational research. *Organizational Research Methods*, 17(2), 118-137.
- Gillies, R., Nichols, K., & Burgh, G. (2011). Promoting problem-solving and reasoning during cooperative inquiry science. *Teaching Education*, 22(4), 427-443.
- Glisson, C., & Hemmelgarn, A. (1998). The effects of organizational climate and interorganizational coordination on the quality and outcomes of children's service systems. *Child Abuse & Neglect: The International Journal*, 22(5), 401-421.
- Goodman, K. (1967). Reading: a psycholinguistic guessing game. *Journal of the Reading Specialist*, 6(4), 126-135.
- Gough, P. (1972). One second of reading. *Visible Language*, 6(4), 291-320.
- Gough, P. B., & Tunmer, W. E. (1986). Decoding, reading, and reading disability. *Remedial and Special Education*, 7(1), 6-10.

- Graesser, A. C., Singer, M., & Trabasso, T. (1994). Constructing inferences during narrative text comprehension. *Psychological Review*, *101*(3), 371-395.
- Graham, L., & Wong, B. (1993). Comparing 2 modes of teaching a question-answering strategy for enhancing reading comprehension - didactic and self-instructional training. *Journal of Learning Disabilities*, *26*(4), 270-279.
- Greenberg, E., Dunleavy, E., & Kutner, M. (2008). Literacy behind Bars: results from the 2003 National Assessment of Adult Literacy Prison Survey. *Journal for Vocational Special Needs Education*, *30*(2), 27-34.
- Greenberg, M., Domitrovich, C., Graczyk, P., & Zins, J. (2005). *The study of implementation in school-based preventive interventions: theory, research and practice* (unpublished draft). Rockville MD: U.S. Department of Health and Human Services.
- Greenway, C. (2002). The process, pitfalls and benefits of implementing a reciprocal reading intervention to improve the reading comprehension of a group of year 6 Pupils. *Educational Psychology in Practice*, *18*(2), 113-137.
- Gregson, J., & Sturko, P. (2007). Teachers as adult learners: re-conceptualizing professional development. *Journal of Adult Education*. *36*(1), 1-18.
- Griffith, A., & Burns, M. (2014). *Outstanding teaching: teaching backwards*: Bancyfelin, Carmarthen: Crown House Publishing.
- Guest, G., MacQueen, K.M., & Namey, E.E. (2012). *Applied thematic analysis*. Los Angeles: Sage Publications.
- Gustafson, S., Samuelsson, C., Johansson, E., & Wallmann, J. (2013). How simple is the Simple View of Reading? *Scandinavian Journal of Educational Research*. *57*(3), 292-308.
- Guthrie, J., & Wigfield, A. (1997). *Reading engagement: motivating readers through integrated instruction*. Newark, Del: International Reading Association.
- Guthrie, J., Van Meter, P., McCann, A., Wigfield, A., Bennett, L., Poundstone, C., . . . Mitchell, A. (1996). Growth of literacy engagement: changes in motivations and strategies during Concept-Oriented Reading Instruction. *Reading Research Quarterly*, *31*(3), 306-332.
- Guthrie, J., Wigfield, A., Barbosa, P., Perencevich, K., Taboada, A., Davis, M., . . . Tonks, S. (2004). Increasing reading comprehension and engagement through Concept-Oriented Reading Instruction. *Journal of Educational Psychology*, *96*(3), 403-423.
- Guthrie, J., Wigfield, A., Metsala, J. L., & Cox, K. E. (1999). Motivational and cognitive predictors of text comprehension and reading amount. *Scientific Studies of Reading*, *3*(3), 231-256.

- Haefffel, G., & Howard, G. (2010). Self-report: psychology's four-letter word. *American Journal of Psychology*, *123*(2), 181-188.
- Hagaman, J., Casey, K., & Reid, R. (2012). The effects of the paraphrasing strategy on the reading comprehension of young students. *Remedial and Special Education*, *33*(2), 110-123.
- Hall, W. (1989). Reading comprehension. *American Psychologist*, *44*(2), 157-161.
- Haller, E., Child, D., & Walberg, H. (1988). Can comprehension be taught? A quantitative synthesis of "metacognitive" studies. *Educational Researcher*, *17*(9), 5-8.
- Harm, M., & Seidenberg, M. (2004). Computing the meanings of words in reading: cooperative division of labor between visual and phonological processes. *Psychological Review*, *111*(3), 662-720.
- Harris, K., Alexander, P., & Graham, S. (2008). Michael Pressley's contributions to the history and future of strategies research. *Educational Psychologist*, *43*(2), 86-96.
- Harris, T., & Hodges, R. (1981). A dictionary of reading and related terms. *International Journal of Rehabilitation Research*, *4*(4), 483-603.
- Harrison, C. (2004). *Understanding reading development*. London: SAGE.
- Hartas, D. (2011). Families' social backgrounds matter: socio-economic factors, home learning and young children's language, literacy and social outcomes. *British Educational Research Journal*, *37*(6), 893-914.
- Hatcher, P. J., Hulme, C., Miles, J. N. V., Carroll, J. M., Hatcher, J., Gibbs, S., . . . Snowling, M. J. (2006). Efficacy of small group reading intervention for beginning readers with reading-delay: a randomised controlled trial. *Journal of Child Psychology and Psychiatry*, *47*(8), 820-827.
- Hattie, J. (2002). Classroom composition and peer effects. *International Journal of Educational Research*, *37*(5), 449-481.
- Hattie, J. (2012). *Visible learning for teachers: maximizing impact on learning*. New York, NY: Routledge.
- Heinz, M. (2015). Why choose teaching? An international review of empirical studies exploring student teachers' career motivations and levels of commitment to teaching. *Educational Research and Evaluation*, *21*(3), 258-297.
- Hepburn, H. (2015, October 26). Scottish Government to be warned about the consequences of national testing. *Teachers Educational Supplement*. London retrieved from <https://www.tes.com/news/school-news/breaking-news/scottish-government-be-warned-about-consequences-national-testing>

- Her Majesty Inspectorate of Education (2007). *Quality Management in Local Authority Educational Psychology Services 2: Self-Evaluation Toolkit*. Retrieved from <http://files.eric.ed.gov/fulltext/ED541218.pdf>
- Hilton, G., Flores, M. A., & Niklasson, L. (2013). Teacher quality, professionalism and professional development: findings from a European project. *Teacher Development, 17*(4), 431-447.
- Hollis, S., & Campbell, F. (1999). What is meant by intention to treat analysis? Survey of published randomised controlled trials. *Bmj, 319*(7211), 670-674.
- Hopkins, W., (2003) Analysis of repeated measures. A tutorial lecture presented at the 2003 annual meeting of the American College of Sports Medicine. Auckland University of Technology. Auckland: NZ
- Horowitz-Kraus, T., Vannest, J. J., & Holland, S. K. (2013). Overlapping neural circuitry for narrative comprehension and proficient reading in children and adolescents. *Neuropsychologia, 51*(13), 2651-2662.
- Hoy, W., & Woolfolk, A. (1993). Teachers' sense of efficacy and the organizational health of schools. *Elementary School Journal, 93*(4), 355-372.
- Idol, L., & Croll, V. (1987). Story-mapping training as a means of improving reading Comprehension. *Learning Disability Quarterly, 10*(3), 214-229.
- Jaeger, A., & Wiley, J. (2014). Do illustrations help or harm metacomprehension accuracy? *Learning and Instruction, 34*, 58-73.
- James-Burdumy, S., Mansfield, W., Deke, J., Carey, N., Lugo-Gil, J., Hershey, A., ... & Faddis, B. (2009). *Effectiveness of selected supplemental reading comprehension interventions: Impacts on a first cohort of fifth-grade students*. NCEE 2009-4032. Washington DC: National Center for Education Evaluation and Regional Assistance.
- Jaycox, L., McCaffrey, D., Ocampo, B. W., Shelley, G., Blake, S., Peterson, D., . . . Kub, J. (2006). Challenges in the evaluation and implementation of school-based prevention and intervention programs on sensitive topics. *American Journal of Evaluation, 27*(3), 320-336.
- Jeffrey, B. (2006). Creative teaching and learning: towards a common discourse and practice. *Cambridge Journal of Education, 36*(3), 399-414.
- Jin, T. (2010). Grounded theory in practice: issues and discussion for new qualitative researchers. *Journal of Documentation, 66*(1), 93-112.
- Johnston, R. S., & Watson, J. E. (2003). *Accelerating reading and spelling with synthetic phonics: A five year follow up*. Insight 4. Edinburgh: Scottish Executive Education Department.

- Joyce, B., & Showers, B. (2002). Student achievement through staff development. In B. Joyce & B. Showers (Eds.), *Designing Training and Peer Coaching: out needs for learning*. VA: National College for School Leadership.
- Kam, C. M., Greenberg, M., & Walls, C. (2003). Examining the role of implementation quality in school-based prevention using the PATHS curriculum. *Prevention Science, 4*(1), 55-63.
- Kahneman, D. (1973). *Attention and effort* (Vol. 1063). Englewood Cliffs, NJ: Prentice-Hall.
- Keenan, J., Betjemann, R., & Olson, R. (2008). Reading comprehension tests vary in the skills they assess: differential dependence on decoding and oral Comprehension. *Scientific Studies of Reading, 12*(3), 281-300.
- Kelly, B., & Perkins, D. (2012). *Handbook of Implementation Science for Psychology in Education*. Cambridge: Cambridge University Press.
- Kendeou, P., Papadopoulos, T. C., & Spanoudis, G. (2012). Processing demands of reading comprehension tests in young readers. *Learning and Instruction, 22*(5), 354-367.
- Kendeou, P., Savage, R., & van Den Broek, P. (2009). Revisiting the simple view of reading. *British Journal of Educational Psychology, 79*, 353-370.
- Ketch, A. (2005). Conversation: the comprehension connection. *The Reading Teacher, 59*(1), 8-13.
- Kidson, M., & Norris, E. (2014). *Implementing the London Challenge*. Retrieved from: [https://www.instituteforgovernment.org.uk/sites/default/files/publications/Implementing%20the%20London%20Challenge%20-%20final\\_0.pdf](https://www.instituteforgovernment.org.uk/sites/default/files/publications/Implementing%20the%20London%20Challenge%20-%20final_0.pdf)
- King, A. (1997). Ask to think-tell why: a model of transactive peer tutoring for scaffolding higher level complex learning. *Educational Psychologist, 32*(4), 221-235.
- Kintsch, W. (1988). The role of knowledge in discourse comprehension: a construction—integration model. *Psychological Review, 95*(2), 163-182.
- Kintsch, W., & Rawson, K. (2005). Comprehension. In M. Snowling & C. Hulme (Eds.), *The Science of Reading* (pp. 209-226). Oxford: Blackwell.
- Kirby, J. R., & Savage, R. S. (2008). Can the Simple View deal with the complexities of reading? *Literacy, 42*(2), 75-82.
- Klimes-dougan, B., August, G., Lee, C.-y. S., Realmuto, G., Bloomquist, M., Horowitz, J., & Eisenberg, T. (2009). Practitioner and site characteristics that relate to fidelity of implementation: the early risers prevention program in a going-to-scale intervention trial. *Professional Psychology: Research and Practice, 40*(5), 467-475.



- Klingner, J. K., Vaughn, S., & Schumm, J. S. (1998). Collaborative strategic reading during social studies in heterogeneous fourth-grade classrooms. *Elementary School Journal*, 99(1), 3-22.
- Klingner, J., & Vaughn, S. (1996). Reciprocal Teaching of reading comprehension strategies for students with learning disabilities who use English as a second language. *The Elementary School Journal*, 96(3), 275-293.
- Klingner, J., & Vaughn, S. (2000). The helping behaviors of fifth graders while using collaborative strategic reading during ESL Content Classes. *TESOL Quarterly*, 34(1), 69-98.
- Knapp, T. R., & Schafer, W. D. (2009). From gain score t to ANCOVA F (and Vice Versa). *Practical Assessment, Research & Evaluation*, 14(6). Retrieved from <http://pareonline.net/getvn.asp?v=14&n=6>.
- Kucan, L., & Beck, I. (1997). Thinking Aloud and reading comprehension Research: inquiry, instruction, and social interaction. *Review of Educational Research*, 67(3), 271-299.
- Kutner, M., Greenberg, E., Jin, Y., Boyle, B., Hsu, Y. C., & Dunleavy, E. (2007). *Literacy in everyday Life: results from the 2003 National Assessment of Adult Literacy*. NCEES 2007-490. National Center for Education Statistics.
- Kymes, A. (2005). Teaching online comprehension strategies using think-alouds. *Journal of Adolescent & Adult Literacy*, 48(6), 492-500.
- LaBerge, D., & Samuels, S. J. (1974). Toward a theory of automatic information processing in reading. *Cognitive psychology*, 6(2), 293-323.
- Lai, S. A., George Benjamin, R., Schwanenflugel, P. J., & Kuhn, M. R. (2014). The longitudinal relationship between reading fluency and reading comprehension skills in second-grade children. *Reading & Writing Quarterly*, 30(2), 116-138.
- Law, Y.-K. (2009). The role of attribution beliefs, motivation and strategy use in Chinese fifth-graders' reading comprehension. *Educational Research*, 51(1), 77-95.
- Le Fevre, D., Moore, D., & Wilkinson, I. (2003). Tape-assisted Reciprocal Reading: Cognitive bootstrapping for poor decoders. *British Journal of Educational Psychology*, 73(1), 37-58.
- Leach, J. M., Scarborough, H. S., & Rescorla, L. (2003). Late-emerging reading disabilities. *Journal of Educational Psychology*, 95(2), 211-24.
- Leppänen, U., Aunola, K., & Nurmi, J. E. (2005). Beginning readers; reading performance and reading habits. *Journal of Research in Reading*, 28(4), 383-399.
- Lesgold, A., & Perfetti, C. (1978). Interactive processes in reading comprehension. *Discourse Processes*, 1(4), 323-336.

- Lewin, K. (1951). *Field theory in social science: selected theoretical papers*. New York: Harper.
- Lidz, C. S. (1991). *Practitioner guide to dynamic assessment*. New York: New York: Guilford Press.
- Liu, F., & Stapleton, P. (2014). Counter-argumentation and the cultivation of critical thinking in argumentative writing: investigating washback from a high-stakes test. *System*, 45, 117-128.
- Loizidou, A., & Koutselini, M. (2007). Metacognitive monitoring: an obstacle and a key to effective teaching and learning. *Teachers and Teaching: Theory and Practice*, 13(5), 499-519.
- Lomax, R. G., & McGee, L. M. (1987). Young children's concepts about print and reading: toward a Model of Word Reading Acquisition. *Reading Research Quarterly*, 22(2), 237-256.
- Loxterman, J., Beck, I., & McKeown, M. (1994). The effects of thinking aloud during reading on students' comprehension of more or less coherent Text. *Reading Research Quarterly*, 29(4), 353-367.
- Lubliner, S., & Smetana, L. (2005). The effects of comprehensive vocabulary instruction on title I students' metacognitive word-learning skills and reading comprehension. *Journal of Literacy Research*, 37(2), 163-200.
- MacGinitie, W., & MacGinitie, R. (1989). *Gates-MacGinitie reading tests* (Level 5/6, Forms K and L). Chicago, IL: Riverside.
- MacKay, T. (1997). Psychological service delivery to primary schools: do head teachers want research? *Educational Psychology in Practice*, 13, 165-169.
- MacKay, T. (2005). *Improving children literacy in areas of socio-economic disadvantage: the design and evaluation of a strategy to address underachievement and illiteracy*. Unpublished PhD Thesis, University of Strathclyde.
- MacNabb, S. (2016, January 6) Nicola Sturgeon to introduce new standardised school assessments *The Scotsman*. Retrieved from <http://www.scotsman.com/news/nicola-sturgeon-to-introduce-new-standardised-school-assessments-1-3993009>
- Madden, N.A., and V. (2006). Crenson. *Reading for knowledge*. Baltimore, MD: Success for All Foundation.
- Maher, E., Jackson, L., Pecora, P., Schultz, D., Chandra, A., & Barnes-Proby, D. (2009). Overcoming challenges to implementing and evaluating evidence-based interventions in child welfare: a matter of necessity. *Children and Youth Services Review*, 31(5), 555-562.

- Malloy, J., & Gambrell, L. (2008). New insights on motivation in the literacy classroom. In C. Block & S. Parris (Eds.), *Comprehension instruction: research-based best practices*. London: The Guildford Press.
- Manion, V., & Alexander, J. (1997). The benefits of peer collaboration on strategy use, metacognitive causal attribution, and recall. *Journal of Experimental Child Psychology*, 67(2), 268-289.
- Manning, B. H., & Payne, B. D. (1993). A Vygotskian-based theory of teacher cognition: toward the acquisition of mental reflection and self-regulation. *Teaching and Teacher Education*, 9(4), 361-371.
- Marcus, G. (2016). *Closing the Attainment Gap: what can schools do?* Retrieved from [http://www.parliament.scot/ResearchBriefingsAndFactsheets/S5/SB\\_16-68\\_Closing\\_The\\_Attainment\\_Gap\\_What\\_Can\\_Schools\\_Do.pdf](http://www.parliament.scot/ResearchBriefingsAndFactsheets/S5/SB_16-68_Closing_The_Attainment_Gap_What_Can_Schools_Do.pdf)
- Marks, M., Pressley, M., Coley, J. D., Craig, S., Gardner, R., Depinto, T., & Rose, W. (1993). Three teachers' adaptations of Reciprocal Reading in comparison to traditional Reciprocal Reading. *The Elementary School Journal*, 94(2), 267-283.
- Marsh, G., Friedman, M., Welch, V., & Desberg, P. (1981). A cognitive-developmental theory of reading acquisition. In G. E. MacKinnon & T. G. Waller (Eds.), *Reading Research: advances in Theory and Practice* (Vol. 3) (pp.199-211). New York: Academic Press.
- Martin, C. (2011). *York Assessment of Reading for Comprehension (YARC)*. *Educational Psychology in Practice*, 27(4), 437-445
- Mastropieri, M., & Scruggs, T. (1997). Best practices in promoting reading comprehension in students with learning disabilities: 1976 to 1996. *Remedial and Special Education*, 18(4), 197-214.
- Mathewson, G. (2004). Model of attitude influence upon reading and learning to read. In R. Ruddell & N. Unrau (Eds.), *Theoretical models and processes of reading* (pp. 1431-1461). Newark, Del: International Reading Association.
- McBride-Chang, C., Manis, F. R., Seidenberg, M. S., Custodio, R. G., & Doi, L. M. (1993). Print exposure as a predictor of word reading and reading comprehension in disabled and nondisabled readers. *Journal of Educational Psychology*, 85(2), 230-238.
- McCartney, E., Boyle, J., & Ellis, S. (2015). Developing a universal reading comprehension intervention for mainstream primary schools within areas of social deprivation for children with and without language-learning impairment: a Feasibility Study. *International Journal of Language & Communication Disorders*, 50(1), 129-135.
- McKeown, M., & Isabel, B. (2009). The role of metacognition in reading comprehension. In D. Hacker, J. Dunlosky, & A. Graesser (Eds.), *Handbook of metacognition in education* (pp. 7-25). Oxon: Routledge.

- McKeown, R., & Gentilucci, J. (2007). Think-aloud strategy: metacognitive development and monitoring comprehension in the middle school second-language classroom. *Journal of Adolescent and Adult Literacy*, *51*(2), 136-147.
- McMaster, K., van Den Broek, P., Espin, C., Pinto, V., Janda, B., Lam, E., . . . van Boekel, M. (2015). Developing a reading comprehension intervention: translating cognitive theory to educational practice. *Contemporary Educational Psychology*, *40*, 28-40.
- McNamara, D. (2004). SERT: self-explanation reading training. *Discourse processes*, *38*(1), 1-30.
- McNamara, D., & Magliano, J. (2009). Self-Explanation and metacognition: the dynamics of reading. In D. Hacker, J. Dunlosky, & A. Graesser (Eds.), *Handbook of metacognition in education* (pp. 60-81). Oxon: Routledge.
- McTigue, E. M. (2010). Teaching young readers imagery in storytelling: what color is the monkey? *Reading Teacher*, *64*(1), 53-56.
- Michie, S., Fixsen, D., Grimshaw, J., & Eccles, M. (2009). Specifying and reporting complex behaviour change interventions: the need for a scientific method. *Implementation Science*, *4*(40) doi:10.1186/1748-5908-4-40
- Michie, S., Van Stralen, M. M., & West, R. (2011). The behaviour change wheel: a new method for characterising and designing behaviour change interventions. *Implementation Science*, *6*(42) doi: 10.1186/1748-5908-6-42.
- Mihalic, S. F., & Elliott, D. S. (2015). Evidence-based programs registry: blueprints for healthy youth development. *Evaluation and program planning*, *48*, 124-131.
- Miller, G. A., & Chapman, J. P. (2001). Misunderstanding Analysis of Covariance. *Journal of Abnormal Psychology*, *110*(1), 40-48.
- Miller, J., & Kintsch, W. (1980). Readability and recall of short prose passages: a theoretical analysis. *Journal of Experimental Psychology: Human Learning and Memory*, *6*(4), 335-354.
- Mills, K. A. (2009). Floating on a sea of talk: reading comprehension through speaking and listening. *Reading Teacher*, *63*(4), 325-329.
- Mintra, D. (2012). Increasing student voice in school reform: building partnerships, improving outcomes. In Kelly, B. & Perkins, D. (Eds.), *Handbook of Implementation Science for Psychology in Education*. (pp. 361-372) Cambridge: Cambridge University Press.
- Mol, S. E., & Bus, A. G. (2011). To read or not to read: a meta- analysis of print exposure from infancy to early adulthood. *Psychological Bulletin*, *137*(2), 267-296.

- Moore, P. J. (1983). Aspects of metacognitive knowledge about reading. *Journal of Research in Reading*, 6(2), 87-102.
- Morrow, L. M., Pressley, M., Smith, J., & Smith, M. (1997). The effect of a literature-based program integrated into literacy and science instruction with children from diverse backgrounds. *Reading Research Quarterly*, 32(1), 54-76.
- Myers, M., & Paris, S. (1978). Children's metacognitive knowledge about reading. *Journal of Educational Psychology*, 70(5), 680-690.
- NAC. (2015). *Council Plan 2015-2020*. Retrieved from Irvine: Author, Cunningham House
- Neale, M. D. (1997) Neale Analysis of Reading Ability – Revised: manual for Schools. NFER-Nelson, Windsor.
- Ness, M. (2009). Reading comprehension strategies in secondary content area classrooms: teacher use of and attitudes towards reading comprehension instruction. *Reading Horizons*, 49(2), 143-166.
- Newby, R. F., Caldwell, J. A., & Recht, D. R. (1989). Improving the reading comprehension of children with dysphonetic and dyseidetic dyslexia using story grammar. *Journal of Learning Disabilities*, 22(6), 373-380.
- NRP. National Reading Panel (US), National Institute of Child Health, & Human Development (US). (2000). *Teaching children to read: an evidence-based assessment of the scientific research literature on reading and its implications for reading instruction*. Washington DC: National Institute of Child Health and Human Development, National Institutes of Health.
- Nicholls, J. G., Cheung, P. C., Lauer, J., & Patashnick, M. (1989). Individual differences in academic motivation: perceived ability, goals, beliefs, and values. *Learning and Individual Differences*, 1(1), 63-84.
- Nieuwenhuis, J., Hooimeijer, P., & Meeus, W. (2015). Neighbourhood effects on educational attainment of adolescents, buffered by personality and educational commitment. *Social Science Research*, 50,100-109.
- Oakes, J. (1985). *Keeping track: how schools structure inequality*. New Haven, CT: Yale University Press.
- Oakhill, J. (2017). I didn't leave it at that...I talked to them about reading. *The Psychologist*, 30, 56-58.
- Oakhill, J. V., Cain, K., & Bryant, P. E. (2003). The dissociation of word reading and text comprehension: evidence from component skills. *Language and Cognitive Processes*, 18(4), 443-468.
- OECD (2010). *PISA 2009 results: overcoming social background: equity in learning opportunities and outcomes* (volume II). Paris, France: Author.

- OECD. (2015). *Improving schools in Scotland: an OECD perspective*. Retrieved from <http://www.oecd.org/education/school/Improving-Schools-in-Scotland-An-OECD-Perspective.pdf>
- Ogden, T., Bjørnebekk, G., Kjøbli, J., Patras, J., Christiansen, T., Taraldsen, K., & Tollefsen, N. (2012). Measurement of implementation components ten years after a nationwide introduction of empirically supported programs--a pilot study. *Implementation science*, 7(49), doi: 10.1186/1748-5908-7-49.
- Oldfather, P., & McLaughlin, H. (1993). *Gaining and losing voice: a longitudinal study of students' continuing impulse to learn across elementary and middle school contexts*. *Research in Middle Level Education* 17(1), 1-25.
- O'Shea, L., & O'Shea, D. (1994). A component analysis of metacognition in reading comprehension: the contributions of awareness and self-regulation. *International Journal of Disability, Development and Education*, 41(1), 15-32.
- Paivio, A. (2007). *Mind and its evolution: a Dual Coding Theoretical approach*: New York: Psychology Press.
- Palincsar, A., & Herrenkohl, L. (2002). Designing collaborative learning contexts. *Theory into Practice*, 41(1), 26-32.
- Palincsar, A. S., & Klenk, L. (1992). Fostering literacy learning in supportive contexts. *Journal of Learning Disabilities*, 25(4), 211-225.
- Palincsar, A., Brown, A., & Martin, S. (1987). Peer interaction in reading comprehension instruction. *Educational Psychologist*, 22(3-4), 231-253.
- Palincsar, A. S., & Brown, A. L. (1984). Reciprocal Reading of comprehension-fostering and comprehension-monitoring activities. *Cognition and Instruction*, 1(2), 117-175.
- Paris, S. G., Cross, D. R., & Lipson, M. Y. (1984). Informed Strategies for Learning: a program to improve children's reading awareness and comprehension. *Journal of Educational Psychology*, 76(6), 1239-1252.
- Paris, S., & Jacobs, J. (1984). The benefits of informed instruction for children's reading awareness and comprehension skills. *Child Development*, 55(6), 2083-2093.
- Paris, S., Lipson, M., & Wixson, K. (1983). Becoming a strategic reader. *Contemporary Educational Psychology*, 8(3), 293-316.
- Paris, S. G., & Oka, E. R. (1986). Children's reading strategies, metacognition, and motivation. *Developmental Review*, 6(1), 25-56.
- Paris, S. G., Wixson, K. K., & Palincsar, A. S. (1986). Instructional approaches to reading comprehension. *Review of Research in Education*, 13, 91-128.

- Parker, M., & Hurry, J. (2007). Teachers' use of questioning and modelling comprehension skills in primary classrooms. *Educational Review*, 59(3), 299-314.
- Payne, B., & Manning, B. (1992). Basal reader instruction: effects of comprehension monitoring training on reading comprehension, strategy use and attitude. *Reading Research and Instruction*, 32(1), 29-38.
- Pearson, D., & Gallagher, M. (1983). The instruction of reading comprehension. *Contemporary Educational Psychology*, 8(3), 317-344.
- Perfetti, C. A., Landi, N., & Oakhill, J. (2005). The acquisition of reading comprehension Skill. In M. Snowling & C. Hulme (Eds.), *The Science of Reading* (pp. 227-247). Oxford: Blackwell.
- Perfetti, C. A., Roth, S., & Lesgold, A. M. (1981). *Interactive processes in reading*. . In G. Griffiths (Ed.), *A Review of Models of Reading Comprehension with Implications for Adults with mTBI and the Campus Reader*. Hillsdale, NJ: L. Erlbaum.
- Perry, L., & Southwell, L. (2014). Access to academic curriculum in Australian secondary schools: a case study of a highly marketised education system. *Journal of Education Policy*, 29(4), 467-485.
- Plaut, D., & Shallice, T. (1993). Deep dyslexia: A case study of connectionist neuropsychology. *Cognitive Neuropsychology*, 10(5), 377-500.
- Poehner, M. E., & Lantolf, J. P. (2005). Dynamic assessment in the language classroom. *Language Teaching Research*, 9(3), 233-265.
- Poitras, E. G., & Lajoie, S. P. (2013). A domain-specific account of self-regulated learning: the cognitive and metacognitive activities involved in learning through historical inquiry. *Metacognition and Learning*, 8(3), 213-234.
- Pressley, M. (1976). Mental imagery helps eight-year-olds remember what they read. *Journal of Educational Psychology*, 68(3), 355-359.
- Pressley, M., & El-Dinary, P. Gaskins, I., Schuder, T., Bergman, J., Almasi, J., and Brown R., (1992). Beyond direct explanation: transactional instruction of reading comprehension strategies. *Elementary School Journal*, 92(5), 513-55.
- Pressley, M., Goodchild, F., Fleet, J., Zajchowski, R., & Evans, E. D. (1989a). The challenges of classroom strategy instruction. *The Elementary School Journal*, 89(3), 301-342.
- Pressley, M., Johnson, C., Symons, S., McGoldrick, J., & Kurita, J. (1989b). Strategies that improve children's memory and comprehension of text. *The Elementary School Journal*, 90(1), 3.

- Pressley, M., Wharton-McDonald, R., Mistretta-Hampston, J., & Echevarria, M. (1998). Literacy instruction in 10 fourth-grade classrooms in upstate New York. *Scientific Studies of Reading, 2*(2), 159-194.
- Prytula, M. (2012). Teacher metacognition within the professional learning community. *International Education Studies, 5*(4), 112.
- Puustinen, M., & Pulkkinen, L. (2001). *Models of self-regulated learning: a review. Scandinavian Journal of Educational Research, 45*(3), 269-286.
- Rack, J. P., Hulme, C., & Snowling, M. J. (1993). Learning to read: a theoretical synthesis. *Advances in Child Development and Behavior, 24*, 99-132.
- RAND. (2004). A research agenda for improving reading comprehension. In R. Ruddell & N. Unrau (Eds.), *Theoretical Models and Processes of Reading* (Fifth ed., pp. 720). Newark, Del: International Reading Association.
- Raphael, T. E., & Au, K. H. (2005). QAR: enhancing comprehension and test taking across Grades and Content Areas. *Reading Teacher, 59*(3), 206-221.
- Rapp, D. N., & Van Den Broek, P. (2005). Dynamic text comprehension: an integrative view of reading. *Current Directions in Psychological Science, 14*(5), 276-279.
- Rathvon, N. (2008). *Effective school interventions: evidence-based strategies for improving student outcomes*. New York: Guilford Press.
- Rawson, K., Dunlosky, J., & Thiede, K. (2000). The rereading effect: metacomprehension accuracy improves across reading trials. *Memory & Cognition, 28*(6), 1004-1010.
- Rellinger, E., Borkowski, J. G., Turner, L. A., & Hale, C. A. (1995). Perceived task difficulty and intelligence: determinants of strategy use and recall. *Intelligence, 20*(2), 125-143.
- Reutzel, R., & Hollingsworth, P. (1988). Highlighting key vocabulary: a generative-reciprocal procedure for teaching selected inference types. *Reading Research Quarterly, 23*(3), 358-378.
- Rice, J. K. (2013). Learning from Experience? Evidence on the Impact and Distribution of Teacher Experience and the Implications for Teacher Policy. *Education Finance and Policy, 8*(3), 332-348.
- Rich, S., & Pressley, M. (1990). Teacher acceptance of reading comprehension strategy instruction. *Elementary School Journal, 91*(1), 43-64.
- Ringwalt, C., Ennett, S., Johnson, R., Rohrbach, L. A., Simons-Rudolph, A., Vincus, A., & Thorne, J. (2003). Factors associated with fidelity to substance use prevention curriculum guides in the nation's middle schools. *Health education & behavior : the official publication of the Society for Public Health Education, 30*(3), 375-391.



- Robertson, J., & Bakker, D. (2002). The balance model of reading and dyslexia. In Reid, D. and Wearmouth (Eds) *Dyslexia and literacy: theory and practice*, (pp. 99-114). London: Wiley
- Robinson, V. (2007). *School Leadership and student outcomes: identifying what works and why*. Retrieved from [http://www.educationcounts.govt.nz/\\_\\_data/assets/pdf\\_file/0015/60180/BES-Leadership-Web-updated-foreword-2015.pdf](http://www.educationcounts.govt.nz/__data/assets/pdf_file/0015/60180/BES-Leadership-Web-updated-foreword-2015.pdf)
- Robson, C. (2011). *Real world research: a resource for users of social research methods in applied settings*. Chichester, West Sussex: John Wiley & Sons Ltd.
- Rojas-Drummond, S., Hernández, G., Vélez, M., & Villagrán, G. (1998). Cooperative learning and the appropriation of procedural knowledge by primary school children. *Learning and Instruction*, 8(1), 37-61.
- Rose, J. (2006). *Independent review of the teaching of early reading: final report*. Annesley, Nottingham: Annesley, Nottingham: DfES Publications.
- Rosenblatt, L. (1978). *The reader, the text, the poem the transactional theory of the literary work*. Carbondale IL: Southern Illinois University Press.
- Rosenblatt, L. (2004). The transactional theory of reading and writing. In R. Ruddell & N. Unrau (Eds.), *Theoretical models and processes of reading* (pp. 1363-1398). Newark, Del: International Reading Association.
- Rosenshine, B., & Meister, C. (1994). Reciprocal Reading: a review of the research. *Review of Educational Research*, 64(4), 479-530.
- Rosenshine, B., Meister, C., & Chapman, S. (1996). Teaching students to generate questions: a review of the intervention studies. *Review of Educational Research*, 66(2), 181-221.
- Rottman, T. R., & Cross, D. R. (1990). Using Informed Strategies for Learning to enhance the reading and thinking skills of children with learning disabilities. *Journal of Learning Disabilities*, 23(5), 270-278.
- Rowan, B., Camburn, E., & Correnti, R. (2004). Using teacher logs to measure the enacted curriculum: A study of literacy teaching in third grade classrooms. *The Elementary School Journal*, 105(1), 75-101.
- Ruddell, R., & Unrau, N. (2004). Sociocognitive model of reading. In R. Ruddell & N. Unrau (Eds.), *Theoretical models and processes of reading* (pp. 1462-1523). Newark, Del: International Reading Association.
- Rumelhart, D. (2004). Towards an interactive model of reading. In R. Ruddell & N. Unrau (Eds.), *Theoretical models and processes of reading* (pp. 1149-1179). Newark, Del: International Reading Association.

- Rumelhart, D. E., & McClelland, J. L. (1982). An interactive activation model of context effects in letter perception: part 2. The contextual enhancement effect and some tests and extensions of the model. *Psychological Review*, 89(1), 60-94.
- Sadoski, M., & Willson, V. (2006). Effects of a theoretically based large-scale reading intervention in a multicultural urban school district. *American Educational Research Journal*, 43(1), 137-154.
- Sadoski, M. (2008). Dual coding theory: reading comprehension and beyond. In C. Block & S. Parris (Eds.), *Comprehension instruction: research-based best practices* (Vol. 2, pp. 38-49). New York: Guilford Press.
- Sadoski, M., & Paivio, A., (2004) A dual coding theoretical model of reading In R. Ruddell & N. Unrau (Eds.), *Theoretical models and processes of reading* (Fifth ed., pp. 594-606). Newark, Del: International Reading Association.
- Sadoski, M., Paivio, A., & Goetz, E. (1991). Commentary: a critique of Schema Theory in reading and a Dual Coding alternative. *Reading Research Quarterly*, 26(4), 463-484.
- Saldaña, J. (2009). *The coding manual for qualitative researchers*. Los Angeles: Sage Publications Ltd.
- Samuels, S. (2004). Toward a theory of automatic processing in reading revised. In R. Ruddell & N. Unrau (Eds.), *Theoretical models and processes of reading* (pp. 1127-1148). Newark, Del: International Reading Association.
- Santa, C., Havens, L. T., & Valdes, B. (2004). *Project CRISS: Creating independence through student-owned strategies*. Dubuque, IA: Kendall.
- Scanlon, D. (1996). Prerequisite skills, early instruction, and success in first-grade reading: Selected results from a longitudinal study. *Mental Retardation and Developmental Disabilities Research Reviews*, 2(1), 54-63.
- Schank, R. (1977). *Scripts, plans, goals, and understanding: an inquiry into human knowledge structures*. Hillsdale, N.J.: L. Erlbaum Associates.
- Schirmer, B. (1995). Mental imagery and the reading comprehension of deaf children. *Reading Research and Instruction*, 34(3), 177-189.
- Schraw, G., Dunkle, M. E., Bendixen, L. D., & Debacker Roedel, T. (1995). Does a general monitoring skill exist? *Journal of Educational Psychology*, 87(3), 433-444.
- Schunk, D. (1991). Self-efficacy and academic motivation. *Educational Psychologist*, 26(3-4), 207-231.
- Scottish Government (2002). *The curriculum for excellence*. Edinburgh: Author.

- Scottish Government (2005). *Getting it right for every child (GIRFEC)*. Edinburgh: Author.
- Scottish Government (2006a). *Scottish survey of achievement: 2005 English language and core skills - practitioners report*. Edinburgh: Author.
- Scottish Government (2006b). *Scottish index of multiple deprivation 2006 technical report*. Scottish Executive, Edinburgh.
- Scottish Government (2008). *The early years framework*. Edinburgh: Author.
- Scottish Government (2010a). *Literacy action plan: an action plan to improve literacy in Scotland*. Edinburgh: Author.
- Scottish Government (2010b). *Programme for international student assessment (PISA) 2009 – Highlights from Scotland’s Results*. Edinburgh: Author.
- Scottish Government. (2012). *The right help at the right time in the right place: strategic review of learning provision for children and young people with complex additional support needs*. Edinburgh: Author.
- Scottish Government (2015a). *Scottish survey of literacy and numeracy (SSLN) (2014)* Edinburgh: Author.
- Scottish Government. (2015b). *The draft national improvement framework for Scottish education*. Edinburgh: Author.
- Scottish Government (2015c). *The final report from the standing literacy commission on the Scottish Government's Literacy Action Plan April 2015*. Edinburgh: Author.
- Scottish Government (2016). *National improvement framework for Scottish education*. Edinburgh: Author.
- Seidenberg, M. (2005). Connectionist models of word reading. *Current Directions In Psychological Science*, 14(5), 238-242.
- Şen, H. Ş. (2009). The relationship between the use of metacognitive strategies and reading comprehension. *Procedia - Social and Behavioral Sciences*, 1(1), 2301-2305.
- Sencibaugh, J. (2007). Meta-analysis of reading comprehension interventions for students with learning disabilities: strategies and implications. *Reading Improvement*, 44(1), 6-22.
- Senge, P. (2006). *The fifth discipline: the art and practice of the learning organization*. London: Random House Business.
- Shanahan, T., Callison, K., Carriere, C., Duke, N., Pearson, D., Schatschneider, C., & Torgesen, J. (2010). *Improving Reading Comprehension in Kindergarten through 3rd Grade. IES Practice Guide What Works Clearinghouse*. NCEE 2010-4038. Washington DC: US Department of Education.

- Shephard, R. (2003). Regression to the Mean. *Sports Med*, 33(8), 575-584.
- Short, E., Yeates, K., & Feagans, L. (1992). The generalizability of story grammar training across setting and tasks. *Journal of Behavioral Education*, 2(2), 105-120.
- Silva, M., & Cain, K. (2014). The relations between lower and higher level comprehension skills and their role in prediction of early reading comprehension. *Journal of Educational Psychology*, 107(2), 321.
- Silvén, M., & Vauras, M. (1992). Improving reading through thinking aloud. *Learning and Instruction*, 2(2), 69-88.
- Slavin, R. (1998). Reading by nine: what will it take? *Peabody Journal of Education*, 73(3/4), 68-80.
- Slavin, R. (2002). Evidence-based education policies: transforming educational practice and research. *Educational Researcher*, 31(7), 15-21.
- Slavin, R., Cheung, A., Groff, C., & Lake, C. (2008). Effective reading programs for middle and high schools: A best-evidence synthesis. *Reading Research Quarterly*, 43(3), 290-322.
- Smith, A. (2015). *Scottish attainment challenge: leadership, learning and success*. Dumfermline: Alastair Smith Training.
- Snow, C. (2002). *Reading for Understanding - Toward an R&D Program in Reading Comprehension*. Santa Monica, CA; RAND Corporation.
- Snowling, M. J. (1998). Reading development and its difficulties. *Education and Child Psychology*, 15(2), 44-58.
- Snowling, M. J., Stothard, S. E., Clarke, P., Bowyer-Crane, C., Harrington, A., Truelove, E., ... & Hulme, C. (2009). *YARC York Assessment of Reading for Comprehension Passage Reading*. Swindon: GL Assessment.
- Solis, M., Ciullo, S., Vaughn, S., Pyle, N., Hassaram, B., & Leroux, A. (2012). Reading comprehension interventions for middle school students with learning disabilities: a synthesis of 30 Years of research. *Journal of Learning Disabilities*, 45(4), 327-340.
- Sosu, E., & Ellis, S. (2014). *Closing the attainment Ggap in Scottish education*. Retrieved from <https://www.jrf.org.uk/sites/default/files/jrf/migrated/files/education-attainment-scotland-full.pdf>
- Souvignier, E., & Mokhlesgerami, J. (2006). Using self-regulation as a framework for implementing strategy instruction to foster reading comprehension. *Learning and Instruction*, 16(1), 57-71.
- Sparks, G. (1988). Teachers' attitudes toward change and subsequent improvements in classroom teaching. *Journal of Educational Psychology*, 80(1), 111-117.

- Spires, H., Gallini, J., & Riggsbee, J. (1992). Effects of schema-based and text structure-based cues on expository prose comprehension in fourth graders. *The Journal of Experimental Education*, 60(4), 307-320.
- Spooner, A. L. (2001). *Investigating and assessing comprehension ability*. Unpublished PhD Thesis, University of Bristol.
- Spörer, N., Brunstein, J. C., & Kieschke, U. (2009). Improving students' reading comprehension skills: effects of strategy instruction and Reciprocal Reading. *Learning and Instruction*, 19(3), 272-286.
- St. Clair, R., Maclachlan, K., & Tett, L. (2009). Educational entrepreneurs? Practitioner-led action research and the formation of the professional adult literacies instructor. *Studies in the Education of Adults*, 41(2), 175-191.
- Stanovich, K. (1988). Explaining the differences between the dyslexic and the garden-variety poor reader: the phonological-core variable- difference model. *Journal of Learning Disabilities*, 21(10), 590-604.
- Stephen, M. F., & Hakwan, C. L. (2014). How to measure metacognition. *Frontiers in Human Neuroscience*, 8(443). doi: 10.3389/fnhum.2014.00443
- Stevenson, J. (1991). Which aspects of processing text mediate genetic effects? *Reading and Writing*, 3(3), 249-269.
- Stobie, I., Boyle, J., Woolfson, L., Truswell, E., & Connaughton, N. (2004). Quality indicators for effective early intervention in literacy and numeracy. *International Journal of Early Years Education*, 12(2), 157-168.
- Stronge, J. H., Ward, T. J., & Grant, L. W. (2011). What makes good teachers good? A cross-case analysis of the connection between teacher effectiveness and student achievement. (Report). *Journal of Teacher Education*, 62(4), 339-355.
- Sullivan, G., Blevins, D., & Kauth, M. (2008). Translating clinical training into practice in complex mental health systems: toward opening the 'Black Box' of implementation. *Implementation Science*, 3(33). doi: 10.1186/1748-5908-3-33
- Swanson, E. (2008). Observing reading instruction for students with learning disabilities: a synthesis. *Learning Disability Quarterly*, 31(3), 115-133.
- Swanson, H. (1999). Reading research for students with LD: A meta-analysis of intervention outcomes. *Journal of Learning Disabilities*, 32(6), 504-532.
- Swanson, L., & Alexander, J. (1997). Cognitive processes as predictors of word recognition and reading comprehension in learning-disabled and skilled readers: revisiting the specificity hypothesis. *Journal of Educational Psychology*, 89(1), 128-158.

- Talbott, E., Lloyd, J. W., & Tankersley, M. (1994). Effects of reading comprehension interventions for students with learning disabilities. *Learning Disability Quarterly*, 17(3), 223-232.
- Taylor, B., & Beach, R. (1984). The Effects of Text Structure Instruction on Middle-Grade Students' Comprehension and Production of Expository Text. *Reading Research Quarterly*, 19(2), 134-146.
- Taylor, J., Roehrig, A. D., Soden Hensler, B., Connor, C. M., & Schatschneider, C. (2010). *Teacher quality moderates the genetic effects on early reading*. *Science*, 328(5977), 512-4.
- Terhart, E. (2011). Has John Hattie really found the holy grail of research on teaching? An extended review of Visible Learning. *Journal of Curriculum Studies*, 43(3), 425-438.
- Thiede, K. W., & Anderson, M. C. M. (2003). Summarizing can improve metacomprehension accuracy. *Contemporary Educational Psychology*, 28(2), 129-160.
- Thompson, G. (2013). NAPLAN, My school and accountability: teacher perceptions of the effects of testing. *International Education Journal: comparative Perspectives*, 12(2), 62-84.
- Topping, K. (2005). Trends in peer learning. *Educational Psychology*, 25(6), 631-645.
- Topping, K. (2014). *Literacy appraisal and action in the early years: a research literature summary*. Retrieved from [http://dera.ioe.ac.uk/20737/1/POLAARLiteratureSummary\\_tcm4-832112.pdf](http://dera.ioe.ac.uk/20737/1/POLAARLiteratureSummary_tcm4-832112.pdf)
- Topping, K., Thurston, A., Tolmie, A., Christie, D., Murray, P., & Karagiannidou, E. (2011). Cooperative learning in science: intervention in the secondary school. *Research in Science & Technological Education*, 29(1), 91-106.
- Torgerson, D. J. (2008). *Designing randomised trials in health, education, and the social sciences*. New York: Palgrave Macmillan.
- Torgerson, C., Brooks, G., & Hall, J. (2006). *A systematic review of the research literature on the use of phonics in the teaching of reading and spelling*. Annesley, Nottingham: DfES Publications.
- Torgerson, C. J., & Torgerson, D. J. (2013). *Randomised trials in education: an introductory handbook*. London: Education Endowment Foundation.
- Trivette, C., Raab, M., & Dunst, C. (2012). An evidence-based approach to professional development in head start classrooms. *NHSA Dialog*, 15(1), 41-58.

- Turner, A., Britton, B., Andrcassen, P., & McCutchen, D. (1996). The predication semantics model of text comprehension and recall. In B. Britton & A. Graesser (Eds.), *Models of understanding text* (pp. 33-72). Mahwah, NJ: Lawrence Erlbaum Associates.
- Unrau, N., & Schlackman, J. (2006). Motivation and its relationship with reading achievement in an urban middle school. *The Journal of Educational Research, 100*(2), 81-101.
- Van Breukelen, G. J. (2006). ANCOVA versus change from baseline had more power in randomized studies and more bias in nonrandomized studies. *Journal of Clinical Epidemiology, 59*(9), 920-925.
- Van Keer, H., & Verhaeghe, J. P. (2005). Effects of explicit reading strategies instruction and peer tutoring on second and fifth graders' reading comprehension and self-efficacy perceptions. *The Journal of Experimental Education, 73*(4), 291-329.
- van Kraayenoord, C. E., & Schneider, W. (1999). Reading achievement, metacognition, reading self-concept and interest: a study of German students in grades 3 and 4. *European Journal of Psychology of Education, 14*(3), 305-324.
- van Loon, M. H., de Bruin, A. B. H., van Gog, T., & van Merriënboer, J. J. G. (2013). Activation of inaccurate prior knowledge affects primary-school students' metacognitive judgments and calibration. *Learning and Instruction, 24*, 15-25.
- Vaughn, S., Klingner, J. K., Swanson, E. A., Boardman, A. G., Roberts, G., Mohammed, S. S., & Stillman-Spisak, S. J. (2011). Efficacy of collaborative strategic reading with middle school students. *American Educational Research Journal, 48*(4), 938-964.
- Vaughn, S., Klingner, J., & Bryant, D. (2001). Collaborative strategic reading as a means to enhance peer-mediated instruction for reading comprehension and content-area learning. *Remedial and Special Education, 22*(2), 66-74.
- Vauras, M., Kinnunen, R., & Rauhanummi, T. (1999). The role of metacognition in the context of integrated strategy intervention. *European Journal of Psychology of Education, 14*(4), 555-569.
- Veenman, M. V. J., & Spaans, M. A. (2005). Relation between intellectual and metacognitive skills: age and task differences. *Learning and Individual Differences, 15*(2), 159-176.
- Vo, V. A., Li, R., Kornell, N., Pouget, A., & Cantlon, J. F. (2014). Young children bet on their numerical skills. *Psychological Science, 25*(9), 1712-1721.
- Vygotsky, L. S. (1978). *Mind in society: the development of higher psychological processes* (M. Cole, V. John-Steiner, S. Scribner & E. Souberman., Eds.) (A. R. Luria, M. Lopez-Morillas & M. Cole [with J. V. Wertsch], Trans.) Cambridge, Mass.: Harvard University Press. (Original manuscripts [ca. 1930-1934])

- Wagner, P. (2000). Consultation: Developing a comprehensive approach to service delivery. *Educational Psychology in Practice*, 16(1), 9-18.
- Wagoner, S. (1983). Comprehension monitoring: what it is and what we know about it. *Reading Research Quarterly*, 18(3), 328-346.
- Warnock, H. M. (1978). *Special educational needs: Report of the committee of enquiry into the education of handicapped children and young people*. London: HM Stationery Office.
- Watson, P., & Doherty, T. (2015). *Statement by Aspect Group of Prospect on the proposed introduction of standardised assessments in Scottish schools* [Press release]. Retrieved from <https://library.prospect.org.uk/id/2015/September/9/Statement-by-Aspect-Group-Prospect-on-proposed-introduction-standardised-assessments-Scottish-school>
- Webster-Stratton, C., Reinke, W., Herman, K., & Newcomer, L. (2011). The Incredible Years teacher classroom management training: the methods and principles that support fidelity of training delivery. *School Psychology Review*, 40(4), 509-529.
- Wechsler, D. (2005). Wechsler Individual Attainment Test—Second UK Edition (WIAT-II UK). Psychological Corporation, London, UK.
- Weiner, B. (2009). A theory of organizational readiness for change. *Implementation Science*, 4(1), 67.
- Weinert, F. E., & Kluwe, R. H. (1987). *Metacognition, motivation, and understanding*. Hillsdale: Erlbaum.
- Weir, J. P. (2005). Quantifying test- retest reliability using the intraclass correlation coefficient and the SEM. *Journal of Strength and Conditioning Research*, 19(1), 231-240.
- Wigfield, A., & Wentzel, K. (2007). Introduction to motivation at school: interventions that work. *Educational Psychologist*, 42(4), 191-196.
- Wilkinson, I. A. G., Parr, J. M., Fung, I. Y. Y., Hattie, J. A. C., & Townsend, M. A. R. (2002). Discussion: modeling and maximizing peer effects in school. *International Journal of Educational Research*, 37(5), 521-535.
- Wilson, J., & Haugh, B. (2009). Collaborative modelling and talk in the classroom. *Language and Education*, 9(4), 265-281.
- Wong, B. Y. L. (1985). Self- Questioning instructional research: a review. *Review of Educational Research*, 55(2), 227-268.
- Woolley, G. (2010). A multiple strategy framework supporting vocabulary development for students with reading comprehension deficits. *Australasian Journal of Special Education*, 34(2), 119-132.



- Yuill, N., & Oakhill, J. (1991). *Children's problems in text comprehension: an experimental investigation*. Cambridge; New York: Cambridge University Press.
- Zeegers, M. (2013). A 3D Approach to first year English education. Quality assurance in education: an international perspective, *Quality Assurance in Education* 21(1), 54-69.
- Zhang, X., & Tomblin, J. B. (2003). Explaining and controlling regression to the mean in longitudinal research designs. *Journal of Speech, Language, and Hearing Research*, 46(6), 1340-1351.
- Zheng, H. D. (2014). *Evidence-based practices: reading comprehension instruction and teacher self-efficacy*. DEdPsyThesis, UCL Institute of Education, London.

## **Appendices:**

- 1) HT letter
  - a) Pilot
  - b) Main study
- 2) Pre-intervention questionnaire
- 3) Information and consent form for intervention group- Teachers
  - a) Pilot
  - b) Main study
- 4) Information and consent form for control group- Teachers
  - a) Pilot
  - b) Main study
- 5) Information and consent form for intervention group- Parents
  - a) Pilot
  - b) Main study
- 6) Information and consent form for control group- Parents
  - a) Pilot
  - b) Main study
- 7) Record of pupils verbal consent
- 8) Intervention Training slides
- 9) Examples of training handouts
- 10) Vocabulary audit
- 11) Strategy Prompt Poster
- 12) WIAT training slides
- 13) SRSU questionnaire
- 14) Post-intervention teacher semi-structured interview
- 15) Fidelity data
- 16) Pilot RCV observational Data
- 17) Main study Teacher survey data
- 18) Main study RCV observation teacher comparison
- 19) Main study fidelity observation data
- 20) Initial coding template for qualitative data

## Appendix 1a- Pilot study

Mrs Taryn Moir  
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School  
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Town  
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Dear [Recipient Name]

I am Taryn Moir, an Educational Psychologist at North Ayrshire Council and a student undertaking a Doctorate in Educational Psychology at the University of Strathclyde. I am interested in effective learning and teaching associated with good outcomes for reading comprehension and motivation for reading and have identified a cost effective, easily implemented framework that potentially promotes positive outcomes for all children.

This approach has been piloted in Scotland but now requires further research to ensure that it could be used effectively within the North Ayrshire context. John Butcher, Director of Service and Sam March, Principal Educational Psychologist, have given their support and are keen to take these ideas forward. The focus of the study will be on Primary 5 pupils and I am writing to invite your school to participate in a preliminary pilot study.

Participating schools will be asked to complete teacher surveys, take part in observations and be randomised to one of two conditions, either:

- An intervention group of 6 primary 5 pupils from a randomly selected primary school. In February 2016, one Primary 5 teacher within your school would be asked to take part in 2 hours of Continuous Lifelong Professional Learning (CLPL) before completing a pre-implementation questionnaire. The training outlines the SHORS project for which they will be asked to run for an intervention period of 8 weeks, during which they will receive ongoing support, associated materials and coaching. It is requested that literacy using the SHORS methods is undertaken 4 times per week for 45 minutes per session. Children in the intervention class who are not participating in the programme would be asked to follow the literacy curriculum determined by the school.
- A control group of 6 primary 5 pupils, again from a randomly selected school for comparison. Here the teacher would be asked to regularly provide reading/ literacy lessons 4 times per week for 45 minutes per session over the same 8 week period.

Consent from the parents/carers of children invited to participate in either the intervention or control groups would be sought in January 2016. Participating children will be assessed in February 2016 using the WIAT II a standardised measure of reading comprehension which will be administered individually by myself to each child (approximately 40 minutes per child). It is requested that group assessment of the 6 children would be carried out by you, the class teacher; comprising of children's self-ratings of reading comprehension strategy use and Motivation for Reading Questionnaire subscales

(approximately 35 minutes per group) overseen by the researcher. Post assessments using the same measures will be carried out at the end of the 8 weeks intervention period in May 2016.

Outcomes will be shared with the parents of participating children and the children themselves via newsletter. The findings will be collapsed across schools and no individual child, teacher or school will be identified to ensure anonymity and confidentiality. Outcomes of the study will be disseminated via presentations in North Ayrshire Council to the Psychological Service and Education Management as requested. It is likely the investigator will also aim to publish the outcomes more widely, e.g. via conference presentations and peer-reviewed journal articles.

No additional resources over and above normal investment in literacy materials would be required by participating schools.

I would greatly appreciate it if you would consider taking part in this research with me as I feel that it will be a mutually beneficial project. Please do not hesitate to get in touch with me if you require additional details or would like to take this forward.

Sincerely,

Taryn Moir

Appendix 1b- Main study

Mrs Taryn Moir  
DEdPsy Student  
Department of Postgraduate Professional Training in Educational Psychology  
School of Psychological Sciences and Health  
University of Strathclyde  
40 George Street  
Glasgow G1 1QE  
UK

School  
School Address 1  
Town  
Postcode

Dear [Recipient Name]

I am Taryn Moir, an Educational Psychologist at North Ayrshire Council and a student undertaking a Doctorate in Educational Psychology at the University of Strathclyde. I am interested in effective learning and teaching associated with good outcomes for reading comprehension and motivation for reading and have identified a cost effective, easily implemented framework that potentially promotes positive outcomes for all children.

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Participating schools will be asked to complete teacher surveys, take part in observations and be randomised to one of two conditions, either:

- An intervention group from randomly selected primary 5 classes: in September 2016 one primary 5 teacher within your school would be asked to take part in 2 hours of Continuous Lifelong Professional Learning (CLPL) before completing a pre-implementation questionnaire. The training outlines the SHORS project for which they will be asked to run for an intervention period of 8 weeks, during which they will receive ongoing support, associated materials and coaching. It is requested that literacy using the SHORS methods is undertaken 4 times per week for 45 minutes per session.
- A control group from randomly selected primary 5 classes for comparison. Here the teacher would be asked to regularly provide reading/ literacy lessons 4 times per week for 45 minutes per session over the same 8 week period.

Consent from the parents/carers of children invited to participate in either the intervention or control groups would be sought in August 2016. Participating children will be assessed in September 2016 using the WIAT II a standardised measure of reading comprehension which will be administered individually by myself to each child (approximately 40 minutes per child). It is requested that group assessment of the class participants would be carried out by you, the class teacher; comprising of children's self-ratings of reading comprehension strategy use and Motivation for Reading

Questionnaire subscales (approximately 35 minutes per group) overseen by the researcher. Post assessments using the same measures will be carried out at the end of the 8 weeks in December 2016.

Outcomes will be shared with the parents of participating children and the children themselves via newsletter. The findings will be collapsed across schools and no individual child or school will be identified to ensure anonymity and confidentiality. Outcomes of the study will be disseminated via presentations in North Ayrshire Council to the Psychological Service and Education Management as requested. It is likely the investigator will also aim to publish the outcomes more widely, e.g. via conference presentations and peer-reviewed journal articles.

No additional resources over and above normal investment in literacy materials would be required by participating schools.

I would greatly appreciate it if you would consider taking part in this research with me as I feel that it will be a mutually beneficial project. Please do not hesitate to get in touch with me if you require additional details or would like to take this forward.

Sincerely,

Taryn Moir

## Developing higher-order reading skills in mainstream primary schools: a metacognitive approach

**2015-2017**

### Pre-implementation Questionnaire following initial project awareness

#### Putting the principles into practice

	Please tick	
	YES	NO
I know about the general aims of the Project	YES	NO
I understand it is based upon sound research and am confident it is effective in helping children achieve their potential	YES	NO
I understand that the Project supports the child's capacity to learn	YES	NO
I feel confident I have the time, skills and resources to implement the Project effectively	YES	NO
I think the Project suits the needs of our primary children	YES	NO
I feel supported by my management in using the Project principles and know the time and resources will be available to me to do this well	YES	NO
I agree that it is important and beneficial to inform parents and involve them in the Project	YES	NO
If I need additional coaching in these principles I know I can request this. Research shows that coaching can boost skills development by 80%	YES	NO
I feel that evaluation is crucial and I will complete the forms provided	YES	NO
I feel that my comments are highly valued and I will make notes of areas where I think changes could be made or other suggestions about the SHORS Project	YES	NO
I feel our establishment is able to commit to carrying out research on the impact of the programme	YES	NO
I do want additional training in the principles of the Project	YES	NO

Print Name \_\_\_\_\_

School \_\_\_\_\_

Date \_\_\_\_\_



Appendix 3a- Pilot study

## Participant Information Sheet for Teachers (Intervention Group)

**Name of department:** School of Psychological Sciences and Health

**Title of the study:** Developing higher-order reading skills in mainstream primary schools: a metacognitive approach

### Introduction

I am Taryn Moir, and I am an Educational Psychologist at North Ayrshire Council and a student undertaking a Doctorate in Educational Psychology at the University of Strathclyde.

### What is the purpose of this investigation?

This purpose of the current research is to investigate the most effective ways of enhancing the teaching and learning of reading comprehension.

### Do you have to take part?

No. You may choose not to participate in this research study if you do not wish to do so. Choosing to participate or not will not affect either your own or your future treatment at the school in any way. You may stop participating at any time that you wish.

### What will you do in the project?

You will be part of an intervention group using the SHORS approach to reading comprehension with 6 randomly sampled Primary 5 pupils. Consent from the parents/carers of children invited to participate will be sought in January 2016. You will be asked to complete a questionnaire and have a literacy lesson observed in January 2016. Then you would be asked to take part in 2 hours of Continuous Lifelong Professional Learning (CLPL) before completing a pre-implementation questionnaire in February 2016. The training outlines the SHORS project for which you will be asked to run for an intervention period of 8 weeks, during which you will receive ongoing support, associated materials and coaching. It is requested that literacy using the SHORS methods is undertaken 4 times per week for 45 minutes per session. Children in the intervention class who are not participating in the programme would be asked to follow the literacy curriculum determined by the school.

Participating children will be assessed using the WIAT II a standardised measure of reading comprehension which will be administered individually by myself to each child (taking approximately 40 minutes per child). It is requested that group assessment of the 6 children would be carried out by you, the class teacher; comprising of children's self-ratings of reading comprehension strategy use and Motivation for Reading Questionnaire subscales (taking approximately 35 minutes per



group) overseen by the researcher. Post assessments using the same measures will be carried out at the end of the 8 weeks in May 2016.

**Why has my class been invited to take part?**

Research states that Primary 5 children may benefit from focused reading comprehension interventions.

**What are the potential risks to you in taking part?**

None

**What happens to the information in the project?**

Parents will not be able to get individual feedback about their child's performance individually although project outcomes will be shared with the parents of participating children and the children themselves via newsletter. The findings will be collapsed across schools and no individual child, teacher or school will be identified in any report to ensure anonymity and confidentiality. Copies of record forms will be anonymised, coded and stored securely in North Ayrshire Psychological Services. Data will be stored electronically on an encrypted USB drive which in turn will be stored in a secure place within North Ayrshire Educational Psychology Service. All data will be retained for a period of up to 5 years for the purpose of future publication. Outcomes of the study will be disseminated via presentations in North Ayrshire Council to the Psychological Service and Education Management as requested. It is likely the investigator will also aim to publish the outcomes more widely, e.g. via conference presentations and peer-reviewed journal articles.

These procedures are also in line with North Ayrshire Educational Psychological Services practices regarding confidentiality. The investigator will follow the ethical guidelines for the research project and any problems or concerns reported during the course of the investigation will be discussed with the Chief Investigator and appropriate action taken.

The University of Strathclyde is registered with the Information Commissioner's Office who implements the Data Protection Act 1998. All personal data on participants will be processed in accordance with the provisions of the Data Protection Act 1998.

Thank you for reading this information – please ask any questions if you are unsure about what is written here.

**What happens next?**

If you are happy to be involved in the project, please sign the attached consent form to confirm this. If you do not want to be involved in the project thank you for your attention. At the end of the study, I will be sharing what has been learnt. It is also intended that results will be published in order that other interested people may learn from this research.

This investigation was granted ethical approval by the School of Psychological and Health Sciences Ethics Committee. If you have any questions about the study, please contact me or my supervisor, Professor James Boyle. If you wish to contact an independent person to whom any questions may be directed or from whom further information may be sought, you can also contact the Chair of the Ethics Committee, Dr James Baxter.

**Professor James Boyle (Supervisor)**

School of Psychological Sciences and Health  
University of Strathclyde  
Graham Hills Building  
40 George Street  
Glasgow G1 1QE  
Email: [:j.boyle@strath.ac.uk](mailto:j.boyle@strath.ac.uk)  
Phone: 0141548 2584

**Dr James Baxter (Chair of Ethics Committee)**

School of Psychological Sciences and Health  
University of Strathclyde  
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Glasgow G1 1QE  
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Phone: 0141 548 2242

**Researcher contact details:**

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DEdPsy Student  
Department of Postgraduate Professional Training in Educational Psychology  
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Phone: (+44) 0141 548 2584  
FAX: (+44) 0141 548 4001



## Consent Form for Teachers (Intervention Group)

**Name of department:** School of Psychological Sciences and Health

**Title of the study:** Developing higher-order reading skills in mainstream primary schools: a metacognitive approach

- I confirm that I have read and understood the information sheet for the above project and the researcher has answered any queries to my satisfaction.
- I understand that my participation is voluntary and that I am free to withdraw from the project at any time, up to the point of completion, without having to give a reason and without any consequences. If I exercise my right to withdraw and I don't want my data to be used, any data which have been collected from me will be destroyed.
- I understand that I can withdraw from the study and any personal data (i.e. data which identify them personally) at any time.
- I understand that anonymised data (i.e. data which do not identify me personally) cannot be withdrawn once the study has undergone its analysis phase (the end of June 2016), as all data will have been collapsed and used in statistical tests of impact.
- I understand that any information recorded in the investigation will remain confidential outside the school and no information that identifies me will be made publicly available.
- I consent to being a participant in the project.

(PRINT NAME)	
Signature of Teacher:	Date:

School:



## Participant Information Sheet for Teachers (Intervention Group)

**Name of department:** School of Psychological Sciences and Health

**Title of the study:** Developing higher-order reading skills in mainstream primary schools: a metacognitive approach

### Introduction

I am Taryn Moir, and I am an Educational Psychologist at North Ayrshire Council and a student undertaking a Doctorate in Educational Psychology at the University of Strathclyde.

### What is the purpose of this investigation?

This purpose of the current research is to investigate the most effective ways of enhancing the teaching and learning of reading comprehension.

### Do you have to take part?

No. You may choose not to participate in this research study if you do not wish to do so. Choosing to participate or not will not affect either your own or your future treatment at the school in any way. You may stop participating at any time that you wish.

### What will you do in the project?

You will be part of an intervention group using the SHORS approach to reading comprehension with your Primary 5 class of pupils. Consent from the parents/carers of children invited to participate will be sought in August 2016. You will then be asked to complete a questionnaire and have a literacy lesson observed in September 2016. Then you would be asked to take part in 2 hours of Continuous Lifelong Professional Learning (CLPL) -before completing a pre-implementation questionnaire in September 2016. The training outlines the SHORS project for which you will be asked to run for an intervention period of 8 weeks, during which you will receive ongoing support, associated materials and coaching. It is requested that literacy using the SHORS methods is undertaken 4 times per week for 45 minutes per session.

Participating children will be assessed in September 2016 using the WIAT II a standardised measure of reading comprehension which will be administered individually by myself to each child (taking approximately 40 minutes per child). It is requested that group assessment of the class participants would be carried out by you, the class teacher; comprising of children's self-ratings of reading comprehension strategy use and Motivation for Reading Questionnaire subscales (taking

approximately 35 minutes per group) overseen by the researcher. Post assessments using the same measures will be carried out at the end of the 8 weeks in December 2016.

**Why has my class been invited to take part?**

Research states that Primary 5 children may benefit from focused reading comprehension interventions.

**What are the potential risks to you in taking part?**

None

**What happens to the information in the project?**

Parents will not be able to get individual feedback about their child's performance individually although project outcomes will be shared with the parents of participating children and the children themselves via newsletter. The findings will be collapsed across schools and no individual child, teacher or school will be identified in any report to ensure anonymity and confidentiality. Copies of record forms will be anonymised, coded and stored securely in North Ayrshire Psychological Services. Data will be stored electronically on an encrypted USB drive which in turn will be stored in a secure place within North Ayrshire Educational Psychology Service. All data will be retained for a period of up to 5 years for the purpose of future publication. Outcomes of the study will be disseminated via presentations in North Ayrshire Council to the Psychological Service and Education Management as requested. It is likely the investigator will also aim to publish the outcomes more widely, e.g. via conference presentations and peer-reviewed journal articles.

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The University of Strathclyde is registered with the Information Commissioner's Office who implements the Data Protection Act 1998. All personal data on participants will be processed in accordance with the provisions of the Data Protection Act 1998.

Thank you for reading this information – please ask any questions if you are unsure about what is written here.

**What happens next?**

If you are happy to be involved in the project, please sign the attached consent form to confirm this. If you do not want to be involved in the project thank you for your attention.

At the end of the study, I will be sharing what has been learnt. It is also intended that results will be published in order that other interested people may learn from this research.

This investigation was granted ethical approval by the School of Psychological and Health Sciences Ethics Committee. If you have any questions about the study, please contact me or my supervisor, Professor James Boyle. If you wish to contact an independent person to whom any questions may be directed or from whom further information may be sought, you can also contact the Chair of the Ethics Committee, Dr James Baxter.

**Professor James Boyle (Supervisor)**

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**Dr James Baxter (Chair of Ethics Committee)**

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**Researcher contact details:**

Mrs Taryn Moir  
DEdPsy Student  
Department of Postgraduate Professional Training in Educational Psychology  
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## Consent Form for Teachers (Intervention Group)

**Name of department:** School of Psychological Sciences and Health

**Title of the study:** Developing higher-order reading skills in mainstream primary schools: a metacognitive approach

- I confirm that I have read and understood the information sheet for the above project and the researcher has answered any queries to my satisfaction.
- I understand that my participation is voluntary and that I am free to withdraw from the project at any time, up to the point of completion, without having to give a reason and without any consequences. If I exercise my right to withdraw and I don't want my data to be used, any data which have been collected from me will be destroyed.
- I understand that I can withdraw from the study and any personal data (i.e. data which identify them personally) at any time.
- I understand that anonymised data (i.e. data which do not identify me personally) cannot be withdrawn once the study has undergone its analysis phase (January 2017), as all data will have been collapsed and used in statistical tests of impact.
- I understand that any information recorded in the investigation will remain confidential outside the school and no information that identifies me will be made publicly available.
- I consent to being a participant in the project.

(PRINT NAME)	
Signature of Teacher:	Date:

School:



## Participant Information Sheet for Teachers (Control Group)

**Name of department:** School of Psychological Sciences and Health

**Title of the study:** Developing higher-order reading skills in mainstream primary schools: a metacognitive approach

### Introduction

I am Taryn Moir, and I am an Educational Psychologist at North Ayrshire Council and a student undertaking a Doctorate in Educational Psychology at the University of Strathclyde.

### What is the purpose of this investigation?

This purpose of the current research is to investigate the most effective ways of enhancing the teaching and learning of reading comprehension.

### Do you have to take part?

No. You may choose not to participate in this research study if you do not wish to do so. Choosing to participate or not will not affect either your own or your future treatment at the school in any way. You may stop participating at any time that you wish.

### What will you do in the project?

Consent from the parents/carers of children invited to participate in the control group will be sought in January 2016.

You will be asked to complete a questionnaire and have a literacy lesson observed in January 2016. Six randomly sampled Primary 5 pupils from your class will be assessed using the WIAT II a standardised measure of reading comprehension which will be administered individually by myself to each child (approximately 40 minutes per child). It is requested that group assessment of the 6 children would be carried out by you, the class teacher; comprising of children's self-ratings of reading comprehension strategy use and Motivation for Reading Questionnaire subscales (approximately 35 minutes per group) overseen by the researcher in February 2016. After, the literacy programme as agreed between yourself and your head teacher will run as normal and children will be reassessed in May 2016 to track their reading progress. Overall class improvement will be compared to that of other P5 children within the authority that are participating in an alternative programme of instruction aimed to develop reading comprehension. Post assessments using the same measures will be carried out at the end of the 8 weeks in May 2016.

### Why has my class been invited to take part?

Research states that Primary 5 children may benefit from focused reading comprehension



interventions. The assessment of children out-with the intervention group is necessary to determine the effectiveness and impact of the alternative framework.

**What are the potential risks to you in taking part?**

None

**What happens to the information in the project?**

Parents will not be able to get individual feedback about their child's performance individually although project outcomes will be shared with the parents of participating children and the children themselves via newsletter. The findings will be collapsed across schools and no individual child, teacher or school will be identified in any report to ensure anonymity and confidentiality. Copies of record forms will be anonymised, coded and stored securely in North Ayrshire Psychological Services. Data will be stored electronically on an encrypted USB drive which in turn will be stored in a secure place within North Ayrshire Educational Psychology Service. All data will be retained for a period of up to 5 years for the purpose of future publication. Outcomes of the study will be disseminated via presentations in North Ayrshire Council to the Psychological Service and Education Management as requested. It is likely the investigator will also aim to publish the outcomes more widely, e.g. via conference presentations and peer-reviewed journal articles.

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**What happens next?**

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This investigation was granted ethical approval by the School of Psychological and Health Sciences Ethics Committee. If you have any questions about the study, please contact me or my supervisor, Professor James Boyle. If you wish to contact an independent person to whom any questions may be directed or from whom further information may be sought, you can also contact the Chair of the Ethics Committee, Dr James Baxter.

**Professor James Boyle (Supervisor)**

School of Psychological Sciences and Health  
University of Strathclyde  
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40 George Street  
Glasgow G1 1QE  
Email: [:j.boyle@strath.ac.uk](mailto:j.boyle@strath.ac.uk)  
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**Dr James Baxter (Chair of Ethics Committee)**

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**Researcher contact details:**

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DEdPsy Student  
Department of Postgraduate Professional Training in Educational Psychology  
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Phone: (+44) 0141 548 2584

FAX: (+44) 0141 548 4001



## Consent Form for Teachers (Control Group)

**Name of department:** School of Psychological Sciences and Health

**Title of the study:** Developing higher-order reading skills in mainstream primary schools: a metacognitive approach

- I confirm that I have read and understood the information sheet for the above project and the researcher has answered any queries to my satisfaction.
- I understand that my participation is voluntary and that I am free to withdraw from the project at any time, up to the point of completion, without having to give a reason and without any consequences. If I exercise my right to withdraw and I don't want my data to be used, any data which have been collected from me will be destroyed.
- I understand that I can withdraw from the study and any personal data (i.e. data which identify them personally) at any time.
- I understand that anonymised data (i.e. data which do not identify me personally) cannot be withdrawn once the study has undergone its analysis phase (the end of June 2016), as all data will have been collapsed and used in statistical tests of impact.
- I understand that any information recorded in the investigation will remain confidential out with the school and no information that identifies me will be made publicly available.
- I consent to being a participant in the project.

(PRINT NAME)	
Signature of Teacher:	Date:

School:



## Participant Information Sheet for Teachers (Control Group)

**Name of department:** School of Psychological Sciences and Health

**Title of the study:** Developing higher-order reading skills in mainstream primary schools: a metacognitive approach

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### What will you do in the project?

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### Why has my class been invited to take part?

Research states that Primary 5 children may benefit from focused reading comprehension interventions. The assessment of children out-with the intervention group is necessary to determine the effectiveness and impact of the alternative framework.

**What are the potential risks to you in taking part?**

None

**What happens to the information in the project?**

Parents will not be able to get individual feedback about their child's performance individually although project outcomes will be shared with the parents of participating children and the children themselves via newsletter. The findings will be collapsed across schools and no individual child, teacher or school will be identified in any report to ensure anonymity and confidentiality. Copies of record forms will be anonymised, coded and stored securely in North Ayrshire Psychological Services. Data will be stored electronically on an encrypted USB drive which in turn will be stored in a secure place within North Ayrshire Educational Psychology Service. All data will be retained for a period of up to 5 years for the purpose of future publication. Outcomes of the study will be disseminated via presentations in North Ayrshire Council to the Psychological Service and Education Management as requested. It is likely the investigator will also aim to publish the outcomes more widely, e.g. via conference presentations and peer-reviewed journal articles.

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**What happens next?**

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This investigation was granted ethical approval by the School of Psychological and Health Sciences Ethics Committee. If you have any questions about the study, please contact me or my supervisor, Professor James Boyle. If you wish to contact an independent person to whom any questions may be directed or from whom further information may be sought, you can also contact the Chair of the Ethics Committee, Dr James Baxter.

**Professor James Boyle (Supervisor)**

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**Dr James Baxter (Chair of Ethics Committee)**

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**Researcher contact details:**

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Phone: (+44) 0141 548 2584

FAX: (+44) 0141 548 4001



## Consent Form for Teachers (Control Group)

**Name of department:** School of Psychological Sciences and Health

**Title of the study:** Developing higher-order reading skills in mainstream primary schools: a metacognitive approach

- I confirm that I have read and understood the information sheet for the above project and the researcher has answered any queries to my satisfaction.
- I understand that my participation is voluntary and that I am free to withdraw from the project at any time, up to the point of completion, without having to give a reason and without any consequences. If I exercise my right to withdraw and I don't want my data to be used, any data which have been collected from me will be destroyed.
- I understand that I can withdraw from the study and any personal data (i.e. data which identify them personally) at any time.
- I understand that anonymised data (i.e. data which do not identify me personally) cannot be withdrawn once the study has undergone its analysis phase (January 2017), as all data will have been collapsed and used in statistical tests of impact.
- I understand that any information recorded in the investigation will remain confidential out with the school and no information that identifies me will be made publicly available.
- I consent to being a participant in the project.

(PRINT NAME)	
Signature of Teacher:	Date:

School:



## **Participant Information Sheet for Parents/Carers/Guardians (Intervention Group)**

**Name of department:** School of Psychological Sciences and Health

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### **Introduction**

I am Taryn Moir, and I am an Educational Psychologist at North Ayrshire Council and a student undertaking a Doctorate in Educational Psychology at the University of Strathclyde.

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This purpose of the current research is to investigate effective ways of enhancing the teaching and learning of reading comprehension.

### **Do you have to take part?**

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### **What will my child do in the project?**

They will be asked to take part in some additional literacy assessments in February 2016. This will be an individual reading assessment taking around 40 minutes. They will also be asked to complete a motivation for reading questionnaire and children's self-rating scales of reading strategy use, which will be administered within a group and take around 35 minutes. All assessments will take place within the school during school hours. After this, participating pupils will take part in a reading comprehension programme during class-time for the next 8 weeks. The programme is an example of effective teaching and learning strategies as defined by current research and will take place as part of the school's regular literacy timetable (45 minutes per day, 4 times a week). Finally, there will be re-assessments of reading at the end of the programme in May 2016 to determine its effectiveness and impact.



**Why has my child been invited to take part?**

Primary 5 children are being invited to take part as research suggests that they may benefit from focused reading comprehension interventions.

**What are the potential risks to you in taking part?**

Consideration has been given to a number of potential risks when carrying out the study. For example, the possibility that a child may become distressed for any reason, and the possibility of fatigue. These issues will be addressed in the following ways: (i) should your child become distressed for any reason the session will be suspended and school staff notified immediately; (ii) frequent rest breaks will be provided; (iii) the session will be suspended should your child display signs of fatigue.

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**Professor James Boyle (Supervisor)**

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Phone: 0141548 2584

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**Researcher contact details:**

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DEdPsy Student  
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Signature of Parent/Carer/Guardian:	Date:

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Signature of Parent/Carer/Guardian:	Date:

Parent of:



**Pupil Record of Consent**      **School** \_\_\_\_\_

**Consent script**

“I am Taryn Moir, an Educational Psychologist and a student. I am carrying out a study on reading and I would like to ask for your help. Your parents/caregivers know about this and said you can take part if you wish. It would mean that you do some reading tests with me which will take no more than 40 minutes and some group activities which should take no longer than 35 minutes. I will keep a record of your results from this test and they will be available only to myself and my supervisor, although you can see them as well. If together we think it would be helpful to share the results with your teacher I can do so. I will only keep the results for as long as I need to for the project. If at any time you feel uncomfortable please let me know and if you want to withdraw from this study, tell me and we can stop. I will do everything I can to ensure the information you gives me stays secret. Now I would like to ask you if you agree to participate in this study. Do you agree to take part?”

Date	NO.	Name	Agreement given (Y/N)
	1		
	2		
	3		
	4		
	5		



Date	Name	Agreement given (Y/N)
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Appendix 8- Training slides

Slide 1



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Slide 2



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Slide 3



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Slide 4

**PROGRAMME FOR THE SESSION**

- What is the project?
- How it has got to this point?
- Strathclyde Higher Order Reading Skills Programme
- What to look for when selecting materials/resources
- Key Components
- Next steps



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Slide 5

“If you are going to get anywhere in life you have to read a lot of books”  
– Roald Dahl



©2017

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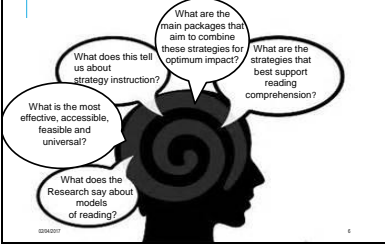
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Slide 6

**THE PROJECT OVERVIEW**



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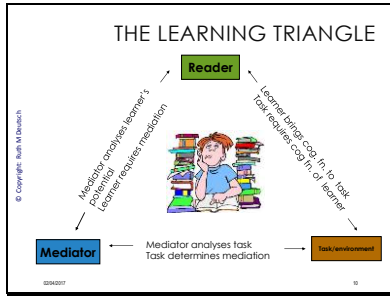
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Slide 10



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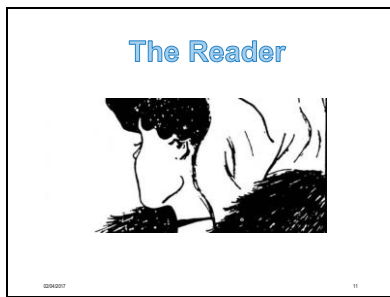
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Slide 11



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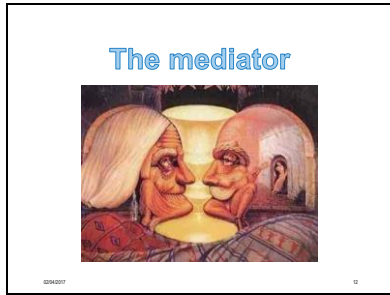
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Slide 12



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Slide 16

**STRATEGY USE SUPPORTED BY.....**

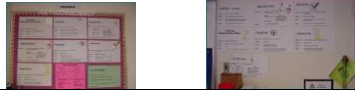

Comprehension Process Motions (CPM)– increase the effectiveness of comprehension strategy instruction by providing kinaesthetic movements as a second learning input system

Hand signals to indicate the use of a strategy

Active involvement

Conscious of own and other children's strategy use.

Anchor Charts– are constructed collaboratively by teacher and children using clear explicit language and act as an aide memoire for each individual strategy.



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Slide 17

**PREPARE YOUR MIND-**

What's this text about? What do I already know? What does the author want me to think? Do I need to have an opinion, understand facts and events or just let myself believe?

Activate Prior Knowledge



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Slide 18



- I can make predictions **before and during** reading.
- I think about the **information I know from the cover, pictures and the story.**
- I think about **what will happen next** and listen to the **author's clues.**
- It doesn't have to be right!!

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Slide 19

**VISUALISE**



If this were a film, what would I see? What would this information look like as a diagram / flowchart?



**Visualising**

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Slide 20


•We use our 'movie' to help us picture the story inside our heads. Smells, sounds, taste and touch can make your movie even better.

•We are like the directors of a movie.

•The words (text) are like the script.

•Change your movie as you get more information.

•Everybody will have a slightly different movie.



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Slide 21

**HEAR A VOICE READING ALOUD IN YOUR HEAD-**

Can intonation help me make sense? Will accents help me track who's speaking?



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Slide 22

**RE-PHRASE-**  
In my own words, that means...

**Summarizing/ Retelling** Students briefly describe, orally or in writing, the main points of what they read.

1. Ask a student to describe the text in *his or her own words* to a partner or a teacher.
2. If a student has trouble doing this, ask questions such as "What comes next?" or "What else did the passage say about [subject]?"

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Slide 23

**SUMMARIZE AND SYNTHESISE AS YOU GO-**

What do I know so far? What don't I know yet? What do I need to know?

Summarize the Story

Characters  
↓  
Setting  
↓  
Problem  
↓  
Solution



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Slide 24



•Synthesising is like piecing together all the pieces of a **jigsaw**. On their own each piece will only give a little insight. You need to use all the pieces/strategies together to **fully understand** the story.

•We need to **stop and think** - to give our brains time to **sort** all the information we have gathered by using our strategies.

•Synthesis is the **glue** that holds all the strategies together.

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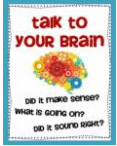
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Slide 25

**HOLD YOUR THOUGHTS AS YOU READ-**

Why am I being told this now? How does this information link together? What am I assuming that isn't in the text?



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Slide 26

**QUESTION**

Does this seem likely? Does this 'ring true'? Do I understand all of this?



**Questioning**

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Slide 27



•We can ask questions anytime!

•They help us to **think more** about what we read.

•Sometimes we can find answers to our questions in the story or using our background knowledge.

•Sometimes the author leaves us wondering!

•Asking questions helps us to 'solve' the story by putting all the pieces together.

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Slide 28

**QUESTIONS TYPES**

**Questions that Inspire Red Thinking**

Teacher generated questions	Pupil generated questions
<ul style="list-style-type: none"><li>• Often lower order</li><li>• "After the fact"</li><li>• Pupils active or passive?</li></ul>	<ul style="list-style-type: none"><li>• Authentic questions - normally higher order</li><li>• Before, during and after</li><li>• Pupils are engaged and active</li></ul>

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Slide 29

**MONITOR, CLARIFY AND FIX UP**

IF YOU DON'T UNDERSTAND: STOP. RE-READ.

- Identify where the difficulty occurs
- Identify what the difficulty is
- Restate the difficult sentence or passage in their own words
- Look back through the text
- Look forward in the text for information that might help them to resolve the difficulty

**DO YOU UNDERSTAND?**

YES I CAN REPHRASE IT

I WOULD NEED MORE HELP

locate Key Words

Re-read the Text

look backwards for understanding

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Slide 30

**IF YOU STILL DON'T UNDERSTAND-**

find the problem word. Does it remind me of other words or parts of words? Can I guess a bit from the context? Who can I ask? If not, **LOOK IT UP**

Use Context Clues

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Slide 31

**LINK TO WIDER EXPERIENCES**

How does this relate to what I already know? What I have read? What I have done? What was new to me? Would I react in the same way?

—Scattering buttons like sunflower seeds.



S: I like that description.  
L: But you wouldn't see sunflower seeds flying all over the place.  
J: Maybe like a dandelion clock.  
Teacher:  
We don't see a lot of sunflower seeds here but there would be more in America. Maybe we need a scheme for it to fully understand it. I think you made it clearer for us by comparing it to the dandelion clock. We can all see that in our stories. But it is a beautiful description. We'll add it to our wall.

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Slide 32

**Inferring is "Reading Between The Lines"**

- We use our **schemas** and our **understanding** to infer things the author has **not written** - the **invisible ink** of the story.
- We use our knowledge of **body language**, **faces**, **expression** and the author's **tone** to help us.
- We are like **detectives** searching for **clues** to understand the story.
- We ask ourselves "**What does the author mean by ?**"



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Slide 33

**THINK ABOUT THE 'CRUNCH' POINTS-**

At what point(s) could this have gone a different way?



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Slide 34

**WONDER TO YOURSELF-**

What could happen in a different context? Why might this person / group behave like this?



**ABOVE ALL,**  
WATCH WITH  
glittering eyes  
THE WHOLE WORLD  
AROUND YOU

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Slide 35

**RECOMMENDATION 2- TEACH STUDENTS TO IDENTIFY AND USE THE TEXT'S ORGANIZATIONAL STRUCTURE TO COMPREHEND, LEARN, AND REMEMBER CONTENT.**

Explain how to identify and connect the parts of narrative texts.  
Provide instruction on common structures of informational texts.



Use Graphic Organizers

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Slide 36

**GRAPHIC AND SEMANTIC ORGANIZERS INCLUDING STORY MAPS**

- For when readers do not use external organization aids that can benefit their understanding.
- Research results show these improve memory and comprehension of text for readers. Predominantly this strategy has been used for the comprehension of social studies and science materials.
- Graphic organizers illustrate concepts and interrelationships among concepts in a text.
- Graphic organizers can help readers focus on concepts and how they are related to other concepts.



STORY MAP

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Slide 37

Graphic organizers can help students focus on text structure as they read; provide students with tools they can use to examine and visually represent relationships in a text; and help students write well-organized summaries of a text.

graphs charts frames clusters semantic organizers  
diagrams pictorial devices graphic organizers maps webs

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Slide 38

**Story Map** A Simple Story Map

Who? \_\_\_\_\_  
What? \_\_\_\_\_  
When? \_\_\_\_\_  
Where? \_\_\_\_\_  
Why? \_\_\_\_\_

**Story Blocks for:**

Setting	_____
Characters	_____
Problem(s)	_____
Solution	_____
Theme	_____

grades 2-5

02/04/2017 38

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Slide 39

**RECOMMENDATION 3-  
GUIDE STUDENTS THROUGH  
FOCUSED, HIGH-QUALITY  
DISCUSSION ON THE MEANING OF  
OF TEXT.**

- Structure the discussion to complement the text, the instructional purpose, and the readers' ability and grade level.
- Develop discussion questions that require students to think deeply about text.
- Ask follow-up questions to encourage and facilitate discussion.
- Have students lead structured small-group discussions.

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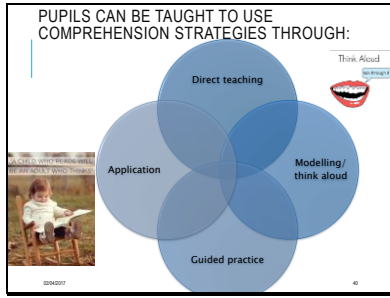
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Slide 40



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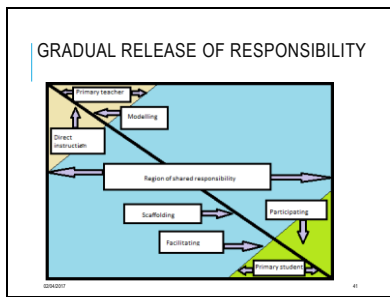
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Slide 41



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Slide 42

RECOMMENDATION 4-

**SELECT TEXTS PURPOSEFULLY TO SUPPORT COMPREHENSION DEVELOPMENT.**

Teach reading comprehension with multiple genres of text.

Choose texts of high quality with richness and depth of ideas and information.

Choose texts with word recognition and comprehension difficulty appropriate for the students' reading ability and the instructional activity.

Use texts that support the purpose of instruction.

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Slide 58

Fuchs D, Fuchs L, D. Mathes, P. G., & Simmons, D. G. (1997). Peer-assisted learning strategies: Making struggling readers responsive to diversity. *American Educational Journal*, 14(1), 1-10.

Harbourk, J. E., Hesse, C., & Rogers, C. H. (1999). "Read Naturally": A strategy to increase oral reading fluency. *Reading Research and Instruction*, 39(1), 27-16.

Hollis, C. and Shovelton, M. (2009) *Reading disorders: Developmental Dyslexia in Developmental Disorders of Language Learning and Cognition*, Wiley-Blackwell, West Sussex 274.

Juel, C. (1991). Beginning reading. In R. Barr, M. L. Kamil, F. B. Moenthal, & P. D. Pearson (Eds.), *Handbook of reading research* (pp. 759-788). New York: Longman.

Kameenui, E. J., & Simmons, D. C. (1990). *Designing instructional strategies: The prevention of academic learning problems*. Columbus, OH: Merrill Publishing Company.

Kaminski, R. A., & Cood, R. H. III (1995). Assessing early literacy skills in a problem-solving model: Dynamic indicators of basic early literacy skills. In M. K. Shiffr (Eds.), *Advanced applications of curriculum based measurement*. New York: Guilford.

Kaminski, R. A., & Cood, R. H. III (1995). *Toward a technology for assessing basic early literacy skills*. *School Psychology Review*, 25(2), 215-221.

Learning First Alliance (1998). *Every child reading: An action plan of the Learning First Alliance*. American Educator, 1-2, 52-63.

Learning without limits. *Open Court Collections for Young Scholars information kit*. Santa Rosa, CA: SEA | McGraw-Hill.

Martson, D., & Denis, S. L. (1987). *Tests of oral reading fluency: Measures for screening and progress monitoring in reading*. Minneapolis, MN: Children's Educational Services, Inc.

McPike, E. (Ed.) (1995). Learning to read: Schooling's first mission. *American Educator*, 19(2), 3-51.

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Slide 59

Mours, L. C. (1999). Teaching reading is rocket science: What expert teachers of reading should know and be able to do. Washington, D. C.: American Federation of Teachers.

National Reading Panel (2000). *Teaching children to read: An evidence-based assessment of the scientific research literature on reading and its implications for reading instruction* (on-line). Available: <http://www.nctdr.nih.gov/publications/nrp/smallbook.htm>.

National Research Council (1998). *Preventing reading difficulties in young children*. Washington, DC: National Academy Press.

Ogile, D. (1986). K-W-L: A teaching model that develops active reading of expository text. *The Reading Teacher*, 39, 564-570.

Pressley, M. (2001) *Put Reading First: The Research Building Blocks for Teaching Children to Read* National Institute for Literacy, Rockville, MD 20817

Rayner, K., & Pollatsek, A. (1989). *The psychology of reading*. Englewood Cliffs, NJ: Prentice Hall.

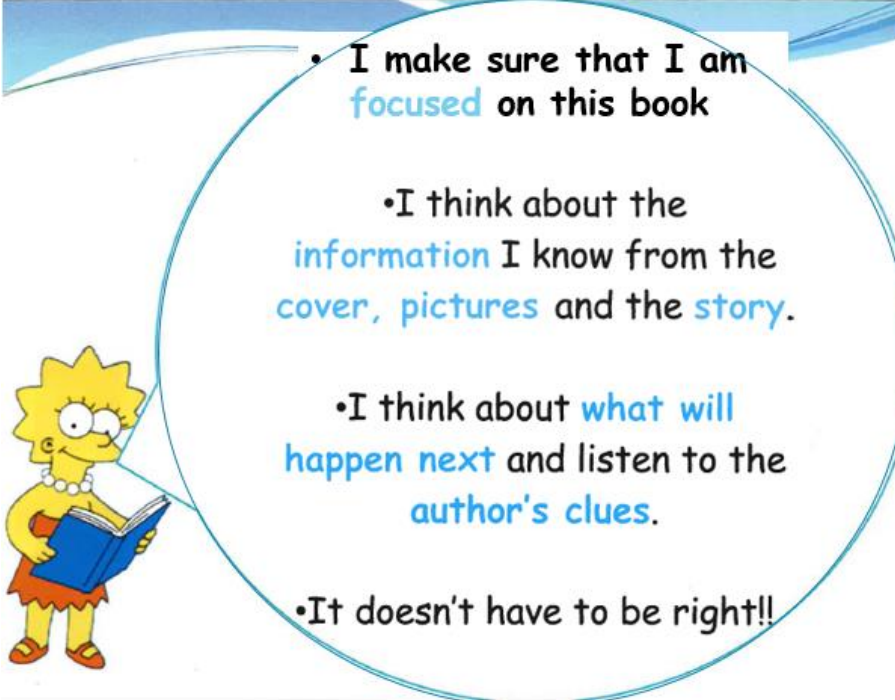
Stahl, S. A., & Shiel, T. R. (1999). Teaching meaning vocabulary: productive approaches for poor readers. In *Read all about it! Readings to inform the profession* (pp. 291-327). Sacramento, CA: California State Board of Education.

Torgerson, C.J., Brooks, C., and Hall, J. (2006) *A Systematic Review of the Research Literature on the Use of Phonics in the Teaching of Reading and Spelling*. London, DfES Research Report 711.

Zins, J. E., & Ponti, C. R. (1990). *Best practices in school-based consultation*. In A. Thomas & J. Grimes (Eds.), *Best practices in school psychology - II* (pp. 673-694). Washington, DC: National Association of School Psychologists.

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- I make sure that I am **focused** on this book
- I think about the **information** I know from the **cover, pictures** and the **story**.
- I think about **what will happen next** and listen to the **author's clues**.
- It doesn't have to be right!!

## 2. VISUALISE



If this were a film, what would I see? What would this information look like as a diagram / flowchart?



# Visualising

**Pupils give fairly accurate information on a vocabulary audit as homework at the start of a unit...**

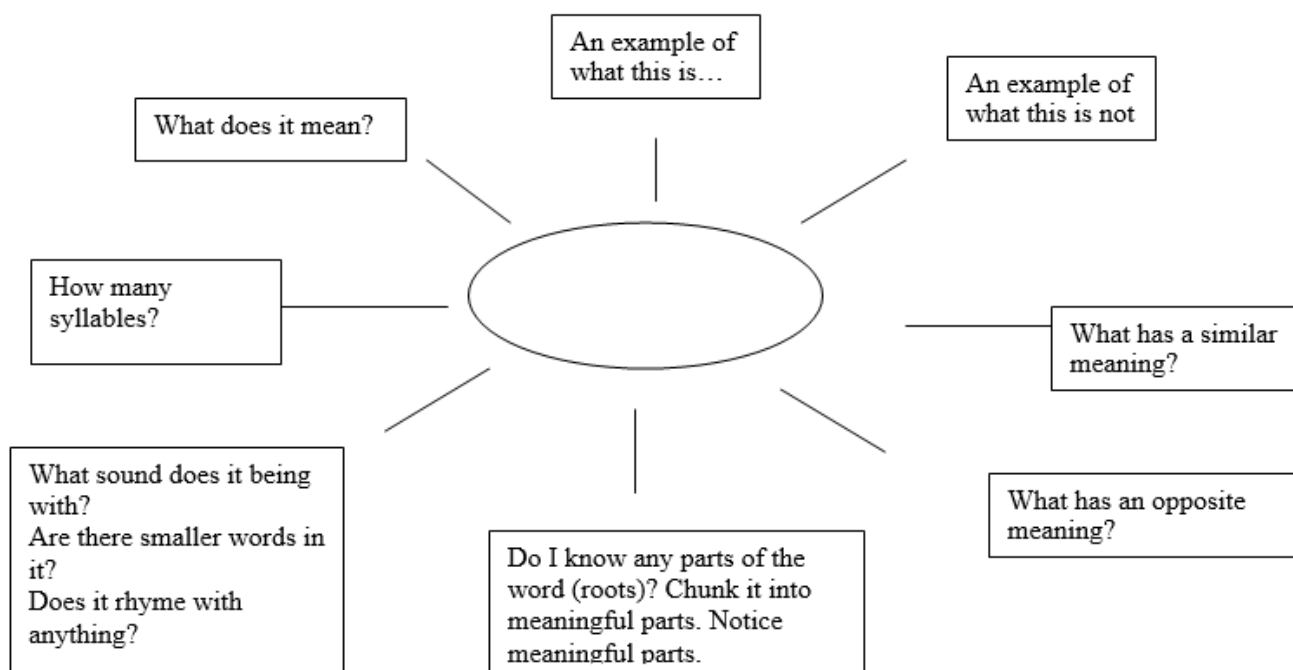
Key unit vocabulary	I know this word, it means....	I have heard this word but I'm not quite sure what it means.	I don't know this word.

**Use this information to plan what needs teaching/ reminding/ clarification, how much is needed, and when**

**ACTIVELY TEACH VOCABULARY**

**Different 'hooks' work for different words**

ACTIVELY TEACH VOCABULARY  
Different 'hooks' work for different words



## **READING TO UNDERSTAND**

**Prepare your mind-** What's this text about? What do I already know? What does the author want me to think? Do I need to have an opinion, understand facts and events or just let myself believe?

**Visualise-** If this were a film, what would I see? What would this information look like as a diagram / flowchart?

**Hear a voice reading aloud in your head-** Can intonation help me make sense? Will accents help me track who's speaking?

**Re-phrase-** In my own words, that means...

**Summarize as you go-** What do I know so far? What don't I know yet? What do I need to know?

**Hold your thoughts as you read-** Why am I being told this now? How does this information link together? What am I assuming that isn't in the text?

**Question-** Does this seem likely? Does this 'ring true'? Do I understand all of this?

**If you don't understand: Stop. Re-read.**

**If you STILL don't understand-** find the problem word. Does it remind me of other words or parts of words? Can I guess a bit from the context? Who can I ask? If not, **LOOK IT UP**

**Link to wider experiences-** How does this relate to what I already know? What I have read? What I have done? What was new to me? Would I react in the same way?

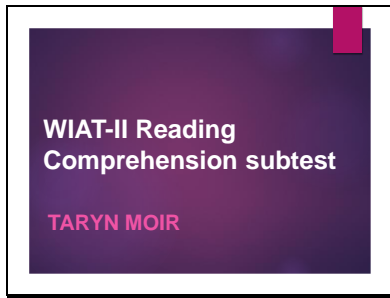
**Think about the 'crunch' points-** At what point(s) could this have gone a different way?

**Wonder to yourself-** What could happen in a different context? Why might this person / group behave like this?



Appendix 12- WIAT training slides

Slide 1



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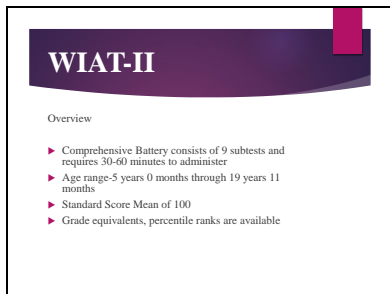
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Slide 2



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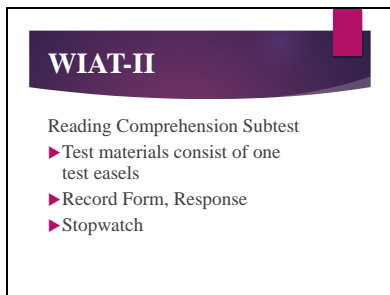
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Slide 3



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Slide 4

**WIAT-II**

What to do...

- ▶ 1. Complete all information in Record Booklet before beginning testing

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Slide 5

The image shows a screenshot of the WIAT-II Record Booklet. Three red arrows point to specific sections: 'Name, Date' at the top, 'Age for base' in the middle, and 'How often do you read' at the bottom.

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Slide 6

**WIAT-II**

- ▶ Try to build a little rapport with the child
- ▶ Ensure they are still willing to take part
- ▶ Ask them how often they read

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Slide 7

**WIAT-II**

▶ **Subtest 3-Reading Comprehension**

Reflects the type of reading conducted in general education classrooms. Initial items include matching a written word with its representative picture. Students also read different types of passages and respond to questions involving comprehension of the content.

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Slide 8

**WIAT-II Reading Comprehension**

**Starting Points**

- ▶ For all children start with Age 8
- ▶ The Upside-Down Tree
- ▶ Item 20 in the reading comprehension record form

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Slide 9



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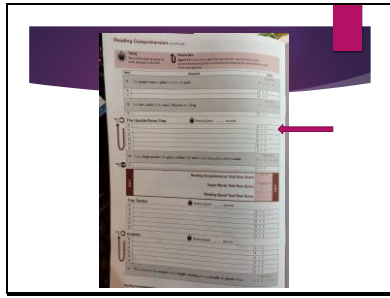
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Slide 10



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Slide 11

**WIAT-II Reading Comprehension**

- ▶ Place the stimulus booklet in front of the child (starting at item 20)
- ▶ Ensure they are comfortable regarding where it is placed in front of them
- ▶ Read the instructions on written in blue verbalim
- ▶ Write the child's response on the appropriate part of the record form
- ▶ Circle the score (as indicated in the stimulus book)

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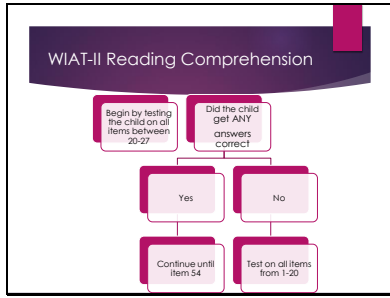
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Slide 12



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Slide 13

**WIAT-II Reading Comprehension**



When doing reading passages e.g.

- ▶ The upside-Down Tree
- ▶ Tidy Tamiko
- ▶ Crickets
- ▶ Good Neighbours



Please record the reading speed in seconds

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**Reading: Pupil self-assessment** 1 Name:..... Class.....

	I do this often	I sometimes do this	I hardly ever do this
<b>Prepare your mind-</b> What's this text about? What do I already know? What's most likely to happen? Do I need to have an opinion and/ or understand facts and events?			
<b>Visualise</b> – If this were a film, what would I see? What would this information look like as a diagram / flowchart?			
<b>Hear a voice reading aloud in your head</b> –can intonation help me make sense? Will accents help me track who's speaking?			
<b>Re-phrase</b> – in my own words, that means...			
<b>Summarize as you go along</b> – What do I know so far? What don't I know yet? What do I need to know?			
<b>Hold your thoughts as you read</b> – Why am I being told this now? How does this information link together? What am I assuming that isn't in the text?			
<b>Question</b> – Does this seem likely? Does this 'ring true'?			
<b>If you don't understand it... Stop. Re-read.</b>			
<b>If you STILL don't understand...</b> find the problem word. Does it remind me of other words or parts of words? Can I guess a bit from the context? Who can I ask? If none of these, <b>LOOK IT UP</b>			
<b>Link to wider experiences</b> – How does this relate to what I already know/ have read/ have done? What was new to me? Would I have reacted in the same way?			
<b>Think about the crunch points</b> – At what point(s) could this have gone a different way?			
<b>Wonder to yourself</b> – What could happen in a different context? Why might this person / group behave like this?			

## Appendix 14- Teacher Semi-Structured Interview

### Teacher semi structured Interview

1. Do you feel that taking part in this project has altered how you approach teaching literacy?
2. If so in what way?
3. Do you think students found the literacy instruction any different?
4. How do you know?
5. Can you identify any strengths of the approach?
6. What aspects were the challenges?
7. What would help overcome these challenges?
8. Do you feel being part of this project impacted upon your:
  - a. Knowledge of reading instruction?
  - b. Skill of delivery?
9. Was the coaching effective?
10. What could have made you feel more supported in applying this approach

Appendix 15: Pilot Fidelity data

	Fidelity observation 1		Fidelity observation 2	
	Orally	Gestured	Orally	Gestured
<b>Teacher Prompts</b>				
<b>Prepare your mind</b> – What is this text about? What do I already know? What is most likely to happen? Do I need to have an opinion and/or understanding of fact and events?	6	yes	8	Yes
<b>Visualise</b> - If this were a film, what would I see? What would this information look like as a diagram/flow chart?	15	Yes	12	Yes
<b>Hear a voice reading aloud in your head</b> - Can intonation help me make sense? Will accents help me track who's speaking?	3	N/A	4	N/A
<b>Re-phrase</b> - In my own words, that means....	5	N/A	4	N/A
<b>Summarise as you go along</b> - What do I know so far? What don't I know yet? What do I need to know?	1	No	6	No
<b>Hold your thoughts as you read</b> - Why am I being told this now? How does information link together? What am I assuming that isn't in the text?	1	N/A	2	N/A
<b>Question</b> - Does this seem likely? Does this ring true?	7	No	16	No
<b>If you still don't understand it.... Stop. Re-read</b>	0	N/A	0	N/A
<b>If you STILL don't understand....</b> Find the problem words. Does it remind me of other words or parts of words? Can I guess a bit from the context? Who can I ask? If none of these, then LOOK IT UP	0	N/A	0	N/A
<b>Link to wider experiences</b> - How does this relate to what I already know/have read/ have done? What was new to me? Would I have reacted in the same way?	14	No	4	No
<b>Think about the crunch points</b> - At what point(s) could this have gone a different way?	5	N/A	2	N/A
<b>Wonder to yourself</b> - What could happen in a different context? Why might this person/group behave like this?	6	N/A	4	N/A
Was a graphic organiser used?	No		No	
Direct-teaching of vocabulary	No		No	
Focused & quality discussion about the text	Yes		Yes	
Interesting and varied reading materials	Yes		Yes	
Establish an engaging motivational context and reading opportunities	Yes		Yes	
Poster up	Yes		Yes	
Gestures up	Yes		Yes	
Use of vocabulary audit	No		No	



Appendix 16- Pilot RCV observational Data

Observation feature	Control	Intervention
Activating prior knowledge	Yes	Yes
Use of text features	No	No
Explicit comprehension instructions	Yes	No
Asking for justifications/elaborations	Yes	Yes
Teacher questions	Yes	No
Teacher elaborations	Yes	No
Vocabulary references	Few references	High level of references
Grouping- 1st 15 minutes 2nd 15 minutes 3rd 15 minutes	Whole class Pairs Whole class	Large group 1:1 Small group
Text reading	Supported oral reading	Independent silent reading
Gave inaccurate and/or confusing explanations or feedback	No	No
Missed opportunity to correct or address error	No	No
Provided opportunities for most students to participate actively during teacher-led instruction	Yes	No
Paced instruction so that the length of the comprehension or vocabulary activities were appropriate for this age group	Yes	Yes
Teaches using outlining and note taking	No	No
Uses graphic organisers	No	No
Keeps students thinking for 2+ seconds before calling on a student to respond to complex questions	Yes	No
Gives independent/pairs/small-group practice in answering comprehension questions or applying comprehension strategy(ies) with expected product	Yes	Yes
Uses writing activities in response to reading	Yes	No
Based on your overall observations, rate the teachers' management/ responsiveness to students	Good	Fair
The teacher managed student behavior effectively to avoid disruptions and provide productive learning environments.	Good	Good
The teacher redirected discussion if a student response was leading the group off topic/focus	Good	Good
Student engagement during the first half of the observation session	Many engaged	Many engaged
Student engagement during the remainder of the observation session	Many engaged	Many engaged

Where both boxes are shaded blue, equal rating was given. The box shaded green represents examples of positive practice in the given area.

## Appendix 17- Main study teacher survey data

	Control 1	Control 2	Intervention 1	Intervention 2	Intervention 3
Professional Discussion	Daily (5)	Twice a week (4)	Monthly (2)	2-3 times a month (3)	Once or twice a week (4)
Respect and trust	Highly evident (5)	Evident (4)	Unable to comment (1)	Evident (4)	Highly evident (5)
Access to new ideas	Evident (4)	Evident (4)	Not evident (1)	Evident (4)	Evident (4)
Support in times of change	Evident (4)	Unable to comment (3)	Not evident (1)	Evident (4)	Evident (4)
Quality of CLPD	Evident (4)	Evident (4)	Slightly evident (2)	Evident (4)	Highly evident (5)
Support by leaders	Highly evident (5)	Unable to comment (3)	Slightly evident (2)	Evident (4)	Highly evident (5)
Self-Efficacy in teaching reading	Evident (4)	Evident (4)	Evident (4)	Evident (4)	Evident (4)
Self- efficacy in teaching	Highly evident (5)	Evident (4)	Evident (4)	Evident (4)	Evident (4)
Total years teaching	6	10	19	1	4
Total years teaching at this school	4	0	18	1	3

Appendix 18- Main study RCV observation teacher comparison

Observation feature	Control 1	Control 2	Intervention 1	Intervention 2	Intervention 3
Activating prior knowledge	Yes	No	Yes	Yes	No
Use of text features	No	No	Yes	Yes	No
Explicit comprehension instructions	Yes	Yes	No	No	Yes
Asking for justifications/elaborations	Yes	Yes	No	No	Yes
Teacher questions	Yes	Yes	Yes	Yes	Yes
Teacher elaborations	Yes	Yes	Yes	Yes	Yes
Vocabulary references	Yes	No	Yes	Yes	Yes
Grouping- 1 <sup>st</sup> 15 minutes 2 <sup>nd</sup> 15 minutes 3 <sup>rd</sup> 15 minutes	Whole class Pairs Whole class	Whole class Small groups Small groups	Small groups Small groups Small groups	Whole class Large group Large group	Small Groups Small Groups Small Groups
Text reading	Supported oral reading	Teacher reads aloud	Independent oral reading	Independent oral and silent reading	Independent oral and silent reading
Gave inaccurate and/or confusing explanations or feedback	No	No	No	No	No
Missed opportunity to correct or address error	No	No	No	No	No
Provided opportunities for most students to participate actively during teacher-led instruction	Yes	Yes	No	Yes	No
Paced instruction so that the length of the comprehension or vocabulary activities were appropriate for this age group	Yes	Yes	Yes	No	Yes
Teaches using outlining and note taking	No	No	No	No	No
Uses graphic organisers	No	No	No	No	No
Keeps students thinking for 2+ seconds before calling on a student to respond to complex questions	Yes	No	No	No	No
Gives independent/pairs/small-group practice in answering comprehension questions or applying comprehension strategy(ies) with expected product	Yes	Yes	No	No	Yes
Uses writing activities in response to reading	Yes	Yes	No	No	No
Based on your overall observations, rate the teachers' management/ responsiveness to students	Good	Very good	Partially effective	Partially effective	Good
The teacher managed student behavior effectively to avoid disruptions and provide productive learning environments.	Good	Good	Fair	Good	Good
The teacher redirected discussion if a student response was leading the group off topic/focus	Good	Good	Fair	Good	Good
Student engagement during the first half of the observation session	Many engaged	Most engaged	Few engaged	Good	Good
Student engagement during the remainder of the observation session	Many engaged	Most engaged	Few engaged	Many engaged	Many engaged

## Appendix 19 Main study fidelity observation data

	Intervention 1				Intervention 2				Intervention 3			
	Fidelity observation 1		Fidelity observation 2		Fidelity observation 1		Fidelity observation 2		Fidelity observation 1		Fidelity observation 2	
	Orally	Gestured	Orally	Gestured	Orally	Gestured	Orally	Gestured	Orally	Gestured	Orally	Gestured
Teacher Prompts												
<b>Prepare your mind</b>	0	No	1	No	6	Yes	12	Yes	6	Yes	4	Yes
<b>Visualise</b>	3	No	2	No	7	Yes	18	2	15	Yes	4	Yes
<b>Hear a voice reading aloud in your head</b>	0	N/A	1	N/A	7	Yes	0	N/A	2	Yes (created own gesture)	2	Yes (created own gesture)
<b>Re-phrase</b>	0	N/A	0	N/A	0	N/A	0	N/A	0	N/A	0	N/A
<b>Summarise as you go along</b>	0	No	1	No	0	No	8	Yes	6	No	6	Yes
<b>Hold your thoughts as you read</b>	0	N/A	0	N/A	0	N/A	4	N/A	0	N/A	0	N/A
<b>Question</b>	0	No	1	No	0	No	20	Yes	6	No	8	Yes
<b>If you still don't understand it.... Stop. Re-read</b>	0	N/A	0	N/A	0	N/A	8	N/A	0	N/A	0	N/A
<b>If you STILL don't understand</b>	2	No	0	N/A	0	N/A	0	No	0	N/A	0	N/A
<b>Link to wider experiences</b>	5	No	2	No	5	Yes	2	No	2	No	0	N/A
<b>Think about the crunch points</b>	0	N/A	0	N/A	0	N/A	0	N/A	0	N/A	0	N/A
<b>Wonder to yourself -</b>	1	No	0	N/A	3	Yes	0	N/A	0	N/A	0	N/A
Was a graphic organiser used?	No		Yes		Yes		No		Yes		Yes	
Direct-teaching of vocabulary	Yes 6 strategies		No		No		Yes 2 strategies		Yes 3 strategies		Yes 6 strategies	
Focused & quality discussion about the text	No		No		Yes		Yes		Yes		Yes	
Interesting and varied reading materials	Yes		Yes		Yes		yes		Yes		Yes	
Establish an engaging motivational context and reading opportunities	Yes		Yes		Yes		No		Yes		Yes	
Poster up	No		No		Yes		Yes		No		No	
Gestures up	No		No		Yes		Yes		Yes		Yes	
Use of vocabulary audit	No		No		No		No		No		Yes	

Appendix 20- Initial coding critical incident themes for qualitative data

Overarching Themes	Sub-themes
<b>Staff traits</b>	<ul style="list-style-type: none"> <li>• Personality</li> <li>• Open to new ideas</li> <li>• Commitment to teaching</li> <li>• efficacy</li> </ul>
<b>Pre-intervention readiness</b>	<ul style="list-style-type: none"> <li>• Commitment to intervention</li> <li>• Knowledge of SHORS</li> <li>• Quality CLPD</li> </ul>
<b>School ethos</b>	<ul style="list-style-type: none"> <li>• Peers support</li> <li>• Leadership support</li> <li>• Positive professional ethos (trust/respect)</li> </ul>
<b>Practicalities of implementation</b>	<ul style="list-style-type: none"> <li>• learning visible</li> <li>• Flexibility</li> <li>• Resources</li> </ul>

Appendix 21- Qualitative raw data related to critical incidents codes

Themes	Source of evidence	Raw Data	Subtheme	
Best practice teaching and learning	1a	“It is different to Blooms Taxonomy because it is more explicit in the use of strategies”	Learning visible (posters/ gestures etc. and more discussion in class) (Most easily done within supportive professional ethos)	
	1a	“Also the strategies for vocabulary were very useful, far better than just putting the word in a sentence”		
	1a	“It helped discussion skills for even a short piece of text children can understand it and talk about it with far greater depth”		
	1a	“The strategies helped the children to really develop higher order thinking instead of rushing through a task”		
	1a	“It developed skills in being very explicit and the language was about the use of strategies rather than resources”		
	4	Strategies were often referred to within a class at pre-intervention point, but not explicitly taught (pre-intervention)		
	5	The amount of references to strategy references increased throughout the intervention period		
	5	Children and teachers were using gestures to reinforce their use of strategies		
	5	Teachers explicitly taught strategies		
	5	Teachers created opportunities for children to practice their use of strategies.		
	1a	“I found myself asking questions that I wouldn’t otherwise have asked”		Not new but best teaching and learning best practice- (School ethos links)
	1a	“It helped discussion skills for even a short piece of text children can understand it and talk about it with far greater depth”		
1a	“The strategies helped the children to really develop higher order thinking instead of rushing through a task”			
6	“It really helped teachers think about what they were asking”			
1b	“Although it did put a new slant on things and perhaps made me more explicit when discussing strategies”			
1b	“I am now more aware of strategies and more able to give clearer instructions”			
1a	“It developed skills in being very explicit and the language was about the use of strategies rather than resources”			
1a	“It could be used across learning”	Not a resource, but a methodology		
1a	“The approach was different in that it was a methodology rather than something that was bought in”			
1a	“Not just another resource”			
1a	“Also the strategies for vocabulary were very useful, far better than just putting the word in a sentence”			
6	“It really helped teachers think about what they were asking”			
1a	“It developed skills in being very explicit and the language was about the use of strategies rather than resources”			
1a	“It could be used across learning”			
5	Teachers explicitly taught strategies			
5	Teachers created opportunities for children to practice their use of strategies.			

School Ethos  (School ethos supported the teaching and learning practices and influenced implementation criteria)	1a	“It was recognised when the children were working with classroom assistants that the children knew more about strategies that the CAs (classroom assistants) and so one of the “intervention” teachers did some training with the CAs”	Leadership support
	6 6 1a 1a 2 3	“Really confident that the strategies were really being taught and not just practiced” “It really helped teachers think about what they were asking” “It could be used across learning” “Having the support of the Head Teacher helped” Teachers felt supported when their HT also attended the training (see 7.3) Lesser fidelity intervention teachers who rated the school lower than other teachers when asked about: support by leaders within the school.	
	1a 1a 1a 6 6 2 3	“All the teachers have taken this on board and all are very positive” “It also links well with the chatty numbers approach” “It was recognised when the children were working with classroom assistants that the children knew more about strategies that the CAs (classroom assistants) and so one of the “intervention” teachers did some training with the CAs” “Really confident that the strategies were really being taught and not just practiced” “It really helped teachers think about what they were asking” Teachers appreciated the peer support offered to them when others were also taking part in the training (see 7.3) Lesser fidelity intervention teachers who rated the school lower than other teachers when asked about levels of respect and trust within the school	Positive professional ethos
Staff traits	1a 1a 1a 6 1b 1b 1b 1b	All high fidelity teachers stated they had learned lots from the project “I really enjoyed taking part” “I found myself asking questions that I wouldn’t otherwise have asked” “It really helped teachers think about what they were asking” “The literacy knowledge was not new to me” “I already knew what to do” “I would always have talked about things like visualising, but perhaps was not as direct in how I taught it. I use signs and gestures already, we have the “P” for punctuation, etc. and we use the “W” for wow words. They always get the opportunity to choose texts that they enjoy and want to read” “No, I did not learn much that was new- I am the literacy co-ordinator and already know plenty about literacy instruction”	Personality (Open to new ideas, readiness, commitment, efficacy) (School ethos and staff traits influence each other)
	1a 6 1b 3	“It really helped teachers think about what they were asking” “The literacy knowledge was not new to me” “No, I did not learn much that was new- I am the literacy co-ordinator and already know plenty about literacy instruction” Lesser fidelity intervention teachers who rated the school lower than other teachers when asked about access to new ideas within the school and support in times of change	
Practicalities of implementation	1a 1a 2	“12 Strategies can be too much and some could be joined together. There is overlap” “It could be used across learning” All readiness criteria were agreed by all intervention teachers	Flexibility (across CfE)
	1a 1b	“I really enjoyed taking part” “Good- Clearly explained approach and coaching was good	Enjoyable

	2 1	All readiness criteria were agreed by all intervention teachers All high fidelity teachers stated they had learned lots from the project	
	1a 1a 1a	“It developed skills in being very explicit and the language was about the use of strategies rather than resources” “12 Strategies can be too much and some could be joined together. There is overlap” “Good- Clearly explained approach”	Resources minimal (SHORS as a methodology)
	1a 1a 1a 1a 1b 2 5	“12 Strategies can be too much and some could be joined together. There is overlap” “I found the research and theory reassuring and it offered confidence in the use of the approach” “The training had the theory and also all teachers left with very practical ideas of how to put it into practice” “Good support given” “Good- Clearly explained approach and coaching was good and I knew where you were if I needed to ask you anything.” All readiness criteria were agreed by all intervention teachers Those with higher fidelity ensured all aspects of the readiness checklist were adhered to	Knowledge of SHORS (Teachers needed traits allowing them to be open to SHORS)
	1a 1a 1a 1a 1b 2 3	“I really enjoyed taking part” “I found the research and theory reassuring and it offered confidence in the use of the approach” “The training had the theory and also all teachers left with very practical ideas of how to put it into practice” “Quality training and good support given” “Good- Clearly explained approach and coaching was good and I knew where you were if I needed to ask you anything.” Teachers felt supported when their HT also attended the training Lesser fidelity intervention teachers rated the school lower than higher fidelity teachers when asked about the quality of CLPD generally provided	Quality CLPD (Teachers needed empowered to engage in CLPD)
Pupil Empowerment (integrated into school ethos)	1a 1a 1a 6 1a 1a 1a 1b	“Children throughout the school were better at articulating” “This is what they imagine throughout their learning” “Primary 1s were confident in talking about visualising for non-picture books” “It enabled children to really get in a text where they had never had the opportunities to do that before” “It built their resilience by giving children a bank of strategies to help them understand” “They (children) enjoyed hearing about the different strategies and children liked using the symbols which helped them to reinforce their understanding” “It was recognised when the children were working with classroom assistants that the children knew more about strategies that the CAs (classroom assistants) and so one of the “intervention” teachers did some training with the CAs” “Empowering for children”	New bank of strategies for children (enjoyment allows empowerment and vice versa)
	1a 1a 1a 6 1a 1a	“It was very child friendly” “Children throughout the school were better at articulating” “This is what they imagine throughout their learning” “Primary 1s were confident in talking about visualising for non-picture books” “It enabled children to really get in a text where they had never had the opportunities to do that before” “It built their resilience by giving children a bank of strategies to help them understand”	Engagement



	1a	“They (children) enjoyed hearing about the different strategies and children liked using the symbols which helped them to reinforce their understanding”	
	1a	“It was recognised when the children were working with classroom assistants that the children knew more about strategies that the CAs (classroom assistants) and so one of the “intervention” teachers did some training with the CAs”	
	1a	“The discussion is far more pupil led”	
	1b	“Empowering for children”	
	1b	“It was a good opportunity for the children to be researchers”	
	1a	“It was recognised when the children were working with classroom assistants that the children knew more about strategies that the CAs (classroom assistants) and so one of the “intervention” teachers did some training with the CAs”	Upskilling CAs
	1a	“It was very child friendly”	Pupil choice
	1a	“This is what they imagine throughout their learning”	
	6	“It enabled children to really get in a text where they had never had the opportunities to do that before”	
	1a	“The discussion is far more pupil led”	
	1b	“Empowering for children”	
	1b	“It was a good opportunity for the children to be researchers”	Being researchers

1=interview (1a high fidelity teachers and 1b lower fidelity teacher)

2=Readiness checklist (and confirmation of readiness components thereafter)

3= Teacher survey

4=RCV

5=Fidelity observation/ES

6- HT spontaneous discussions