USING STORIES TO FACILITATE THE DEVELOPMENT OF METACOGNITIVE AWARENESS AMONG YOUNG LEARNERS IN THE INTERMEDIATE PHASE

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DECLARATION

By submitting this dissertation electronically, I declare that the entirety of the work contained therein is my own, original work, that I am the authorship owner thereof (unless to the extent explicitly otherwise stated), and that reproduction on publication thereof by Stellenbosch University will not infringe any third party rights and that I have not previously in its entirety or in part submitted it for obtaining any qualification.

Date: December 2015

My PhD journey

It was a long and difficult beginning

With my extremely wide field of interests

Previous supervisors who abandoned their posts

And two baby blessings unexpectedly arriving after years of prayer

It was the workload and hundreds of students in my class

Nappies and bottles and helping “Ouboet” prepare for school exams

The impulsive decision to resign, write a book and qualify as life coach

Then a passion for learner support became a full-time research project

It was being supermom, every day preparing healthy meals for a family of five

Tooth fairy responsibilities, hockey team driver, school concert make-up artist

Checking homework, piano practice squabbles and helping with school assignments

Yet slowly but surely the research took form, chapters emerged and data were collected

It was the challenge of supporting a loving husband through retrenchment

The diagnosis of our teenager with TS, losing time when my computer was stolen

Starting a demanding new job, and supporting my mother and friend battling cancer

So the writing of final chapters took slightly longer, struggling to keep all the balls afloat

It was a bit like doing a puzzle, difficult to first get all the corner and side pieces in place

Then slowly a picture surfaces, excitement grows, and you seek, connect and deduce

Sometimes you get a lot of pieces at once and the joy of discovery (writing) makes it all worth it

And other times you struggle, pieces scattering to the ground and you dig deep to start again

It was the best of times, it was the worst of times, it was my unique PhD journey

The cost was very high, too busy to read a bedtime story, cancelling a coffee date with hubby

But the journey also took me to places – physical, emotional and cognitive – that enriched my life

And now that this puzzle is complete, I am looking forward to reinvesting the fruits of my journey

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John-James, Benko and Miekemari, who inspire and elevate me to supermom status.

To God be the glory!

ABSTRACT

A fundamental goal of education is to promote the development of self-regulated learning. Although the importance of metacognition has been established by various researchers, metacognitive knowledge and strategies are seldom explicated in schools, and especially in the early years of education. This design-based research study presents the findings of an intervention aimed at developing metacognitive awareness among early Intermediate Phase learners. Self-reflection, the language of thinking and metacomprehension strategy use in the content areas were modelled using storytelling.

The aim of the intervention was twofold: Firstly, at the design level, the main objective was to develop and refine a learner-centred intervention in the form of a series of stories engaging learners in learning about and reflecting on themselves as learners and how they learn. Secondly, at the practice level, the main aim was to assess the feasibility and influence of the intervention on learner self-knowledge, metacognitive strategy awareness and comprehension performance. The research was conducted among two intact Grade 4 class groups, along with their teachers from two public schools that differed in terms of socio-economic context. The study comprised iterative cycles of design, implementation, analysis and review. A case study research methodology was employed and a pragmatic paradigm supported the use of a mixed-methods, non-experimental design. During the second iteration pre- and post-intervention data gained from metacognitive strategy awareness questionnaires, focus group interviews, self-reflective tasks and reading comprehension tests, were compared.

The primary contribution of this research study is the set of design principles accompanying the conceptualised intervention, providing insight into the function and key characteristics of the story-based intervention, as well as the procedural conditions guiding implementation. The results obtained were encouraging, with most learners showing a marked improvement in terms of metacognitive awareness on most measuring instruments. The questionnaire testing learners’ knowledge of metacomprehension strategies, for instance, revealed an improvement after the intervention of between 41 and 94%. The data gathered by means of the qualitative measures, however, indicated that the learners in both groups particularly struggled to

verbalise their thoughts. Even after the intervention, only a slight improvement in terms of frequency of metacognitive elements mentioned was noticed, although the variety increased. In the school that serves a very poor community, low literacy rates had a significant impact on both data collection and the outcome of the intervention. The results clearly show a correlation between reading ability and overall scholastic performance. Those learners struggling with reading comprehension also seem to struggle to develop effective metacognitive learning strategies such as self-questioning, summarising and applying fix-up strategies.

From the study it is clear that the story-based intervention is a feasible and effective learning tool to develop metacognitive awareness, within the context described in the present study. Strengths and limitations are discussed, and future prospects that could result from the study are considered.

OPSOMMING

ŉ Grondliggende doelwit van onderwys is die bevordering van die ontwikkeling van selfgereguleerde leer. Alhoewel die belangrikheid van metakognisie deur verskeie navorsers bevestig is, word metakognitiewe kennis en strategieë selde eksplisiet in skole ontwikkel, veral in die vroeë onderrigjare. Hierdie ontwerpgebaseerde navorsingstudie bied die bevindinge van ŉ intervensie gemik op die ontwikkeling van metakognitiewe bewustheid onder leerders in die vroeë Intermediêre Fase. Selfbesinning, die taal van denke en die gebruik van metabegripstrategieë in die inhoudsareas is aan die hand van storievertelling gemoduleer.

Die doel van die intervensie was tweeledig: Eerstens, op ontwerpvlak, was die hoofdoel om ŉ leerdergesentreerde intervensie in die vorm ŉ reeks stories te ontwikkel en te verfyn. Hierdie stories moedig leerders aan om meer te leer van hulself as leerders asook van die manier waarop hulle leer, en om daaroor te besin. Tweedens, op die praktiese vlak, was die hoofdoel om die uitvoerbaarheid en invloed van die intervensie op leerders se selfkennis, bewustheid van metakognitiewe strategieë en begripsprestasie te assesseer. Die navorsing is uitgevoer onder twee volledige graad 4-klasgroepe en hul onderwysers van twee publieke skole wat met betrekking tot sosio-ekonomiese konteks verskil. Die studie het bestaan uit iteratiewe siklusse van ontwerp, implementering, ontleding en evaluering. ŉ Gevallestudie-navorsingsmetodologie is ingespan en ŉ pragmatiese paradigma het die gebruik van 'n nie-eksperimentele ontwerp, met sowel kwalitatiewe as kwantitatiewe metodes ondersteun. Gedurende die tweede siklus is die data wat voor en na die intervensie met behulp van vraelyste oor bewustheid van metakognitiewe strategieë, fokusgroeponderhoude, selfbesinningstake en leesbegripstoetse ingesamel is, vergelyk.

Die vernaamste bydrae van hierdie studie is die stel ontwerpbeginsels wat met die gekonseptualiseerde intervensie gepaard gaan, wat insig bied in die funksie en hoofeienskappe van die storiegebaseerde intervensie, asook die prosedurele toestande wat implementering rig. Die resultate van die studie is baie bemoedigend, aangesien die meeste leerders ŉ duidelike verbetering met betrekking tot metakognitiewe bewustheid aan die hand van die meerderheid meetinstrumente getoon het. Die vraelys wat die leerders se kennis van

metabegripstrategieë toets, het byvoorbeeld ŉ verbetering van tussen 41 en 94% ná die intervensie getoon. Die data wat met behulp van die kwalitatiewe metodes gegenereer is, het egter getoon dat die leerders in albei groepe veral gesukkel het om hul gedagtes te verbaliseer. Selfs ná die intervensie is slegs ŉ geringe verbetering met betrekking tot frekwensie van die betrokke metakognitiewe elemente opgemerk, alhoewel die verskeidenheid toegeneem het. In die skool wat ŉ behoeftige gemeenskap bedien, het lae geletterdheidsvlakke ŉ aanmerklike impak op sowel data-insameling as die uitkoms van die intervensie gehad. Die resultate toon ŉ duidelike korrelasie tussen leesvermoë en algehele akademiese prestasie. Die leerders wat met leesbegrip sukkel, blyk ook te sukkel om doeltreffende metakognitiewe leerstrategieë soos selfondervraging, opsomming en toepassing van herstelstrategieë te ontwikkel.

Op grond van die studie is dit duidelik dat die storiegebaseerde intervensie ŉ uitvoerbare en doeltreffende instrument is om metakognitiewe bewustheid, in die konteks wat in die studie beskryf is, te ontwikkel. Die sterk punte en beperkinge van die studie word bespreek, asook toekomstige ondersoeke wat uit die studie kan spruit.

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CHAPTER 1
INTRODUCING THE STUDY

"Unless you know everything, what you need is thinking"

– Edward de Bono (Maclure & Davies, 1991, p. xii)

1.1 INTRODUCTION

In view of a constantly changing technological world where it is not only impossible for individuals to acquire all existing knowledge, but it is also difficult to envisage which knowledge will be essential for the future, the need for developing metacognition is particularly urgent (De A'Echevarria, 2010; Georghiades, 2004; Green, 2014). Hoffman (2003) maintains that employability in future requires the ability to deal effectively with change, to keep learning new things and *know how to learn*, and to *think* independently. Donovan, Bransford and Pellegrino (1999) advocate helping learners develop the intellectual tools and learning strategies needed "to acquire the knowledge that allows people to think productively and can assist them in becoming self-sustaining, lifelong learners" (p. 5). A fundamental goal of education today, more than ever, is therefore to promote the development of self-regulated learning. Metacognition, our ability to think about our thinking and how we learn, plays a central role in self-regulation (Boekaerts & Corno, 2005; Fisher, 2007; Sha, 2008; Topçu & Yilmaz-Tüzün, 2009). "One of the basic skills for success in the knowledge society is the ability to learn" and the development of the core competence of 'learning to learn' needs to be prioritised (Hoskins & Fredriksson, 2008, p. 5).

As a child I remember my father, an educationist by profession, telling me that learning and studying is supposed to be fun. Preparing for a test or doing a science project truly was fun for me as a young learner and as I progressed through school and later into tertiary education, I became even more proficient in the 'act of learning'. I am not highly intelligent and I had to work very hard to achieve good grades, but even as a young child I was strategic in terms of the way in which I interacted with learning material. I liked to learn and I knew *how* to learn, I utilised strategies to best recall what I read and I developed a habit of continuously reflecting on my level of comprehension. After a test, I was usually correct in predicting how well I would do. What I did not realise at the time was that I was highly metacognitive in my learning. I simply did what came naturally to me and with practice I became even better at it. What I also did not realise was that my experience was not the norm.

Many years later, as a university lecturer, I realised that most of my students lacked the ability to effectively learn from text. Typically, I would start every semester spending a few hours first teaching them some basic learning strategies and the principles of self-knowledge and reflection, in an attempt to help them master the content I would cover in the weeks to follow. I recall an upset senior student asking me one day: "Why did no one teach us this in school? Learning could have been so much more enjoyable". We all love doing what we are good at. Doing schoolwork, studying for tests and preparing a project is often no fun for children (or adults) and when the feedback we get is negative, we start believing that we are not good at 'being a learner'. Often it is not because of lack of cognitive ability (intelligence), but simply because we lack the know-how. Metacognition helps people "make the most of their mental resources" (Fisher, 1998, p. 2). After many years of working with learners at different levels of the education spectrum and particularly because of my experience with trying to help my eldest through primary school, my interest in the field of 'learning to learn' grew. I became convinced that the development of metacognition does not happen for many people if not explicitly modelled and taught, and that early intervention is critical, before ineffective habits and beliefs about themselves as learners are formed.

This chapter serves as an introduction to the concept of developing metacognition in young learners.[1] A brief background to the study and its rationale follows. The chapter also describes the aim of the study and its theoretical framework and provides an overview of the research methodology employed. In conclusion, it outlines the general structure of the thesis.

[1] Throughout the thesis 'young learners' refers to primary school learners in the Intermediate Phase (Grade 4–6).

1.2 BACKGROUND

Being aware of our thinking as we perform a specific task and then using this awareness to actively control and self-regulate what we are doing are commonly known as metacognition. Metacognition is a multifaceted concept and comprises knowledge (including beliefs), processes and strategies that appraise, monitor or control cognition (Veenman, Van Hout-Wolters, & Afflerbach, 2006; Wells, 2000). This metacognitive ability of learners to be aware of and monitor their learning processes, although related, differs from cognition (Fisher, 2008; Veenman et al., 2006). Cognition is “needed to perform a task, whereas metacognition is necessary to understand *how* it was performed” (Schraw, 1998, p. 113). Fisher (2008) explains the difference as follows: “Metacognition is not thinking *about*, but thinking *above* (above cognition), and becoming consciously aware of how one thinks and learns” (p. 628). Although there are many definitions and models of metacognition, an important distinction is made between metacognitive knowledge and metacognitive regulation (skills) (Jacobs & Paris, 1987; Sheppard & Kanevsky, 1999). This differentiation between knowledge of and control over cognitive processes “has proved to be a useful one for education in that understanding and knowing are readily distinguished from taking the actions of regulating and controlling” (Dimmitt & McCormick, 2012, p. 158).

According to the early, seminal researchers in the field of metacognition (Brown, 1987; Flavell, 1979), metacognitive knowledge (or awareness) consists of three variables: person (the self), task and strategy variables. Jacobs and Paris (1987) refer to the three types of metacognitive knowledge as declarative, procedural and conditional knowledge. Declarative metacognitive knowledge is knowledge that learners have about their abilities and the factors that affect their learning, while procedural knowledge is being aware of how to execute plans of action, such as learning strategies. Conditional metacognitive knowledge is “knowing when and why to use procedures or strategies” (Dimmitt & McCormick, 2012, p. 159). On the other hand, activities such as *planning* how to approach a given learning task, *monitoring* comprehension and *evaluating* progress towards the completion of a task are metacognitive skills (Jacobs & Paris, 1987) and characteristic of the self-regulated learning process.

Research suggests that the two components of metacognition, namely knowledge of cognition and regulation of cognition, are related (Sperling, Howard, Staley & DuBois, 2004).

Baker's (1989) work proposes the possibility that knowledge of cognition is a prerequisite to regulation of cognition, while Schraw and Dennison (1994) provided evidence to suggest that knowledge of cognition may precede regulation of cognition. It is reported that "knowledge of cognition was a better predictor of performance on a reading comprehension test than was regulation of cognition" (Schraw & Dennison, 1994, p. 465). In further research, Schraw (1998) found that those scoring lower on the knowledge measure were also less able to accurately monitor their performance, while the opposite was true for high monitors. These and other studies (Annevirta & Vauras, 2006; Armbruster, 1983; Lodico, Ghatala, Levin, Pressley & Bell, 1983; Sheppard & Kanevsky, 1999) lend support to my decision to concentrate on the knowledge component of metacognition in this study. A basic premise of my study is that children must first become aware of their own characteristics as learners, as well as the text structures and task demands, before they can strategically control the learning process.

As I started on this research journey to find a way to help others develop metacognitively and test my own assumptions, I realised that research supported my convictions mentioned earlier (see Section 1.1). Metacognition can be developed and the possible benefits to learner performance are well documented (Armbruster, 1983; Dimmitt & McCormick, 2012; Thiede, Anderson & Therriault, 2003; Wall & Hall, 2007; Watkins, 2001). The problem is, however, that not all people develop metacognitive awareness 'spontaneously' and for many the development of metacognition is delayed (Baker, 2008; Mahdavi, 2014; Veenman et al., 2006). Not all people become what Ertmer and Newby (1996, p. 1) call "expert learners". Experts do not only know more, but their knowledge is better organised and integrated, and they have better strategies and methods for accessing their knowledge, using it, applying it and integrating it. Moreover, experts, as described by Berliner (1994), are more aware of themselves as learners; their learning is "reflected upon more than is the learning in which others engage" (p. 162). Ertmer and Newby (1996) further suggest that "learner expertise depends on more than just knowing facts and procedures" (p. 8). It is the monitoring and self-regulatory skills that enable experts to know not only *what* is important (declarative knowledge) but also *how* (procedural knowledge), *when, where* and *why* (conditional knowledge) to apply the appropriate knowledge and action (Schraw, 1998). Expert learners are *strategic* and they use the metacognitive knowledge they have gained to deliberately control the learning process. Most importantly, however, is that this expertise (metacognitive skilfulness) can be taught (Nietfeld & Shraw, 2002; Thiede et al., 2003). Significant to note is that research has shown that learners with cognitive impairments and behaviour disorders, who almost always lack metacognitive skills, benefit even more than the average learner with explicit instruction in metacognition (Younger & Warrington, 2005).

A further opinion I expressed earlier was that of early intervention. Meltzer (2010) comments that even in early primary grades, teachers expect of learners to complete assignments and learning tasks that necessitate executive functions. There has been an ongoing debate about the most appropriate age to expose learners to metacognitive training (Dimmitt & McCormick, 2012). Dufresne and Kobasigawa (as cited in Perfect & Schwartz, 2002) found, for instance, that young learners particularly struggle with monitoring even after extensive training and older learners choose to restudy the more difficult items, whereas younger learners appear to randomly select items for restudy. Metacognition develops with age. Fisher (2007) explains that older children are more successful learners, partly because "they have internalised a greater quantity of metacognitive information"; however, metacognitive development relates not just to age, but also to experience (p. 620). He encourages teachers to help even young children to develop some of the metacognitive strategies that underpin successful learning (Fisher, 2007). Claxton (2004) states that even the very young can demonstrate conscious reflection on the learning process. Apart from the fact that research clearly shows that even young learners are capable of developing and expressing metacognitive capabilities (Dimmitt & McCormick, 2012; Fisher, 2007), I am convinced that the reason why metacognitive training should be done intentionally and as early as possible also relates to motivation to learn.

Part of motivation to learn is the concept of self-efficacy, and research has shown its significant influence on self-regulation (Zimmerman & Schunk, 2008). Self-efficacy refers to the expectations that people hold about their abilities to accomplish certain tasks (Sha, 2008). Bandura (1997, 2001) has argued that whether or not people will undertake particular (learning) actions in the environment, attempt to perform particular tasks, or strive to meet specific goals depends on whether or not they believe they will be efficacious in performing these actions under the given circumstances. Self-efficacy beliefs are conceptualised as "highly specific control-related beliefs that concern one's ability to produce a particular outcome at a particular time" (Linnenbrink & Pintrich, 2003, p. 119). The stronger one's perceived self-efficacy, the more one will exert effort and persist at a task, and this in turn will lead to more practice and better learning outcomes (Sha, 2008). Overwhelming evidence shows self-efficacy to be the most important predictor of academic performance (Linnenbrink & Pintrich, 2003). Relating it to the concept of childhood socialisation, Bandura (1997, 2001) believes that early experiences with success and failure lead people to develop fairly stable conceptions of their self-efficacy in different domains. This has profound relevance to the motivation behind why this particular research study focused on primary school learners. What if young learners can be equipped with metacognitive knowledge and skills that would lead to better experiences with learning early on in life, before ineffective learning strategies become habitual and destructive belief systems become stable?

The importance of the self-system and the idea that it provides the necessary motivation and affective states to foster a learner's progress towards self-regulation is clear (Zimmerman, 2008), but it is the metacognitive system that oversees the "means to reach that goal" (Hofer & Pintrich, 1997, p. 89). In order for the metacognitive system to work properly, learners must have adequate information about both strategy knowledge and metacognitive activity. Hence, positive attributions or high motivation (self-efficacy) to succeed would be of little use to an individual who does not have the necessary accompanying strategic knowledge and metacognitive skills. However, in the presence of strategic knowledge and metacognitive skills, motivation and affective states are very advantageous in promoting progress towards self-regulated and ultimately more effective learners (Elliott, 1993). Self-awareness and epistemological beliefs, as an important part of metacognitive knowledge (see Section 2.5), are often not included in traditional study skills training focusing only on strategies, mostly to maximise memory (McGuire, 2004). Perhaps this is why rote memorising is still the usual learning strategy and often the only strategy (Nist, 1993) employed by learners at all levels of the education system, even those exposed to some form of study skills training (Woolfolk, 2013). Rote learning is "verbatim memorisation" and is not necessarily accompanied by any understanding of the text, while "meaningful learning", on the other hand, is learning that is tied to previous knowledge, and it is understood well enough to be manipulated, paraphrased and applied to novel situations (McGuire, 2004, p. 3). The present study highlights the importance of the meaning-making process in reading to learn.

From a developmental perspective, Dimmitt and McCormick (2012) state that understanding and awareness (i.e. metacognitive knowledge) precedes metacognitive skills (control of metacognitive processes). According to Carr and Biddlecomb (1998) school-aged children's metacognitive knowledge grows through the development of a strong conceptual knowledge base and domain-specific strategies that over time result in the accommodation of schemes at higher levels of abstraction. Through reflecting on one's own learning and on the learning of others, metacognitive knowledge becomes a comprehensive theory around the age of nine and ten years (Berk, 1997; Veenman, 2015). In addition, metacognitive knowledge was found to expand using efficient metacognitive skills and these metacognitive skills were found to be maturing until adolescence (Carr, Alexander & Folds-Bennett, 1994; Dimmitt & McCormick, 2012; Veenman, 2015). In the South African school system, learners are exposed to formal examinations for the first time at the age of nine to ten (Grade 4). Why not teach a more effective way of studying, creative thinking and useful learning strategies from the very beginning in a simplistic manner?

1.3 RATIONALE FOR THE STUDY

Various factors might influence a child's cognitive development and belief system, and these include parental, societal and school influences. These sources of influence might have an effect on a learner's self-confidence, motivation for success and *how* he[2] learns, both explicitly and implicitly. In relating my own experience of being a metacognitive learner, I alluded to the possible impact of a parent. Explicit modelling of strategic thinking in everyday life, but also when faced with a specific (learning) task, most possibly had an impact on my own metacognitive development. However, it is in the classroom where young learners first get the opportunity to actively engage with learning material and I cannot recall any teacher at school ever demonstrating to us as young learners *how* to learn and *why* a certain learning strategy would work better than another. Unfortunately, Georghiades (2004) and Woolfolk (2013) confirm that the notion of metacognition is largely unknown to the average teacher, learner and parent. Those teachers who happen to be familiar with the importance of metacognition frequently do not know how to develop metacognition, and Lovette (2008) states that often attempts to teach metacognition are ineffective. Learners are taught abstract

[2] Throughout this thesis, I made use of masculine pronouns such as "he", "him" and "his" when discussing 'the general learner' for ease of reading. These masculine terms denote both the masculine and feminine, unless specified by contextual clues.

study skills (strategies), but they struggle to then apply (transfer) them, and attitudes and beliefs are difficult to change (Veenman, 2015).

Georghiades (2004) further maintains that “the state of the literature on metacognition indicates a theory–practice gap emerging, comprising extensive academic elaboration on the mechanisms of metacognitive thinking and rare attempts to bring this inside ordinary classrooms” (p. 379). Many are campaigning for research on the use and training of metacognition in ‘natural settings’ as an important step forward (Veenman et al., 2006). By using a design-based research (DBR) approach, the present study addresses this need to consider the ‘authentic’ context of learning. The research specifically draws attention to the enormous challenge of equipping learners with the knowledge and ability to learn purposefully and think consciously about the process of learning, given the socio-economic circumstances of many learners in South-African schools. Veenman et al. (2006) urge researchers to take individual conditions of learners and contextual factors into account when deciding upon what to train and how to instruct metacognition. We know from research that the vast majority of learners “pick up metacognitive knowledge and skills to a certain extent from their parents, their peers, and especially their teachers” (Veenman et al., 2006, p. 9). But what if the learning context is lacking in the positive support structures (parent modelling and teacher prompting) that would normally facilitate metacognitive development? Perhaps we need a type of intervention that does not depend so heavily on more knowledgeable adult intervention? If young learners could be exposed to examples (modelling) in the form of stories (as a learning tool) about learners like themselves that learn about how to learn, subscribe to more sophisticated epistemological beliefs about the nature of knowledge and understand the power of self-knowledge, they just might circumvent the fate of most children without quality educational support.

Relative little research has been done and published on the topic of metacognition in the South African context and the urgent need for research has been expressed by numerous authors (Department of Education, 1999; Green, 1997, 2014; Howie et al., 2008; Klopper, 2012). Most local research focuses on teacher training (Borman, 2005; Pieterse, 2014), while Van der Walt and her colleagues (Van der Walt, Maree & Ellis, 2006) have contributed to the field of metacognition in mathematics and Butterfield (2012) investigated metacognitive procedure in Natural Science teaching. Recently, Klopper (2012) conducted a study on developing reading comprehension strategies at high school level (Senior Phase) and she advocates the explicit instruction of reading comprehension strategies as a key factor in creating independent readers. Apart from these and a few other recent studies such as those by Moonsamy (2014) and Cockcroft (2014) on the impact of metacognition instruction on reading comprehension, the development of metacognitive awareness in the content areas and among Intermediate Phase (primary school, Grade 4) learners has not been investigated in the South African context as far as can be established. This specific type of intervention – metacognitive modelling and strategy awareness training in the content areas by means of telling stories with the learning process as theme – is a novel concept and requires empirical investigation. Previously, an encouraging local project, “Stories for Thinking”, supported by the Department of Education, had as its aim the investigation of a range of strategies primary school teachers could use to develop cognitive abilities (Borman, 2005). The learning material was developed using Philosophy for Children (P4C) (Lipman, 1993) as a model and stories with activities were designed to encourage learners to think critically, creatively and caringly. This project had a much broader focus than the present study, although many theoretical principles compare positively (see Section 3.8.1.2).

In a quest for equality in education and helping all children to realise their potential, the present study aimed at proposing a learning tool that could be practically used by learners that, as mentioned earlier, might not have all the educational and social support necessary to grow their learner expertise. Apart from taking cognisance of the socio-economic context of the learning environment and its impact on the development of metacognition (see Section 3.6), the study was also conducted in the participating learners’ home language, namely Afrikaans, as supported by Coetzee (2008): “As early as 1953 UNESCO reported that the best medium for teaching a child is through his/her mother tongue” (p. 17). In a local study on reading and comprehension skills, Coetzee (2008) found that learners should be equipped with strategies in their home language first for these skills to be effective in attaining the ‘other’ language. She also mentions that “learners need to be aware of the fact that they carry knowledge in their own language that can and should be used to learn” (in an additional language) (Coetzee, 2008, p. ii). South Africa has 11 official languages, but the predominant language of learning and teaching is English (O’Connor & Geiger, 2009). The present study was, however, conducted in the Western Cape, where a large percentage of people speak

Afrikaans. In my investigation on the development of metacognition, I have found that there exists a lack of learning support material for learners with Afrikaans as home language. The feasibility of an inexpensive resource, not dependent on highly trained facilitators, namely a story about themselves as learners at their level of development and in their home language, was therefore tested in this research study.

As the need for metacognitive thinkers accelerates with the information explosion, the possible contribution of the present study is very relevant. The profound impact that metacognitive skilfulness can have on the improvement of learning (particularly in the long term) (Dimmitt & McCormick, 2012) is largely unfamiliar to learners and learning facilitators in South Africa and the school curriculum does not include the explicit facilitation of metacognitive awareness and strategies (Van der Walt et al., 2006). Van der Walt and her colleagues recommend that urgent attention be given to the implementation of metacognition at all levels of education. This study is important because of its potential impact on learners, as it bridges the divide between academic research and classroom reality (see discussion on DBR in Section 4.3), and because it promotes equality in education. Lena Green from "Thinking Schools South Africa" (TSSA) claims that sustainable transformation starts with the development of thinking and metacognitive skills (Green, 2014).

1.4 PROBLEM STATEMENT

The problem is that most children do not instinctively know *how* to learn. In school they are told explicitly *what* to learn, but the how and why of learning are seldom explained. Children go home after being given a study assignment and then have to figure out the 'how to' for themselves. It results in a random process of trial and error, which might or might not result in appropriate study habits and skills development. Usually, youngsters will simply read and reread a piece of work until they think they will remember most of the content, or a parent/caregiver will sit with a child and try to drill information into him. When the amount of study material is still minimal and simplistic enough, most appear to be successful using this method. Some children are naturally good at memorising vast amounts of content, and they will be perceived as intelligent achievers. Unfortunately, a habit of rote learning and simply memorising facts without any deep processing is established early on (Woolfolk, 2013). Many would underperform later, as the work becomes progressively more complex, particularly when they reach tertiary level, because they have never been explicitly taught to think about their own thinking and to understand their own learning process (Anderson & Walker, 1991; Biggs, 1987; Birenbaum, 1996; Moonsamy, 2014). Dimmitt and McCormick (2012) contend that "metacognitive strategies require a level of consciousness not just about *what* is being learned but also about *how* it is being learned and an awareness of having learned it" (p. 157).

Reading text is a primary means by which people learn new information. This type of reading involves a number of complex activities such as understanding and remembering task demands, identifying and selectively attending to important information, monitoring comprehension and taking corrective action when necessary (Baker & Brown, 1984; Thiede et al., 2003). These activities all involve metacognition. The need to make meaning out of content through the regulation of cognition increases as learners progress through the grades and the knowledge overload, because of technological advancement, provides added urgency to become self-regulated learners. As learners turn to the internet or other forms of technology for information, they struggle because the information is not pre-organised by experts and learners are not systematically and explicitly taught learning strategies. The challenge is therefore to transform readers into active processors of text.

The younger and less proficient readers tend to focus on reading as a decoding process rather than as a meaning-making process (Baker, 2008; Singhal, 2001). Research shows that explicitly teaching metacognitive strategies in content subjects improves learning (El-Hindi, 1997; Thiede et al., 2003), but research also shows that learning how to learn the content (comprehension of expository text) is seldom made clear (Williams et al., 2005). Some teachers may assume that reading comprehension will develop naturally without any direct teaching of comprehension (Denton & Fletcher, 2003) or that metacomprehension strategy training only belongs in language class. "Expository text is particularly challenging because its content is usually unfamiliar; the ideas expressed often represent complex abstract logical relationships instead of the simple sequence of familiar events represented by most narrative text" (Williams et al., 2005, p. 538). Bernhardt, Destino, Kamil and Rodriguez-Munoz (1995) warned that without proper attention to expository text in the early grades, learners remain unprepared for the comprehension demands that await them.

South Africa has a serious education challenge (Howie et al., 2008). In their study on reading comprehension in high-poverty schools, Pretorius and Lephalala (2011) refer to the disheartening results of the Progress in International Reading Literacy Study (PIRLS 2006). Of the 40 participating countries, South Africa came last. In the present study I propose that explicit metacognitive awareness and strategy training have the potential to profoundly improve the discouraging statistics. I would argue for an innovative approach to the above problem statement. As was explained previously, metacognition is primarily developed through explicit instruction and modelling, and if neither of these is intentionally presented to a learner, metacognitive ability could be delayed. The explicit development of metacognitive awareness is essential, but how can this best be done given the challenging and diverse educational environment in many South African schools? What if parents and peers are unable to model positive learning habits or the teacher lacks the necessary metacognitive awareness and approach to teaching?

Metacognition is not new to the field of education. In a review of literature more than a decade ago, Wang, Haertel and Walberg (as cited in Veenman, 2015) concluded that "metacognition is one of the most important factors in the learning process, more important than intelligence, socio-economic status, and study motivation" (p. 10). Over the years many scholarly books and articles were published on the topic of metacognition, and there are even now an international journal and institute specifically dedicated to bring knowledge on metacognition into the public domain (Veenman, 2015).

Van der Walt et al. (2006), however, maintain that metacognition is not explicated in the South African curriculum. Much research has been done on ways to develop metacognition, but why is metacognition not given the pedagogical importance in practice? Moonsamy (2014) mentions that "interest in cognitive and metacognitive instruction has been a feature of the education and psychology literature since the early 1970s", and although research findings "strongly suggest that this is a promising direction, these ideas have not found their way into general education practice, internationally or locally" (p. 50). Explicit teaching of thinking and metacognition is not practised in most classrooms. Moonsamy (2014) contemplates some of the possible reasons for this, stating that "South Africa's historical past with many inequities continue to exist despite the current programmes for redress". The classrooms in South African public schools are generally small and often overcrowded, with the “student-teacher ratio often allowing neither individual student attention nor in-depth verbal discussions” (p. 59).

Another challenge is the time constraints that teachers are faced with. They have to work through an extensive curriculum and they have numerous other responsibilities on their calendars. Even those teachers who are aware of the need to teach metacognitively often perceive metacognitive awareness training as an ‘add-on’, as being time-consuming and as requiring considerable effort. Some teachers, on the other hand, express negative attitudes to cognitive education, assuming that learners already “know how to think” (Moonsamy, 2014, p. 59). Van Tonder (2013) notes the challenges of multiple, complex and constantly changing curriculum demands, lack of training and mentoring resources and lack of support in administrative duties as additional factors that contribute to the present excessive workload of most teachers in South African public schools. Veenman, Kok and Kuilenburg (2001) interviewed teachers on how they applied metacognition in their lessons and, although most expressed a willingness to invest effort in the instruction of metacognition, they said they did not know how to – they needed the ‘tools’ for implementing metacognition.

What if a training tool can be created that is readily available, practical and inexpensive and that does not require a highly trained educationist to facilitate? What if learners at a young age, before bad habits and negative academic self-concepts develop, can learn how to verbalise their thoughts and be made aware of more effective ways to employ their mental resources to establish fertile ground for healthy learning habits as academic challenges increase with age? “One way of teaching metacognition is to make explicit and infuse the language of thinking” (Fisher, 1998, p. 9) and learning into an activity that most children love – a story. The aim is to model the vocabulary, strategy use and self-knowledge we want children to draw on in their thinking and understanding of learning by explicitly incorporating it in the text of an entertaining ‘story’ they can read and reflect on in or outside class. Haynes (1997) says: “How can one be metacognitively aware or reflective without a language to think about oneself?” (p. 6). Metacognition is a mental process and notoriously difficult to assess, even with adults. Assessing a young child’s level of metacognitive knowledge and strategy use is extremely challenging, particularly because they struggle to express themselves adequately (Pintrich, Wolters & Baxter, 2000). The type of intervention proposed in this study has the potential to help children verbalise their thought processes, increase awareness and also make it easier to assess development. Better assessment paves the way for better development.

1.5 RESEARCH QUESTIONS

In response to the above stated perspective, the present research was guided by the following questions:

What are the characteristics of an effective intervention that facilitates the development of metacognitive awareness among young learners in content area learning? More specifically, how can storytelling help young learners acquire reflective self-awareness and knowledge of metacomprehensive strategy use in content area learning?

Combined, the main research question reads as follows:

How can storytelling be used to foster the development of metacognitive awareness among learners in the Intermediate Phase?

In addition to the main research question, I have formulated the following secondary questions to aid in achieving the research objectives (see Section 1.6):

1. How aware are early Intermediate Phase learners (average 10 years) of how they learn, what they believe about learning and themselves as learners, and can they verbalise this awareness (knowledge)?
2. What is the difference between low-achieving and high-achieving learners in terms of their metacognitive awareness and the effect of the intervention on their metacognitive development?
3. How does the socio-economic context of the learners have an impact on the development of metacognitive awareness, and specifically, does it influence the effect of the intervention?
4. How practical (feasible) is this type of learning intervention within the current school system and at the early Intermediate Phase – what are the experiences of learners and teachers?

1.6 OBJECTIVES OF THE STUDY

This study explored the nature and development of metacognitive awareness among young learners in the content areas. The purpose of the study was twofold:

1) To develop a story-based intervention in the form of a series of stories engaging learners in learning about and reflecting on themselves as learners and how they learn.
2) To assess the feasibility and impact of the story-based intervention on a learner's self-knowledge, metacomprehension strategy awareness and comprehension ability applied to content area learning.

Given the many educational challenges facing the inclusive education system in South Africa today, the study particularly attempted to propose a practical, learner-centred way of facilitating self-directed learning through exposing early Intermediate Phase learners to reflective thought about the learning process and themselves as learners, built around the idea of telling stories of what and how expert learners think and act. The possible impact of this type of intervention is then reflected on and design principles are outlined.

1.7 THEORETICAL FRAMEWORK

Lucas (2005) states that the real and pressing issue underpinning an effective school system is the recognition that *learning is learnable*. Dweck (as cited in Dietz, 2005) adds to this important statement by reminding us that "ability is not fixed but expandable – as we learn things we can become smarter" (para. 4). The present study is presented from a developmental perspective. Helping learners become more knowledgeable of and responsible for their own cognition and thinking has always been a feature of research on learning. Pintrich (2002) states that this emphasis on self-regulation and reflection cuts across all the different theoretical approaches to learning and development – from neo-Piagetian models, to cognitive science and information-processing models, to Vygotskian and cultural or situated learning models. Researchers all agree that with development learners become more aware of their own thinking as well as more knowledgeable about cognition in general, and as they act on this awareness they tend to learn better (Bransford, Brown & Cocking, 1999; Dimmitt &

McCormick, 2012). In order to understand how people develop this ability to reflect on their own behaviour, and how self-knowledge and conscious control emerge, the present study draws from the constructivists' accounts of cognitive and emotional development.

Constructivism is a set of theories about learning that fall somewhere between cognitive and humanistic views. Behaviourism treats the organism as a black box, while cognitive theory recognises the importance of the mind in making sense of the material with which it is presented, but it still presupposes that the role of the learner is primarily to assimilate whatever the teacher presents (Atherton, 2011). Constructivist learning theory is an approach to learning that "locates cognition and understanding within the individual" (Daley, 2002, p. 21) and Peters (2000) points out how the use of constructivist learning with its emphasis on self-reflection and knowledge construction can contribute to the development of skills in metacognition. In essence, a metacognitive approach and learning to learn is a process of discovery about learning and the learner is much more actively involved in the 'meaning-making' process. In order for learners to *construct* an understanding about themselves as learners and how to learn, they need to interact with more knowledgeable 'others' (Vygotsky, 1986). Social interactions and meanings play a critical role in Vygotsky's theory of cognitive development. Woolfolk (2013) explains that, according to Vygotsky, children's interactions with competent others serve to mediate thinking and text comprehension in the cognitive space between what can be accomplished alone and in collaboration with more capable others – the zone of proximal development (ZPD).

The design-based intervention in this study employs peer modelling and self-reflection, supporting social constructivism (see Section 2.2). Young learners are exposed to stories about learning that are presented by learners like themselves modelling how they think and act when encountering authentic learning activities. The intervention is learner-centred and guides learners in constructing their own understanding of knowledge through peer collaboration.

1.8 RESEARCH DESIGN AND METHODOLOGY

The present study is situated within a pragmatic paradigm (see Section 4.2), supported by a DBR approach with a combination of qualitative and quantitative research methods and presented in a case study format. DBR is an ideal approach for investigating complex and real-world educational problems, as it enables researchers and practitioners to collaborate through often long-term research cycles of analysis, development, evaluation and reflection (Reeves, Herrington & Oliver, 2005; Reeves, McKenney & Herrington, 2011). Brown (1992) maintains that within a DBR methodology, interventions are conceptualised and then implemented in natural settings in order to generate new frameworks for conceptualising learning, instruction, design processes and educational reform.

The research design, methodology and different measuring instruments are discussed in detail in Chapter 4 of this thesis. In an attempt to answer the research question stated earlier, I followed two distinct iterative cycles of "*analysis of a practical problem* by researcher in collaboration with practitioners, *the development of a solution* within a theoretical framework, the *evaluation and testing* of solutions in practice and the documentation and *reflection* to produce design principles (own emphasis)", as proposed by Ma and Harmon (2009, p. 76). An overview of the research process is presented in Figure 1.1, indicating the two iterations and positioning the two main research objectives within the DBR structure.

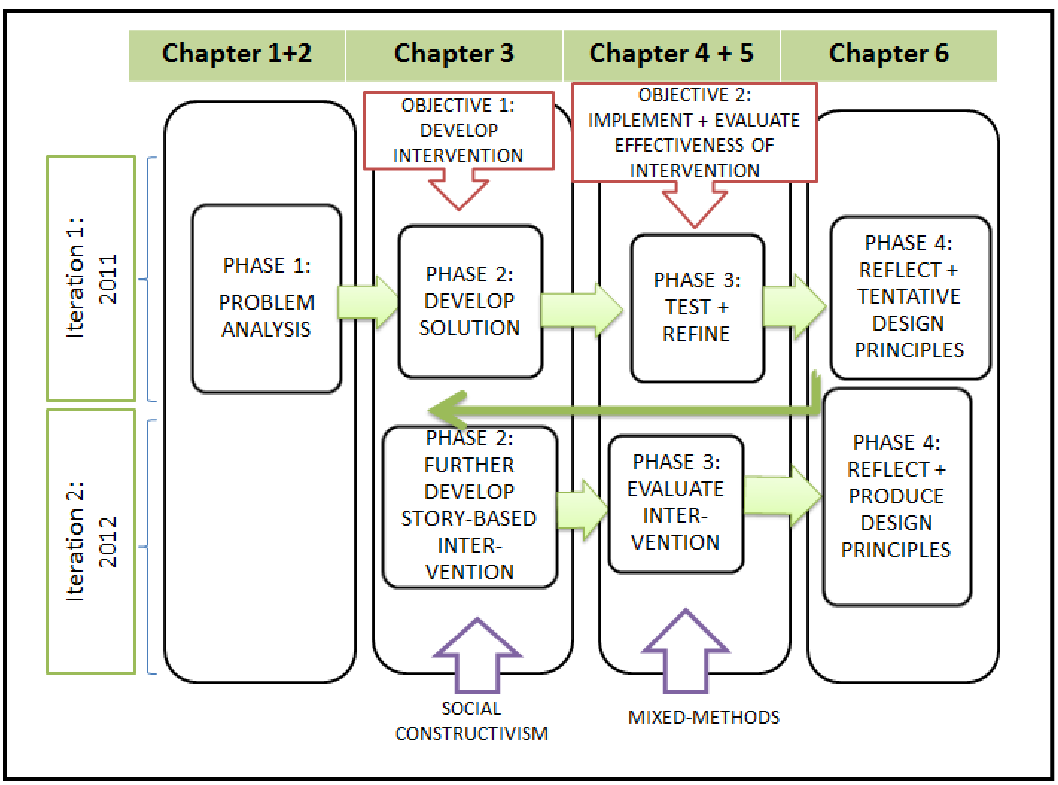


Figure 1.1: Graphical representation of the research plan

The first research objective was to develop an innovative, learner-centred training intervention, based on the idea of modelling expert learner thinking and behaviour through storytelling and self-reflection. The development of the learning tool (a set of short stories) was informed by a broad theoretical and evidence-based framework (refer to chapters 2 and 3). The training intervention was structured not like a textbook with a series of factual sessions about learning, but as a story – a story about Abe, Annabel and their friends learning about what it means to be an expert learner. Explicit metacognitive actions were incorporated into the story and additional reflective questions with metacognitive prompts were posed in text. The idea that a child should be able to enjoy and learn from the storytelling without being dependent on a skilled facilitator is an example of one of the tentative design principles in Phase 4 of Iteration 1. The stories have characters they can identify with and are about learners such as themselves explicitly learning how to learn, as they are taken on a journey (adventure) of discovering the process of learning and self-knowledge by reflecting on facets of the story. Each story is developed to challenge and broaden children's thinking about thinking and learning, and every session (story) focuses on a major theme(s) (e.g. self-checking and monitoring during problem solving; identifying main ideas in text). Learners are explicitly provided with the means and terminology/vocabulary to explain (verbalise) their own thinking and learning process.

The second objective was to test the feasibility and possible effect of this type of training intervention (Phase 3). The learning tool was implemented and evaluated in an authentic classroom setting. During the second iteration, pre- and post-intervention measures determined possible change in Intermediate Phase learners' metacognitive knowledge and strategy awareness in content learning. DBR uses mixed methods to analyse the outcomes of an intervention and to refine the intervention. Both quantitative (questionnaire testing metacognitive strategy knowledge, comprehension test) and qualitative (semi-structured interviews and written self-reflections) methods were used to gather data in the present study. Research suggests a significant correlation between reading ability, academic performance and metacognition (Carlisle & Rice, 2002; Carreker, 2004), as well as the socio-economic learning environment and metacognitive development (see Section 3.5). This study also reports on these issues, and further secondary research questions (see Section 6.3) listed earlier are addressed (Phase 4).

The research reported on in this study targeted early Intermediate Phase learners (primary school learners; grades 4–6). Intact Grade 4 class groups (approximately 60 learners in each iteration, average age 10), along with their teachers (the same two teachers), in two public schools in the Western Cape were involved in the study, which spanned over two years. The schools are in the same physical area and although they differ drastically in size, more importantly they also differ in terms of the socio-economic context of the learners that attend the schools. Context played a critical role in the study, from the research design to the interpretation of the data.

A multitude of factors have an impact on the success of any educational intervention, and Biggs and Moore (1993) advise that it is virtually impossible to assess the independent effect of any one of these factors, especially in 'authentic' classroom contexts. This was also not the aim of the DBR study – not to provide empirical proof, but to improve an intervention. The present study specifically concerned itself with the development of metacognitive knowledge, and for the purpose of this study, metacognitive knowledge is similar to being metacognitively aware and also comprises the learners' affective view of (personal reflections on) their own knowledge and skills. Reflection (in the form of conscious verbalisations of reflective thought while engaged in the learning process) actively links metacognitive awareness with metacognitive self-regulation (metacognition in action). The scope of the study was limited to the improvement of comprehension of expository text for learning purposes (academic reading in the content learning area), not reading skills development for narrative prose or numeracy literacy, for instance. Ethical considerations and further limitations of the study are discussed in Chapter 4 (see Section 4.6) and Chapter 6 (see Section 6.5) respectively.

1.9 STRUCTURE OF PRESENTATION

This study is organised into six chapters that correspond with the DBR process (see Figure 1.1). Chapter 1 provides a brief overview of metacognition and identifies the research problem and purpose. In Chapter 2, the theoretical underpinnings framing the study are described, and a comprehensive discussion of metacognition research, as well as a deliberation on comprehension in the content areas, in particular, are presented. These two chapters represent Phase 1 of the DBR process of analysing a practical problem, informed by both theory and practice.

Intervention research in learning is the focus of Chapter 3 and the motivation behind storytelling as a learning tool is presented. In this second phase of the DBR cycle, the development of the design solution (story-based intervention) within a theoretical framework is outlined.

Chapters 4 and 5 coincide with Phase 3 of the DBR process, namely the implementing and testing of the intervention. In Chapter 4, the research design and methodology are discussed in detail. DBR as a design approach is defined and the specifics of all the data-collection methods, as well as the unique research conditions and sample features, are explained. In Chapter 5, the findings are reported on in case study format.

Phase 4 of the DBR approach requires the presentation of guiding principles and the dissemination of the findings for gain in both theoretical and practical settings, as proposed by Herrington, McKenney, Reeves and Oliver (2007). This important stage in the research process is attained in Chapter 6, offering a reflection on the findings and a set of design guidelines. Limitations of the present study and future research possibilities are discussed.

CHAPTER 2
METACOGNITION AND LEARNING FROM TEXT

"Most of us only know how to be taught,

we haven't learned how to learn." – Malcolm Knowles (1975, p. 9)

2.1 INTRODUCTION

This chapter addresses the major theoretical and philosophical underpinnings of this research study by starting off with a discussion of social constructivism. Metacognition is then introduced, highlighting the contributions of seminal researchers. A self-regulated learning model is presented, with metacognitive awareness as critical mediator to task performance. Aspects of the nature of metacognition are discussed, pointing out some of its important yet problematic dimensions, and the potentially positive impact that metacognition can have on the learning process is explained. Metacognition in the context of expository text comprehension is deliberated on and the chapter concludes with a discussion of expert learning.

As a DBR study, the literature review process (part of Phase 1) is critical in conceptualising the fundamental purpose of the study. Figure 2.1 positions this critical first phase within the research process of the present study. Herrington et al. (2007) state that the literature review not only performs the usual research functions, but in design-based studies, along with thorough collaboration with practitioners, it also facilitates the creation of draft design principles (guidelines) (see sections 3.9 and 6.4). These design principles inform the design and development of the intervention that seeks to address the identified problem (see Section 1.3).

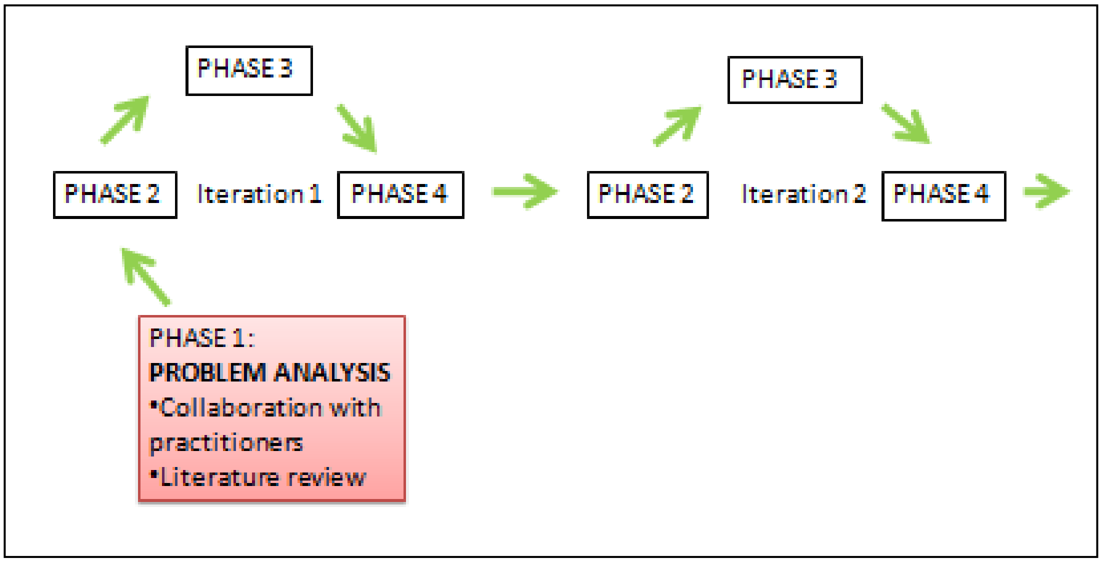


Figure 2.1: Research design - positioning Phase 1

2.2 SOCIAL CONSTRUCTIVISM

In Chapter 1, I mentioned that the present study is situated within the constructivist learning theory (see Section 1.5). Elaborating on Knowles' quote (see above), there is a growing agreement among learning science practitioners that deep learning should replace the traditional classroom practices of teacher-directed learning, learners memorising everything instead of thinking about the purpose, and class material presented as disconnected bits of knowledge (Sawyer, 2006). Deep learning requires from learners to relate new understandings to what they already know and to integrate their knowledge into expanding conceptual systems. Deep learning, according to Sawyer (2006), also requires from learners to understand that knowledge is socially constructed by people and should be critically reflected on. Snowman and McCown (2015, p. 347) maintain that constructivism is based on four central ideas:

- Meaningful (deep) learning is the active creation of knowledge structures from personal experience.
- Social interaction and the negotiation of understanding with others can help learners construct knowledge.

- Self-regulation by learners is a key to successful learning.
- Authentic problems provide realistic contexts that contribute to the construction and transfer of knowledge.

Constructivist perspectives on cognitive development and learning can be traced back to the research of Piaget, Vygotsky, the Gestalt psychologists, Bartlett, Bruner, Rogoff and Dewey, to name a few. Snowman and McCown (2015) distinguish between three variations of the constructivist learning theory. One form of constructivism, *cognitive constructivism*, or what Woolfolk (2013) refers to as "psychological constructivism" (associated with the work of Piaget), focuses on how individuals use information, resources and the assistance of others to build and improve their mental models and problem-solving strategies (p. 359). Cognitive constructivism therefore emphasises the role of cognitive processes in meaningful learning. *Social constructivism*, on the other hand, emphasises the role of culture and social interaction, and claims that meaningful learning occurs when people are explicitly taught how to use the psychological tools of their culture (such as language) within authentic circumstances creating a common meaning. Social constructivism encourages active engagement with peers and teachers to create meaning of knowledge and the applicability of this knowledge to specific contexts. As we engage with others and with our environment, our thoughts and actions are influenced.

The third form of constructivism, *critical constructivism*, was recently added to the debate, as some researchers "began to incorporate a critical theory perspective to study how learners constructed knowledge" (Snowman & McCown, 2015, p. 350). Critical constructivists seek to understand why learners from some cultural and/or social groups construct knowledge in school environments more easily. Ultimately, the focus is on helping those struggling learners who experience difficulty in school settings to ensure that all learners successfully construct knowledge. In critical constructivism, the impact of cultural and socio-economic diversity is addressed and the social aspects of the learning environments that teachers create in their classrooms are highlighted (Snowman & McCown, 2015). In the present study, I view critical constructivism as part of a broader social constructivist perspective and do not distinguish between the two, but incorporate the emphasis of critical theory into a social constructivist theoretical framework. Although the three variations of the constructivist perspective emphasise different aspects of learning, the common theme assumes that learning is learner-centred, an active process of constructing meaning from knowledge and takes place in a facilitative context (e.g. receiving help from a teacher or peer).

Larkin (2009) draws attention to “the need for greater acknowledgement of the social factors in models of metacognition” (p. 151). Initially, metacognitive theory was researched within individualistic developmental and cognitive models, but now it is acknowledged that metacognition is socially situated and socially constructed. Metacognition draws on the broader concept of self-regulated learning (see Section 2.5.1) and the social and cultural contexts, and the situated nature of learning is thus acknowledged (Post, Boyer, & Brett, 2006; Zimmerman, 2001). Over the years, much classroom-based research on how children develop metacognition “through interacting in collaborative learning situations” has been conducted (Larkin, 2009, p. 150). The present study also builds on the assumption that learning is socially mediated and socially constructed, and is underpinned by Vygotsky’s (1978, 1986) theory of cognitive development. In this study, mediation is, however, not primarily realised through the traditional direct teacher–learner relationship, but by means of a socially contextualised learning tool using the principles of peer modelling and demonstrative self-reflection in a story text (see Section 3.3 for a further discussion of the Vygotskian learning theory).

According to Vygotsky (as cited in Louca-Papaleontiou, 2008), “a great deal of learning occurs in the presence of, and is fostered by, the activity of others” (p. 9) and therefore social interaction plays a major role in the origin and development of higher mental (e.g. metacognitive) functions. Louca-Papaleontiou (2008) explains that “many cognitive acts are initially experienced in social settings, but in time, the results of such experiences become internalised” (p. 9). Parents, teachers or peers – the more knowledgeable (experienced), supportive others – act as interrogators, leading and systematically guiding the novice to mastery. During the process of development, the interrogative, regulatory role, however, becomes internalised and children become able to fulfil some of these functions for themselves through self-regulation (Louca-Papaleontiou, 2008). Peer modelling is one of the primary features of the intervention proposed in the present study (see Section 3.9) and this indirect form of “cognitive apprenticeship” (Snowman & McCown, 2015, p. 326) fosters constructivist learning.

Most psychologists classify Vygotsky as a social constructivist, because his theory relies heavily on social interactions and the cultural context to explain learning. Woolfolk (2013), however, contends that Vygotsky's theory of learning gives us a way to consider both the psychological (cognitive) and the social. An example would be Vygotsky's concept of the zone of proximal development (ZPD), which he defined as the difference between what children can do by themselves and what can be accomplished with some assistance. The notion of creating cognitive development by embedding instruction within a learner's ZPD has many implications and has been referred to as "a place where culture and cognition create each other" (Woolfolk, 2013, p. 361). Culture creates cognition when the more knowledgeable other (in this case a peer in the form of a story character) uses tools and practices from the culture (language – in the form of a story) to steer the child towards goals valued by the culture (text comprehension). Cognition creates culture, as the interactions between the learner and the more knowledgeable other generate new practices and problem solutions. We can therefore think of knowledge as both individually constructed and socially mediated, integrating individual and social constructivism.

For the purpose of this study, Vygotsky's views on learning were explored as a theoretical framework most appropriate for the study's purpose and in the next chapter, I address cognitive development further and specifically how Vygotsky and Piaget's work had an impact on our understanding of metacognitive development (see Section 3.3). In the following sections, I clarify the concepts central to the present study, namely metacognition and content area learning.

2.3 DEFINING METACOGNITION – HISTORICAL ROOTS

About 50 years ago, Tulving and Madigan (as cited in Metcalfe & Shimamura, 1996, p. 10) suggested the following in the Annual Review of Psychology:

> What is the solution to the problem of lack of genuine progress in understanding memory? It is not for us to say because we do not know. But one possibility does suggest itself: why not start looking for ways of experimentally studying, and incorporating into theories and models of

> memory, one of the truly unique characteristics of human memory: *its knowledge of its own knowledge* (own emphasis).

At the core of what makes us distinctively human is the ability to reflect upon our thoughts and behaviours. This self-reflective nature of human thought has fascinated the minds of countless philosophers and scientists over the decades. Brown (1987) points out in a review of the origins of metacognition that ‘processes metacognitive’ have been recognised and advocated by educational psychologists such as John Dewey well before the emergence of the term ‘metacognition’. According to Dewey (1910), the aim of reflective reading (and studying) is to induce active monitoring, critical evaluation and deliberate seeking after meanings and relationships. He made a clear connection between learning and thinking and said that reading is thinking stimulated by text (Dewey, 1910). Thorndike (1917, p. 329) advocated metacognitive processes of reading and stated the following:

> Understanding a paragraph is like solving a math problem. It consists of selecting the right elements of the situation and putting them together in the right relations, and also with the right amount of weight or influence or force for each. The mind is assailed as it were by every word in the paragraph. It must select, repress, soften, emphasize, correlate, and organize, all under the influence of the right mental set or purpose or demand.

De Bruin and Van Gog (2012) trace the scientific study of metacognition back to the 1960s, when Hart first experimentally studied metacognitive experiences. He gave the Feeling-of-Knowing (FOK) state its name (Hart, 1965) and this is still a popular research topic today (Hertzog & Touron, 2011). FOK is when asked a semantic knowledge question (such as “When was Nelson Mandela born?”), and being able to quite adequately and quickly indicate whether or not you will be able to retrieve the correct answer from memory, even though you are not yet attempting to retrieve it. A few years later, Piaget (1976) wrote about the importance of the concept of reflected abstraction to human intelligence and pointed out the need for making cognitions statable and available to consciousness, at which point they can be worked on and further extended. However, Georghiades (2004) contends in his report of three decades of metacognitive research that the historical roots of metacognition go far beyond the 20th century to the utterances of Plato and Aristotle. They hypothesised a separate power whereby, over and above actually seeing and hearing, the psyche becomes aware of doing so, and in the writings of Strato,[3] specific reference is made to the possible importance of "cognising one's own cognition" (Georghiades, 2004, p. 367).

To follow is a discussion of the work of seminal researchers in the field of metacognition in an attempt to define this prominent construct in education and cognitive psychology. As far as possible, throughout the thesis, I have used original sources to explain the main concepts.

2.3.1 The contributions of John Flavell and Ann Brown

The term 'metacognition' was first popularised in a series of academic papers in the 1970s by the developmental psychologist John Flavell from Stanford University (Georghiades, 2004; Veenman, 2015). Flavell (1979) defined metacognition as: "knowledge and cognition about cognitive phenomena" (p. 906). Flavell was profoundly influenced by the work of Jean Piaget and his definition of introspection as "the reflection on one's own conscious experience" makes the impact obvious (Butler & McManus 1998, p. 4) (see Section 3.3.). The argument that effective learning consists of being able to think about thinking came about as a result of Flavell's extensive work with young children experiencing learning difficulties.

Metacognition is "cognition about cognition or thinking about one's own thinking, including both the processes and the products" (Hartman, 2001, p. xi). Flavell (1976) explained that you are engaged in metacognition if you, for instance, notice that you are having more trouble learning X than Y, or if it strikes you that you should double-check Z before accepting it as a fact. If you become aware that you do not understand something and "you decide to ask for help to clarify a concept or instructions", this would be a metacognitive experience (Flavell, 1976, p. 232). Flavell (1987) proposed a taxonomic categorisation of the components of metacognition and offered four components: (a) metacognitive knowledge, (b) metacognitive experiences, (c) goals or tasks and (d) actions or strategies. "A person's ability to control a wide variety of cognitive enterprises depends on the actions and interactions among these components" (Gama, 2004, p. 13). Figure 2.2 shows the relations between them.

[3] Greek philosopher, 335–269 BC

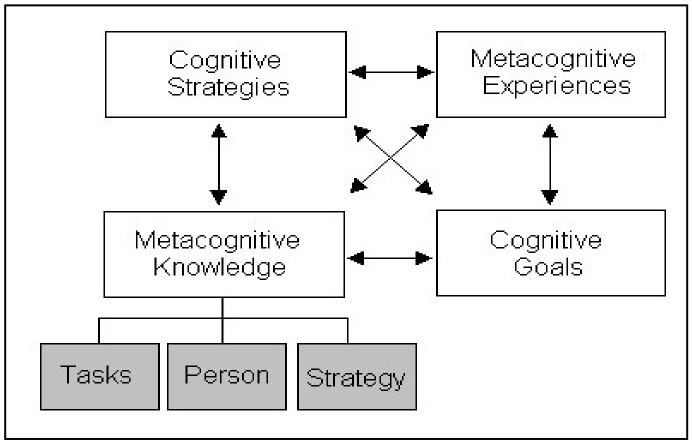


Figure 2.2: Flavell's model of metacognition (adapted from Flavell, 1987)

'Metacognitive knowledge' is that part of one's acquired world knowledge that has to do with cognitive (psychological) matters. Flavell (1987) explains that "as people grow up, an important part of what they learn or come to believe concerns the mind and other things psychological" (p. 21). This knowledge or awareness and beliefs about what factors or variables act and interact in what ways to affect the course and outcomes of cognitive enterprises can be grouped into the following three general categories (Balcikanli, 2011; Flavell, 1987; Sagor, 1999):

Person variables: This is knowledge about everything that one can come to believe about the nature of oneself and others as a cognitive processor, including skills, abilities, strengths and weaknesses. Realising that I am better at memorising history than doing fractions, or the awareness that I prefer to draw pictures and diagrams when studying from text (visual learning style), would be examples of this category.

Task variables: This entails knowing the characteristics of a task regarding its difficulty and how best to approach it in the light of what is required. "The individual learns something about how the nature of the information encountered affects and constraints how one should deal with it" (Flavell, 1987, p. 22). In other words, being aware that it is easier to recognise facts than to recall them and consequently knowing that one would therefore approach the learning of a multiple-choice test differently from a test where recall was necessary would be an example of this.

Strategy variables: In this category we find knowledge about which strategies, approaches or procedures are likely to be effective for achieving goals and enhancing performance in various cognitive tasks. Knowing when the meaning of a phrase or word is unfamiliar to you and then deciding to get help, whether asking the teacher or consulting other sources, would be an example of a strategy.

Flavell (as cited in Gama, 2004) emphasises that these knowledge variables always interact, and that intuitions about their interaction are also acquired. Metacognitive knowledge does not differ in form and quality from other knowledge stored in the long-term memory, according to Flavell. Gama (2004) therefore concludes that, "as a consequence, it (metacognitive knowledge) can either be retrieved as a result of a deliberate and conscious memory search, or it can be activated unintentionally and automatically by retrieval clues in the task situation" (p14). Therefore, metacognitive knowledge can be used unconsciously or it may also rise to consciousness (also see Section 3.4) and provoke the other major conceptual entity in Flavell's taxonomy, namely a 'metacognitive experience' (Flavell, 1979, 1987). A metacognitive experience is a conscious cognitive or affective experience that accompanies a cognitive action. For example, if a learner is studying the lifecycle of the frog and he gets that uneasy feeling that he does not understand the concepts discussed in the expository text, but he wants to understand it, that feeling is a metacognitive experience.

The goals or tasks in Flavell's taxonomy refer to the actual objectives of a cognitive endeavour, such as reading and understanding an expository passage, which will trigger the use of metacognitive knowledge and lead to new metacognitive experiences. And finally, "actions or strategies refer to the utilisation of specific techniques that may assist in achieving those goals" (e.g. a metacognitive experience could be remembering that outlining the main ideas of a passage on a previous occasion had helped increase comprehension) (Gama, 2004, p. 13).

This model of Flavell lays the foundations of metacognition theory, as he attempts to define the components of metacognition and the interactions among these components. Ann Brown refined Flavell's description of metacognition and also distinguishes between the two different categories of metacognition. She states: "Metacognition refers to understanding of knowledge, an understanding that can be reflected in either effective use or overt description of the knowledge in question" (Brown, 1987, p. 65). Brown (1987) describes knowledge of cognition (metacognitive knowledge) as the "statable and stable knowledge one possesses about one's own cognitive processes" (p. 65), but speculates about its fallibility and the possibility that it is age-dependent.

Similar to Flavell (1987), she also divides metacognitive knowledge into three components. We first need to ask the question: "Who am I as a learner?" providing declarative knowledge, and then the "how" and "when and why" are addressed through procedural and conditional knowledge. She considered the second component to be "the regulation of a cognitive activity" (Brown, 1987, p. 65). Regulation of cognition consists of the activities used to regulate and oversee learning and these processes include planning activities (e.g. predicting) prior to undertaking a problem, monitoring activities during learning and checking outcomes (evaluating). These activities are relatively unstable, not necessarily statable (knowing how to do something does not necessarily mean that the activities can be brought to the level of conscious awareness and reported on to others) and relatively age-independent. According to Brown (1987), these two forms of metacognition, knowledge and regulation (skills), are closely related, each feeding on the other recursively, although they can be readily distinguishable. Refer to Figure 2.3 for Brown's evergreen model of metacognition.

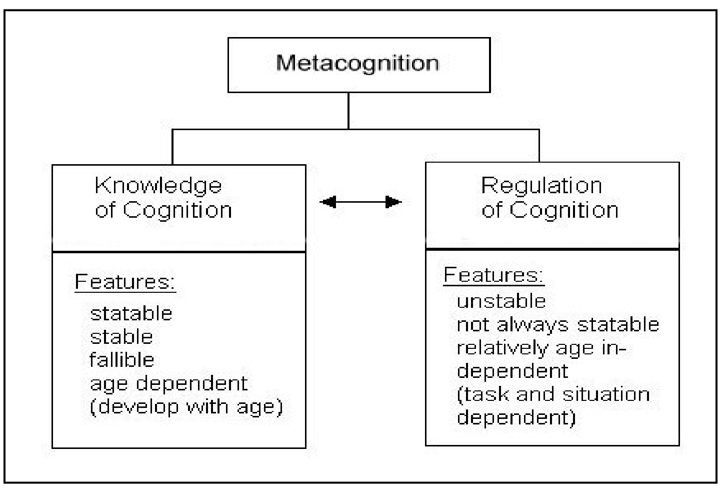


Figure 2.3: Brown's model of metacognition (adapted from Brown, 1987)

It is important to highlight Brown's (1987) contention that metacognitive knowledge comprises learners' affective view (personal reflections) of their own knowledge, abilities, motivation and characteristics as learners. Van der Walt et al. (2006) conclude that such reflections play a pivotal role in the making of decisions on when and how to use (knowledge) strategies. In the present study, metacognitive reflection is viewed as the mediator between the static knowledge component of metacognition and self-regulation (implementing strategic knowledge).

Interestingly, Veenman et al. (2006) explain the relationship between the two components of metacognition by reminding us that “metacognitive knowledge about our learning processes can be correct or incorrect, and this self-knowledge may be quite resistant to change” (p. 4). For instance, a learner may incorrectly think that he invested enough time in preparation for a mathematics test, despite repeated failure in the past (“the questions were too difficult ...”). Such misattributions prevent learners from amending their self-knowledge. Correct metacognitive knowledge is, therefore, “an essential, but not sufficient condition for adequate regulation of learning behaviour” (Veenman, 2015, p. 10). Metacognitive skills (regulation of metacognition), on the other hand, have a feedback mechanism built in. You are either capable of planning your actions ahead and task performance progresses smoothly, or you do not and your actions go astray. Veenman et al. (2006) make the important statement that “failing metacognitive skills may render new metacognitive knowledge, but the process of skill acquisition takes time and effort” (p. 5). Research shows that the more children know about their cognitive processes and skills, the more able they are to regulate them, with metacognitive knowledge about strategies predicting children’s use of strategies and performance outcomes (Carr, Borkowski & Maxwell, 1991).

These latter statements have major implications for intervention research on the development of metacognition. The present study is premised on this interplay and argues for the importance of metacognitive knowledge development as early as possible, because metacognitive awareness (knowledge) precedes and continuously informs metacognitive regulation and effective use of learning strategies (Garner, 1987).

The central components as proposed in the above more general taxonomies of metacognition were used as a basis for the present study. Flavell and Brown’s classifications of metacognition was followed by numerous other researchers (e.g. Jacobs & Paris, 1987; Nelson & Narens, 1990; Schraw & Dennison, 1994), often portraying different emphases on (or different understanding of) mechanisms and processes associated with metacognition. This study specifically focuses on the development of metacognitive awareness among learners at the early Intermediate Phase (Grade 4 level) engaged in content area learning (reading to learn). Content area learning refers to a defined domain of knowledge or skills in an academic programme and is a synonym used among educators for ‘subject’ or ‘subject area’. The content areas typically include science, social studies/history and mathematics, but any area outside of literature instruction (e.g. English) constitutes a content area. In the next sections, further perspectives from researchers such as Pressley and Afflerbach (1995), Pintrich (2002) and Meijer, Veenman and Van Hout-Wolters (2006), who specifically investigated metacognitive activities supporting text studying, are presented.

2.4 THE COMPLEX RELATIONSHIP BETWEEN COGNITION AND METACOGNITION

Although much work has been done in the past few decades, “the complexity and multifaceted aspect of metacognition generates difficulties for its researchers to build testable theories” and execute evidence-based studies (Gama, 2004, p. 11). Research on metacognition has originated independently in different areas and disciplines, and the investigations are done for widely different purposes, which resulted in some debate over the exact meaning of the word. In literature, metacognition is thus often referred to as a “fuzzy concept” (Dimmitt & McCormick, 2012, p. 157) and Brown (1987) even spoke about its “puzzling and mysterious” disposition (p. 65). As one works through the plentiful research on metacognition, it is apparent that, while there is consistent acknowledgement of the importance of metacognition in successful learning (McCormick, 2003), inconsistency still marks the conceptualisation of the construct.

One of the primary problems with the concept of metacognition is that it is often difficult to distinguish between what is ‘meta’ and what is ‘cognitive’ (Veenman et al., 2006). Cognition refers to the intellectual processes of the human mind that are characterised by remembering, understanding, focusing and processing information (Gordon & Braun, 1985); hence, what we know and think. Weinert (1987) argues that, on the surface, it seems easy to differentiate between the two – metacognitions are second-order cognitions: what we know about our knowing and thinking, thoughts about thoughts, knowledge about knowledge, or reflections about actions. However, the problems arise when one attempts to apply this general definition to specific cases. For instance, Weinert (1987) provides the example of a child who takes more time to study difficult than easy items when learning a word list (a learning strategy), but who is not aware of the easy/difficult distinction, and who is unable to describe his learning strategy. Does this child have metacognitive knowledge?

In an attempt to make such a distinction clear, Flavell (1976) suggested that cognitive strategies 'facilitate' learning and task completion, whereas metacognitive strategies 'monitor' the process. From a functional perspective, Mahdavi (2014) explains that cognitive skills make task achievement possible, while metacognitive skills help to regulate task achievement. Slife, Weiss and Bell (1985) describe metacognition as an 'observer' of thought, thus implying a position outside the function of cognition. They propose that it is this self-regulation component of metacognition that sets it apart from cognitive activity. Another perspective would be that of Watts (as cited in Georghiades, 2004), who views metacognition in a hierarchical relationship to cognition. He maintains it is a 'metalanguage' that permits individuals to talk about what is happening in their first level of feedback-governed learning, representing second-order change. This 'talk about' (metacognitive reflection) involves the critical revisiting of the learning process in the sense of noting important points of the procedures followed, acknowledging mistakes made on the way, identifying relationships and tracing connections between initial understanding and learning outcome. Engaging in critical self-appraisal is therefore fundamental to being metacognitive (Georghiades, 2004; Griffin, Wiley & Thiede, 2008).

In reality, constant interaction between these two components is what happens and Slife et al. (1985) aptly describe the co-existence as follows: "After all, metacognition requires something to plan, monitor, and regulate, and cognition requires control processes to guide its functioning" (p. 438). Sagor (1999) advises, however, that if metacognition is to be considered as a concept independent from cognition, then Brown's two components of metacognition, namely knowledge about cognition and regulation of cognition, should be demonstrated to be functioning separately from cognition. Considering also the prominent research of Sternberg (1990) on intelligence, Sagor (1999) makes a clear distinction between *higher-level processes* (metacomponents or executive skills) used for decision making, planning, monitoring and evaluating, and what she calls *lower-order skills* that have to do with the acquisition and retention of new information and subsequent performance, such as remembering, recalling or demonstrating a newly acquired skill. Therefore, in conclusion, despite the interrelatedness between them, metacognition and cognition operate at different levels.

To attain a more unified definition of metacognition and its components, Nelson (1996) proposed a model, distinguishing an 'object level', at which level cognitive activity takes place, from a 'metalevel', which governs the object level (see Figure 2.4). Dunlosky and Metcalfe (2009) explain that metacognitive knowledge is complemented by the two highly interactive metacognitive processes of monitoring and control, with a continuous flow of information between the object and metalevels. Information about the state of the object level is conveyed to the metalevel through monitoring processes, while instructions from the metalevel are transmitted to the object level through control processes. "Checking the progress of task completion and judging the likelihood of success" are some of the *monitoring*, assessing and evaluating elements of this model, while *control* refers to "the regulation of cognitive activity", such as allocating study time or modifying a plan of action while studying (Dimmitt & McCormick, 2012, p. 158). "If errors occur on the object level, monitoring processes will give notice of it to the metalevel and control processes will be activated to resolve the problem" (Veenman et al., 2006, p. 4).

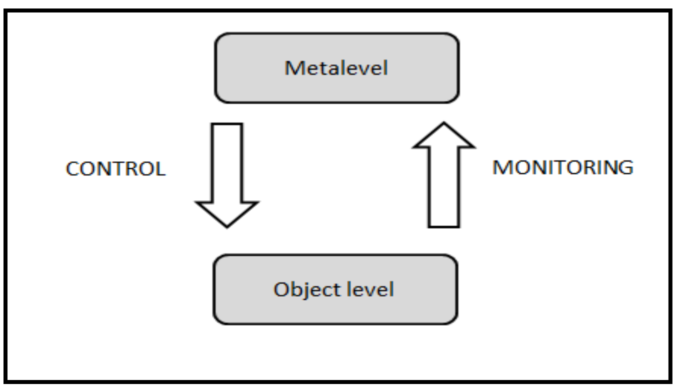


Figure 2.4: Metacognitive model (adapted from Nelson & Narens, 1990)

It is further important to mention the unexpected research evidence indicating a non-significant relationship between intelligence and metacognition (correlational analysis). Metacognitive skills cannot be equated with intellectual ability (Sternberg, 1990), despite their intertwined relation with cognitive processes. There is ample evidence that metacognitive skills, although moderately correlated to intelligence, contribute to learning performance on top of intellectual ability (Veenman et al., 2006). Research indicated that only 10% of variance in learning can be uniquely accounted for by the average intellectual ability. Metacognitive skills uniquely account for 17% of variance in learning, whereas both predictors share another 20% of variance in learning for learners of different ages and backgrounds, for different types of tasks and for different domains (Veenman & Spaans, 2005). The importance of metacognitive development is underscored, implying that an adequate level of metacognition may compensate for learners' cognitive limitations (Georghiades, 2004). Surprisingly, gifted learners "have been found to employ fewer metacognitive strategies than less gifted students. It seems that gifted learners, "because they learn easily, may not need to employ metacognitive strategies to excel", and this could however "result in reasoning deficits in later life" (Dresel & Haugwitz, 2005, p. 209).

2.5 FRAMING THE CONCEPT

Mahdavi (2014) simply refers to metacognition as "our ability to know what we know and what we don't know" (p. 529). While the concept of metacognition is really as simple as the above definition, the subject is rich in theory, research and philosophy. Being a broad, general area of psychological inquiry, metacognition has been defined in many different ways by many different people over the last few decades. In addition, the various terms used in literature to describe an awareness of problems, situations and ways of thinking about them have been the cause for certain confusion. Some of the terms researchers use in metacognitive research is metalearning (Jackson, 2004), learning to learn (Hoskins & Fredriksson, 2008), mindfulness (Carson & Langer, 2006), metacognitive beliefs, feeling of knowing and judgement of learning, theory of mind (Dunlosky & Metcalfe, 2009), metamemory, metacognitive skills or executive skills (Meltzer, 2007), higher-order skills, metacomponents, comprehension monitoring, learning strategies, heuristic strategies and self-regulation (Zimmerman, 2002). While these terms emanated from and helped to focus research, Veenman et al. (2006) maintain that "the domain of metacognition is one that lacks coherence" (p. 4). Some terms refer to more general knowledge and skills in metacognition, whereas others deal with rather specific ones for certain age groups or types of tasks. Some of them relate to both cognitive and metacognitive processes (for instance, learning strategies and heuristic strategies), whereas others are "purely metacognitive by nature" (see the next section for clarification of some of these terms) (Veenman et al., 2006, p. 4).

The present study focused on *learning how to learn* and specifically how to equip young learners engaged in studying from expository text (content area learning) with metacognitive knowledge. A lay person might refer to this area of investigation as 'study skills or methods', but metacognition encompasses far more than simply the teaching of a technique, such as mnemonics in an effort to help learners memorise content. In order to provide a theoretical foundation for the content of the intervention developed, the concept of metacognition and its components, as it is interpreted in the present study, is delineated in the following sections. The conceptual framework and my interpretation of how key theoretical concepts link, is depicted in Figure 2.5. Vithal and Jansen (2002) distinguish between a theoretical overview and conceptual framework.

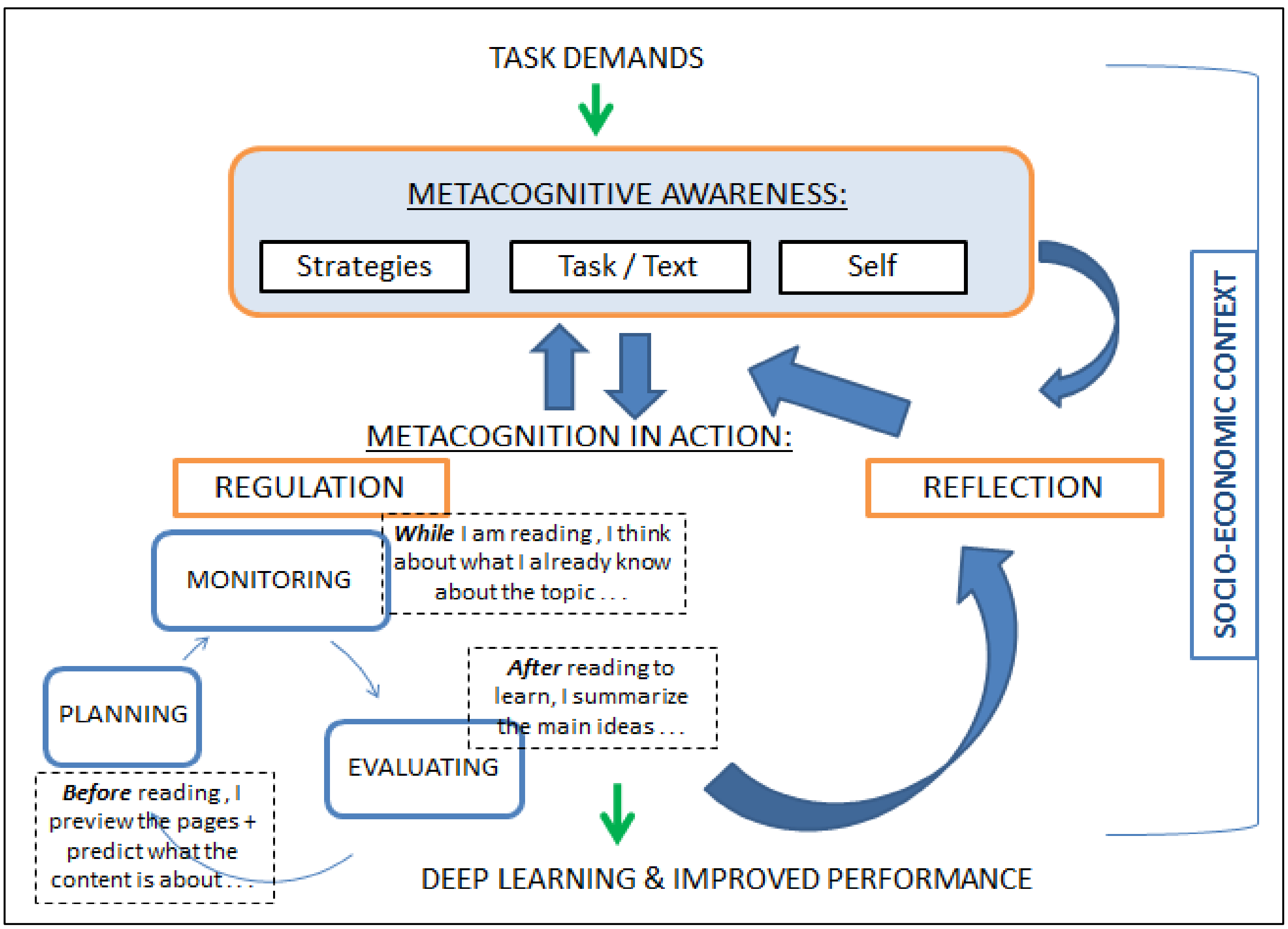


Figure 2.5: Conceptual framework for present study

Most researchers agree that metacognition comprises two fundamental components referred to as *knowledge of cognition* and *regulation of cognition* (see Section 2.3.1) (Brown, 1987; Jacobs & Paris, 1987; McCormick, 2003; Schraw, 1998). Dimmitt and McCormick (2012) comment that this distinction is very useful for education “in that understanding and knowing are readily distinguished from taking the actions of regulating and controlling” (p. 158). These main elements of metacognition are interrelated, and metacognitive knowledge (awareness) has been proposed as a prerequisite of effective behavioural control (Garner, 1987; Ridley, Schutz, Glanz & Weinstein, 1992). The present study is premised on the assumption that knowledge of cognition is closely related to and predictive of cognitive performance. This is in accordance with Lin, Moore and Zabrucky (2000), who state that “individuals who have more knowledge of their own thinking processes and strategy use are expected to be more likely to apply this knowledge, resulting in better performance” (p. 738).

Adding to the seminal work of Flavell and Brown mentioned earlier (see Section 2.3.1), Jacobs and Paris (1987) proposed that the metacognitive knowledge component can be differentiated into several categories of knowledge, most prominently into declarative, procedural and conditional aspects. *Declarative metacognitive knowledge* refers to the awareness learners have about their abilities and the factors affecting their learning, while *procedural metacognitive knowledge* refers to knowledge of how to execute plans of action, such as learning strategies. As mentioned earlier, Flavell (1979) discriminated between kinds of declarative knowledge along the aspects of self or person, task and strategies or actions (see Section 2.3.1). The knowledge of how to apply procedures such as learning strategies or actions to make use of what we know about ourselves as learners and the task characteristics, in order to achieve set learning goals, is what procedural knowledge entails (Mahdavi, 2014). *Conditional metacognitive knowledge* is knowledge about when and why to use procedures or strategies (Dimmitt & McCormick, 2012). Mahdavi (2014) explains that conditional knowledge is critical to the effective use of strategies, as it relates to knowing when, where and why to use declarative knowledge as well as particular procedures or strategies. McCormick (2003) states: “Conditional knowledge of successful learners makes them vary facile and flexible in their strategy use” (p. 80).

The control component of metacognition, often also referred to as ‘metacognitive skills’ or ‘executive control’, incorporates various executive processes of planning, monitoring and evaluation (Jacobs & Paris, 1987). According to Mahdavi (2014), regulation of cognition is a sequence of actions taken by learners to control their own thinking and learning ("metacognition in action"). *Planning* includes activities such as initial task analysis and the selection of appropriate strategies (Dimmitt & McCormick, 2012). *Monitoring* entails self-testing skills essential to regulate learning and refers to "the critical analysis of the effectiveness of the strategies being implemented" (Mahdavi, 2014, p. 531). Mahdavi (2014, p. 531) mentions that Schraw (1998) viewed monitoring as "one's online awareness of comprehension and task performance" (p. 115). *Evaluation* or reflection refers to the examination of progress being made towards goal achievement and can trigger further planning, monitoring and evaluation (see the cyclic demonstration in Figure 2.5).

I have previously mentioned (see Section 2.3) the pivotal mediating role of reflective thought. In the present study, I view conscious (preferably verbalised) reflection as a distinct component of 'metacognition in action' and not just as part of the metacognitive process of regulation. Gaining knowledge of ourselves as learners as we engage in a learning activity leads to self-reflection, and reflective thought would recursively add to our metacognitive knowledge. In the present study, I propose the purposeful development of metacognitive reflection. It is my belief that metacognitive reflection, and specifically our ability to bring our awareness to consciousness through verbalisation, plays a mediating role to ensure that our knowledge of ourselves as learners and the learning process is applied and self-regulative behaviour is fostered.

In recent literature, Louca-Papaleontiou (2008) expands on the initial definition of metacognition that only focused on the cognitive aspect ('thinking about our thinking') and defines metacognition in broader psychological terms. Metacognition therefore includes knowledge about one's knowledge, processes and cognitive and affective states, and the ability to consciously and deliberately monitor and regulate one's knowledge, processes and cognitive and affective states (Louca-Papaleontiou, 2008). The present study also subscribed to this all-encompassing definition, and with the focus on the development of the knowledge component of metacognition, the taxonomy as proposed by Pintrich, Wolters and Baxter (2000) was used as conceptual framework. According to Pintrich et al. (2000), learners' knowledge of general strategies for learning and thinking are referred to as *strategic knowledge,* while knowledge of cognitive tasks, as well as when and why to use these different strategies, is categorised as *knowledge of cognitive tasks,* and include appropriate contextual and conditional knowledge. Finally, included in their taxonomy is knowledge about the self in relation to both cognitive and motivational components of performance (*self-knowledge*). In Figure 2.6 I have graphically summarised my interpretation from literature of metacognitive knowledge and its components, and to follow in the next paragraphs is a brief clarification.

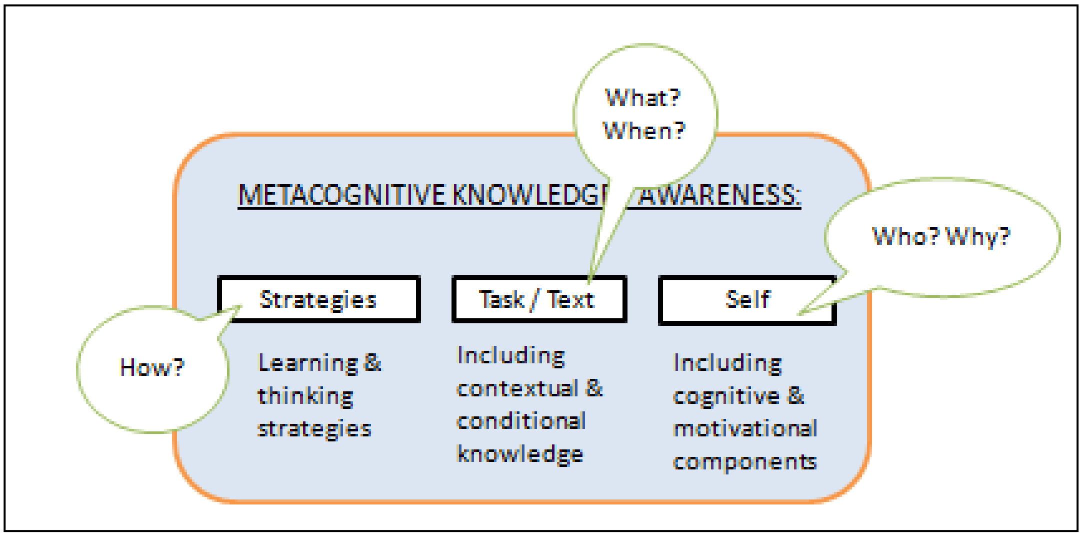


Figure 2.6: Metacognitive knowledge delineated

Strategic knowledge includes knowledge of the various strategies learners might use to memorise material, to extract meaning from text and to comprehend what they hear in classrooms or what they read in books and other course material. Although there are a large number of different learning strategies, Weinstein and Mayer (1986) advise that they can be grouped into three general categories: rehearsal, elaboration and organisational. Rehearsal strategies refer to the strategy of repeating words or terms to be remembered over and over to oneself – generally not the most effective strategy for learning more complex cognitive processes. In terms of reading comprehension, we know from research that to read a paragraph over and over again will not necessarily improve comprehension (Boulware-Gooden, Carreker, Thornhill, & Joshi, 2007). In contrast, elaboration strategies include various mnemonics for memory tasks, as well as strategies such as summarising, paraphrasing and selecting main ideas from texts. These elaboration strategies result in deeper processing of the material to be learned, and result in better comprehension and learning than do rehearsal strategies. Finally, organisational strategies include various forms of outlining, concept mapping and note taking, where the learner makes connections between and among content elements. Like elaboration strategies, these organisational strategies usually result in better comprehension and learning than rehearsal strategies.

These general learning strategies are differentiated from knowledge of various so-called metacognitive strategies that will be useful to learners in planning, monitoring and regulating their learning and thinking. According to Pintrich et al. (2000), "these strategies include ways individuals plan their cognition" (e.g. set sub-goals), "monitor their cognition (e.g. ask themselves questions as they read a piece of text; check their answer to a maths problem) and regulate their cognition (e.g. re-read something they do not understand; go back and 'repair' their calculating mistake in a maths problem)" (p. 47). Finally, there are a number of strategies for problem solving and thinking (Pintrich et al., 2000). An example would be the knowledge of working backwards from an answer when solving a problem and drawing on appropriate samples to make inferences. Expert learners are aware of various different strategies to help them learn and comprehend, and in research we find slightly contradicting categorisations of strategies. In this study, I placed all the above-mentioned strategy types under one heading, "strategic knowledge", indicating an awareness of all cognitive and metacognitive strategies. Underlining and selecting main ideas can be classified as cognitive strategies and not metacognitive as such, but the distinction becomes somewhat blurred in practice when we refer to monitoring strategies such as using visual organisers. I did, however, group the different strategies according to when they are applied in the metacognitive process of comprehending expository text – before, during and after reading text (see Section 2.6.3 for a discussion).

In addition to knowledge about various strategies, Pintrich et al. (2000) contend that individuals also accumulate knowledge about different cognitive tasks. *Knowledge of tasks* includes knowledge that different tasks can be more or less difficult and may require different cognitive strategies. A recall task is more difficult than a recognition task, for example, because in the recall task, the individual must actively search memory and retrieve the relevant information. In the recognition task, the emphasis is on discriminating among alternatives and selecting the appropriate answer. As learners develop their knowledge of different learning and thinking strategies and their use, the knowledge of tasks reflects the 'what' and 'how' of the different strategies. However, this knowledge may not be enough for expertise in learning, because learners also need to develop some knowledge about the 'when' and 'why' of using these strategies appropriately (Karia, 2007). Because not all strategies are appropriate for all situations, the learner must develop some knowledge of the different conditions and tasks where the different strategies are used most appropriately. Specific strategies are better suited to different tasks.

Self-knowledge is the third important component of metacognition. Self-knowledge is about knowing one's strengths and weaknesses (Flavell, 1979). For example, a learner who knows that he generally does better on multiple-choice tests than on essay tests has some metacognitive self-knowledge about his test-taking ability. This knowledge may be useful to the learner as he studies for the two different types of tests. One of the hallmarks of experts is that they know when they do not know something and have to rely on some general strategies for finding the appropriate information (Ertmer & Newby, 1996; Pintrich et al., 2000). This self-awareness of the breadth and depth of one's own knowledge base is an important aspect of self-knowledge. Learners' unique learning style also fall under self-awareness and has received considerable attention in inclusive education in the past. Inclusive education means that all learners attend and are welcomed by their neighbourhood schools in age-appropriate, regular classes and are supported to learn, contribute and participate in all aspects of the life of the school. Making young learners aware of how they learn and how to best apply their own cognitive (and affective) resources when engaged in a learning task facilitates self-regulated learning. Learning style refers to a learner's consistent way of responding to and using stimuli in the context of learning. Keefe (1979) defines learning styles as the "composite of characteristic cognitive, affective, and physiological factors that serve as relatively stable indicators of how a learner perceives, interacts with, and responds to the learning environment" (p. 1). Learning styles are not really concerned with *what* learners learn, but rather *how* they prefer to learn, and Stewart and Felicetti (1992) define learning styles as those "educational conditions under which a learner is most likely to learn" (p. 15).

In addition to general self-knowledge, individuals also have beliefs about their motivation. These include judgements about their capability to perform a task (self-efficacy), their goals for completing a task (learning or just getting a good grade) and the interest and value the task has for them (high interest and high value versus low interest and low value) (Pintrich et al., 2000). Notably, self-efficacy has been found to be by far the most important predictor of academic performance (Zimmerman, 1990). Although motivation falls outside the scope of the present research, the fact that a fairly substantial body of literature shows important links between learners' motivational beliefs and their cognition and learning (Snow, Corno & Jackson, 1996) merits a brief discussion. Pintrich et al. (2000) make the comment that it seems important that just as learners need to develop self-knowledge about their knowledge and cognition, they also need to develop awareness about their motivation. Accurate self-knowledge should further not be confused with self-esteem, which is a completely different construct. The challenge lies in helping young learners develop accurate perceptions of and judgements about their knowledge base and expertise (Pintrich & Schunk, 2002). As a lecturer in higher education for more than a decade, I have experienced a surge of young adults with seemingly inflated self-esteems and inaccurate self-knowledge, making exact knowledge judgements very difficult. Providing learners with positive, but false, inaccurate and misleading feedback about their strengths and weaknesses and academic performance sets them up for possible failure later in life.

The importance of motivational and affective states for metacognitive development is summed up by Borkowski, Carr, Rellinger and Pressley (1990) as follows: "the self-system power(s) metacognition by giving children reasons to learn" (p. 64). They suggest that children with positive self-systems are more likely to activate their metacognitive systems (to develop strategic behaviour) and increase their metacognitive knowledge because these processes have paid off in the past, elevating performance and enhancing self-esteem. To add to the warning alerted to in the previous paragraph, Elliott (1993) stresses the importance of the complementary and interactive roles of both self- and metacognitive systems. He cautions that motivation and good feelings are of little use to a child who does not have the corresponding strategic knowledge and skills (Elliott, 1993).

A final issue that needs to be mentioned as part of our self-awareness as learners, is epistemological beliefs. In most cognitive models, epistemological beliefs are a cluster of metacognitive variables and this is also how epistemological beliefs are viewed in this study. Epistemological beliefs refer to ideas about the origin, nature and process of our knowledge, such as whether a learner's intelligence or learning ability is fixed or can be improved through practise with effort or whether knowledge is conveyed by others or constructed by the learner; whether knowledge is a fixed, unchangeable and absolute 'truth' or a tentative, dynamic entity that continues to evolve; whether learning is a simple process that collects discrete and isolated facts; or whether it is a complex process through which a learner gradually acquires and interrelates information (Hofer & Pintrich, 1997; Lan & Skoog, 2003; Schommer, 1994). Ultimately, Dweck (2002, 2006) argues that the formation of this network of beliefs, with implicit theories at the heart of it all, hinges on whether people believe that their abilities are fixed or not (is learning learnable?). Her argument suggests that the beliefs learners hold can have a remarkable effect on their academic achievement and motivation, regardless of factors such as previous achievement or developmental level. Most recently, researchers started to study younger learners' epistemological beliefs to test the hypothesis that learners develop epistemological beliefs at early ages (Topçu & Yilmaz-Tüzün, 2009) and it is argued that there should be a link between children's theory of mind and epistemological thinking (Chandler, Hallett & Sokol, 2002). This has direct implications for metacognitive development research.

2.5.1 Self-regulated learning and how it relates to metacognition

Learning research has developed typically within two separate research paradigms (Hoskins & Fredriksson, 2008), namely the cognitive and the social cultural paradigm, and this also contributed to the plethora of terminology and concepts, often conceptually overlapping, describing our understanding of the learning process (Jackson, 2004). In a review of more than 100 studies, it is reported that, in the world of education, practices reflecting the idea of 'higher-order' processes of understanding and metacognition have been taken up in various ways (Watkins, 2001). Most often the term 'metacognition' is simply defined as 'thinking about thinking', and indicating the awareness of thinking processes and the 'executive control' of such processes.

Apart from thinking about thinking, we also find in psychology literature the constructs of 'learning to learn' and 'metalearning'. Learning to learn can be defined as a process of discovery about learning and involves a set of principles and skills which, if understood and used, help learners learn more effectively and so become learners for life (Hoskins & Fredriksson, 2008). Learning to learn was highlighted as a key competence at the Lisbon summit in 2000, when the leaders of the European Union member states met to discuss goals and strategies for the future. The interest in this critical competence has gained momentum in recent years (Hoskins & Crick, 2008) and by regarding learning to learn as a competence, it directs our attention beyond the acquisition of 'knowledge' as storable contents (*what* we know) to acquire into processes by which we create knowledge (*how* we know); hence, the importance of being metacognitive.

According to some researchers "metalearning covers a much wider range of issues than metacognition, including goals, feelings, social relations and context of learning" (Watkins, 2001, p. 1), while others would posit self-regulation as an even more encompassing concept. Metalearning as psychological construct was added to the field of study by Biggs (1985) and his conception is framed around the idea of being aware of and taking control of one's own learning. Implicit within this conception are the ideas that people need to have knowledge of how they learn, they have the motivation to be proactive in managing themselves in this way, and they have the capacity to be able to regulate their learning (Jackson, 2004). There is therefore a strong connection of metalearning to metacognition, self-awareness, self-identity as a learner and reflection as a process for achieving this self-awareness as a learner. For the purpose of the present study, I viewed learning to learn and metalearning as similar to metacognition.

Dimmitt and McCormick (2012) concur with Meltzer's (2007) view that 'executive function' is an umbrella term for the complex cognitive processes that serve ongoing, goal-directed behaviours. They further conclude that self-regulation, particularly with its emphasis on motivation, highlights the executive function processes that are particularly relevant to applied learning settings (Dimmitt & McCormick, 2012). According to Efklides (2006), metacognition is best understood as a process within the broader construct of self-regulation. In fact, Mahdavi (2014) draws attention to the belief that the acquisition of knowledge of one's own cognitive and affective processes and the regulation of these processes do not take place in a vacuum and are highly influenced by one's goals, motivations, perceptions of ability, attributions and beliefs, as well as context, such as social and cultural norms. Researchers such as Zimmerman (2002) and Borkowski, Chan and Muthukrishna (2000) therefore encourage taking these major factors into due consideration for a better understanding of metacognition, because they constitute influences on metacognition as well as being influenced by metacognition. In an attempt to present a theoretical framework for the present study, I explored the concept of self-regulation a bit more, although the scope of the study is limited to only the metacognitive awareness component.

Self-regulation is the ability to control and direct one's own feelings, thoughts and actions (Schunk & Zimmerman, 1998). "Learners are self-regulated to the degree that they are metacognitively, motivationally and behaviourally active participants in their own learning process" (Zimmerman, 2001, p. 5). It can be as simple as a learner asking a question in class to better understand instructions given, or as complex as a learner controlling his feelings when frustrated or angry. Two types of self-regulated learning models can be identified in literature (Muis, 2007). The one is focused on goal orientation and emphasises the constructive and self-generated character of self-regulation. Researchers such as Boekaerts (1992) and Zimmerman (1998) suggest that monitoring, regulating and controlling one's learning include cognitive, motivational and social factors. In contrast, models within a metacognitive framework (see Borkowski et al., 2000; Winne & Hadwin, 1998) emphasise that metacognition is the key facet to self-regulated learning. Metacognitive processes are employed to adapt the use of cognitive tactics and strategies to tasks.

MacLeod et al. (1996) present a self-regulated learning model that helped direct my own conceptualisations of the role of metacognition (see Figure 2.7). They suggested that, when faced with an academic task, strategic learners engage in a recursive cycle of cognitive activities: "they analyze the presented task, set task specific goals, select, adapt, or invent appropriate strategies, monitor progress towards goals, generate internal feedback about progress, and flexibly and adaptively adjust approaches accordingly" (MacLeod et al., 1996, p. 2). Self-regulated learners also manage their cognitive engagement in tasks by adaptively employing motivation and volition control strategies when motivation wanes (see Corno, 1993). Zimmerman (1989) emphasises the support of both learners' active management of task engagement and their regulation of the dynamic cycle of cognitive activities underlying strategic learning. Important for the present study is that Butler and Winne (1995) suggest that the way in which learners self-regulate their engagement in tasks is a function of the knowledge and beliefs that they bring to the learning context, because this is where metacognition comes into play. According to MacLeod et al. (1996), the types of knowledge and beliefs that influence self-regulation include learners' domain-specific understandings, beliefs about factors responsible for successful and unsuccessful performance, epistemological beliefs about learning, specific and general knowledge about strategies, knowledge about tasks, and knowledge about their strengths and weaknesses as learners. One of the goals of strategy intervention models highlighted by the MacLeod et al. (1996, p. 2) study is particularly pertinent to the present study, namely "to support students to construct a range of knowledge and beliefs that support, rather than undermine, further self-regulation".

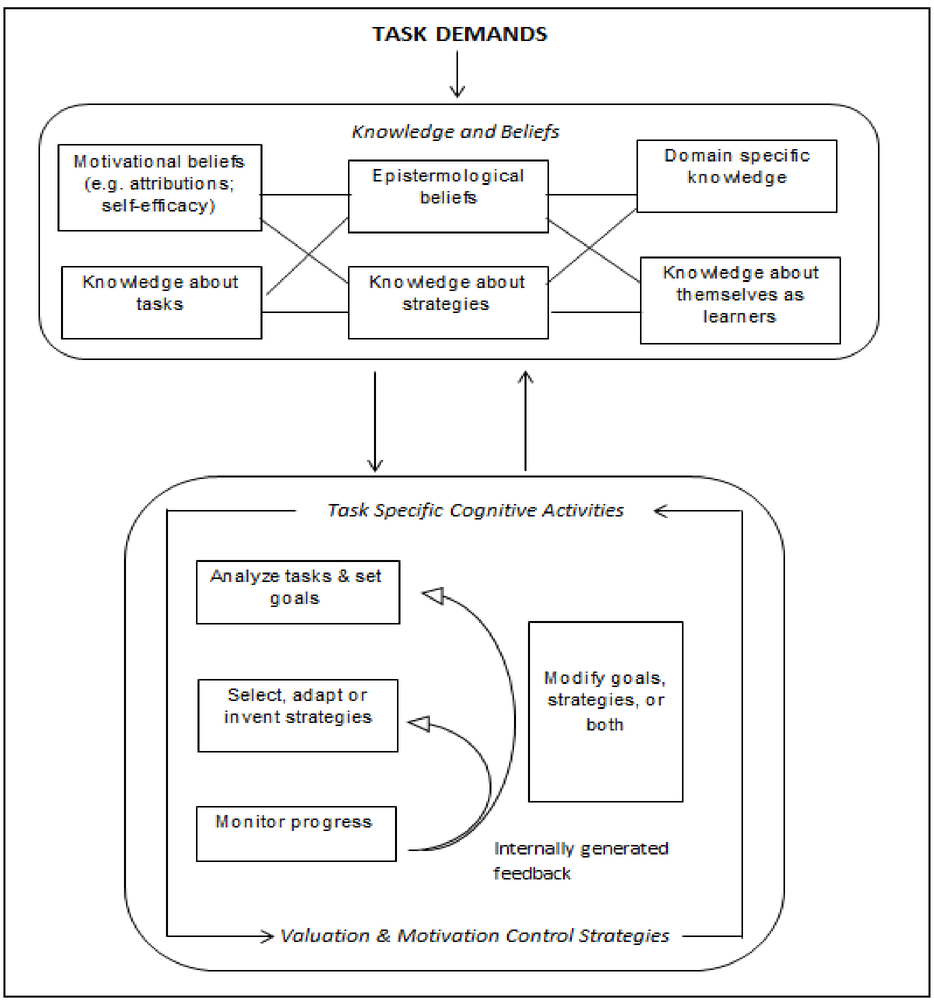


Figure 2.7: Simplified SRL model (adapted from MacLeod, Butler & Syer, 1996, p. 3)

The model of self-regulated learning presented in Figure 2.7 emphasises the bi-directional interplay between knowledge and action during self-regulated learning. This reminds of the basic metacognitive model of Brown (1987) discussed earlier (see Section 2.3.1), as she also distinguishes between knowledge and regulation (activities), and refers to their interplay. In addition, MacLeod et al. (1996) echo the notion of the kinds of metacognitive knowledge mentioned in the previous section, but epistemological beliefs are seen as a separate variable that has an impact on the act of learning. As defined previously, epistemological beliefs deal with how people form their conceptions of knowledge and knowing, and how people utilise these conceptions to understand their surroundings (Chen & Pajares, 2010). Although individuals mostly unconsciously hold these beliefs about knowledge and knowing, they are still influenced by them, and in the present study I included epistemological beliefs in the intervention, although only as part of the self-awareness facet. Two further components of self-regulated learning highlighted by MacLeod et al. (1996) and others are motivation (including self-efficacy) and domain-specific knowledge. Motivation to learn falls outside the scope of this particular study, but the act of learning can never be separated from the affective dimension of the individual involved in learning. The comment can be made that metacognition develops alongside motivation in young learners, as well as beliefs about themselves as learners. Prior knowledge of the subject that a learner is attempting to study plays a vital role in the ultimate mastering of that content, and this very important aspect is addressed in more detail later in the chapter.

Efklides (2011) recently proposed a new model of self-regulation, namely the metacognitive and affective self-regulated learning (MASRL) model. The MASRL model highlights the close linkage of metacognition and affect with cognition, and provides additional support for the initial statement made earlier that metacognition is most easily understood as an essential component of self-regulated learning. The MASRL model distinguishes itself from previous models by positing two levels of functioning, namely the person level and the person and task level (see Efklides, 2011).

To conclude the discussion of self-regulated learning and how it relates to metacognition, the concept of 'agency' needs to be mentioned. Zimmerman (1995) states that "self-regulation involves more than metacognitive knowledge and skill; it involves an underlying sense of self-efficacy and personal agency and the motivational and behavioural processes to put these self-beliefs into effect" (p. 217). McCormick, Dimmitt and Sullivan (2013) maintain that a learner could have well-developed metacognitive knowledge, but be unable to self-regulate in a specific context, because self-regulated learning refers to the capability to mobilise, direct and sustain one's instructional efforts. Sha (2008) remarks that the basic epistemological assumption of the role of metacognition in cognitive operations is the view of the human being as an active organism with agency in a prominent position. She further reminds us of the concept of consciousness being inherently associated with the idea of agency (Sha, 2008). Self-regulated learners are believed to exercise agency by consciously setting their learning goals, metacognitively monitoring their engagement towards the achievement of these goals, and choosing optimal strategies given the conditions (Greene & Azevedo, 2007).

For the purpose of this research, I synthesised (a metacognitive skill!) the work of researchers mentioned in this chapter, including Jacobs and Paris (1987) and Pressley and Afflerbach (1995), to conceptualise the theoretical framework guiding the present study. I presented a graphical illustration of the metacognitive concepts involved in content area learning in Figure 2.5 earlier. Metacognitive knowledge can be described in terms of self-awareness (including motivational beliefs), task awareness (together with text issues) and knowledge of strategies. The interrelatedness between metacognitive knowledge and skills (metacognition in action) is also evident, functioning within and influenced by a particular socio-economic context. Metacognitive strategies (see Table 2.1) are applied in a cyclic manner, starting with forethought and planning processes before reading, monitoring processes while reading, and then reviewing and reflecting on what was read to evaluate comprehension. Apart from the regulation process, metacognitive awareness also leads to conscious reflection, fostering agency and therefore self-regulated action. Metacognitive reflection brought to consciousness is viewed as a mediating factor, having a recursive impact on our knowledge of the learning activity as well as how we strategically apply this knowledge.

2.6 METACOGNITION AND CONTENT AREA LEARNING

Typically, in a content area classroom, learners are assigned pages to read (expository text) or they are directed to a website containing information on the topic of discussion (e.g. the history of slavery) to peruse. The complexity and quantity obviously increase as they progress through the grades, but the goal is the same: to best understand and remember the information presented in the text. Teachers, however, report that learners seem unable to process and build on text information independently (Dunn, 2000). When her learners were given a reading-to-learn task for homework, Dunn (2000) recounted that they remembered very little from their readings the next day and even the strong readers who seemed to understand the text fell short of the level of comprehension and information processing that is necessary to form deep layers of understanding. She concluded that “[l]earners are simply not connecting with text” (Dunn, 2000, p. 5).

The critical role played by reading comprehension in the process of learning is widely documented and through the years a great deal of theoretical research and instructional energy has gone into understanding reader–text interactions (Cekiso, 2012; Coleman, 2003; Garner, 1987). As stated by Cekiso (2012), “[r]eading comprehension forms the basis for the learning process” (p. 1). Metacognition, as a body of theory and research that addresses learners’ knowledge and use of their own cognitive resources, has enormous explanatory power for descriptions of the reading process. In this study, and particularly in the following section, the implications of metacognition are discussed as it relates to an important type of learning – reading to learn.

As children leave the Foundation Phase, the emphasis on learning to read becomes an emphasis on reading to learn. Goldman (2012) explains that learning to read involves mastering basic procedural reading skills that enable readers to recognise written words, pronounce them correctly, and read with reasonable fluency. Reading to learn, however, involves moving beyond these procedural skills to acquiring information from text. Those who approach content area reading tasks (science, social studies, mathematics, etc.) without an appropriate repertoire of reading strategies are at a distinct disadvantage (Abromitis, 2009) and often fall far behind their peers in terms of background knowledge and the ability to keep up with their assignments and grades. Being able to access the information in a text is very important to achievement. Further, reading for information varies greatly from reading for pleasure (e.g. language art class), and learners must approach the task with a different set of strategies in order to be successful (Gersten, Fuchs, Williams & Baker, 2001). Expository prose (also referred to in literature as content area or informative or academic text) can be defined as continuous text designed to describe factual information to the reader. As such, these texts are often “information based, contain technical vocabulary specific to the content domain, have more abstract logical arguments than narrative texts, and use more complicated and varied structures” (Dimmitt & McCormick, 2012, p. 170). Expository text is also characterised by several different types of text structures (description, sequence, compare and contrast, etc.), adding to the difficulty of making sense of expository text many children experience (Williams et al., 2005). Tercanlioglu (2004) insists that “academic reading is a very deliberate, demanding and complex process in which the students are actively involved in a repertoire of reading strategies” (p. 563).

At this point I need to clarify the concept of ‘disciplinary literacy’. According to Shanahan and Shanahan (2012), content area literacy focuses on study skills that learners can use to help them learn from subject matter-specific texts. Disciplinary literacy, in contrast, emphasises the knowledge and abilities possessed by those “who create, communicate, and use knowledge within the disciplines” (Shanahan & Shanahan, 2012, p. 7). Disciplinary literacy emphasises the unique tools that the experts in a discipline use to engage in the work of that discipline. Content literacy, however, emphasises techniques that a novice might use to make sense of a disciplinary text (such as how to study for a Geography test) and the scope of the present is limited to the latter.

2.6.1 Reading to learn and metacomprehension

Snow (2002) states that “meaning does not exist in text, [it] must be actively constructed, [and] instruction in how to employ strategies is necessary to improve comprehension” (p. 32). Text comprehension represents one of the most important aspects in learning, given the role it plays in the processes of acquisition, sharing and construction of knowledge (Tarchi, 2010). To ‘comprehend’ means to understand or ‘grasp mentally’ (Tarchi, 2010, p. 415). Neufeld (2005) defines comprehension as the process of constructing a supportable understanding of a text and states that implicit in this brief definition are two important features of the comprehension process. First, seeking to comprehend a text is an active, intentional thinking process through which the reader constructs meaning. In Chapter 1 I mentioned that the present study is situated in the pragmatic paradigm and supports social constructivism (see

Section 1.5). Klapwijk (2011) explains that the constructivist view of reading emphasises the active construction of meaning by the learner and opposes the view that knowledge is fixed. McLaughlin and Lee (2008) remind us that learning occurs when new knowledge is integrated with a learner's existing knowledge, and that this integration of new knowledge is only possible when the learner is actively involved in the learning process. Learning is a highly social process (McLaughlin & Lee, 2008) and, therefore, effective reading to learn requires engaged readers being strategic in constructing meaning from text. To simply reproduce the text (often part of rote learning) instead of constructing meaning from it is not learning.

In addition to emphasising the active nature of reading, constructivists believe that the meaning constructed from a text is subjective (Loyens, Rikers & Schmidt, 2009). Readers are influenced by the sum of their individual experiences and unique individual make-up when processing text (Klapwijk, 2011). Neufeld (2005), however, states that, while learners' understanding of texts is expected to vary as a result of differences in their background knowledge and experiences, not all interpretations of a given text can be considered valid. Pressley (2002) makes the important point that both what the reader brings to the text (i.e. knowledge of the topic) and the ideas conveyed through the words printed in the text are important to the comprehension process. Two readers, for instance, might have differing perspectives of what was described in a text or of the author's purpose for writing it, but if the readers have comprehended the text, the essential 'story' they both understand the author to be presenting should be similar (Pressley, 2002). Comprehension of text is therefore the integration of three components, namely the explicit information contained in the text that triggers the meaning-making process, the inferences by the reader (implicit information) and what the reader brings to the reading context in the form of prior knowledge and experience (Morley, 2009).

"The goal of reading is to understand the text, and reading only really occurs when it is understood" (Gee, 1998, p. 1). Reading without comprehending is not learning, but merely decoding. Comprehension can therefore be seen as the result of active reading and constructing meaning from text. To ensure deep learning, however, we need more than just understanding text on the object level (see Section 2.4). "Just because readers understand a text's meaning (i.e. comprehension), does not mean they have also correctly assessed how complete their understanding of the text actually is (i.e. metacomprehension)" (Griffin et al., 2008, p. 96). This notion of metacomprehension as a secondary process to text comprehension follows directly from what have been widely presumed to be critical features of the metacognitive system. In Section 2.4 I explained the interaction of the different cognitive processes at object level and metalevel. Processing at the object level (comprehension), where the object is the text informs one's own mental processes and representation of the text at metalevel (metacomprehension) (Nelson & Narens, 1990).

The present study partly focused on making young learners aware of text-processing strategies and the metacognitive skill of monitoring understanding of what is being read; hence, the development of metacomprehension. Dunlosky and Lipko (2007) refer to metacomprehension as our ability to judge our own learning and/or comprehension of text material. Gee (1998) explains that this "awareness of one's state of reading comprehension" proceeds by means of unconscious strategic processing until there is a breakdown in understanding (p. 1). Skilled readers detect this comprehension failure (breakdown), which alerts them to pause and invest in conscious strategies to restore understanding. These metacognitive strategies allow learners to control their own cognition and improve comprehension. In the following sections I elaborate on the factors that impact a learner's ability to metacomprehend text and I then identify specific strategies that expert learners employ.

2.6.2 Factors that have an impact on metacognition and content area learning

To understand the factors that have an impact on content area learning, we can start by asking: Why does comprehension failure occur so frequently? According to Tercanlioglu (2004), learners lack target language proficiency and vocabulary, they are unfamiliar with the content and/or formal schemata of the texts to be read and they frequently use inefficient reading strategies. Furthermore, research indicates that young learners also fail to comprehend text because of decoding deficiencies, confusion about task demands, meagre domain knowledge, weak comprehension monitoring, low self-esteem and low interest in the topic or task (Fisher & Frey, 2014; Garner, Alexander & Hare, 1991; Klapwijk, 2011; Simpson & Nist, 2000). Learning from written text is a complex task and requires the ability to analyse, synthesise and evaluate information from multiple sources and different content types, connecting the new information with prior knowledge (Goldman, 2012).

Many years ago, James Jenkins (as cited in Bransford, 1985) conceptualised what he called the Tetrahedral Model, highlighting important constellations of factors that must be simultaneously considered when attempting to think about issues of teaching and learning. Over the years, many researchers have adapted the model slightly to fit the current discussion. In her seminal work, Armbruster (as cited in Collins, 1994) presents “reading to learn from a metacognitive perspective as it relates to the four variables” identified in Jenkins’s original design: text, tasks, strategies and learner characteristics (par. 2). In the present study, I used similar categories in defining metacognitive knowledge variables, but grouped ‘text’ and ‘task’ together under the same heading (see Figure 2.6). An understanding of what these variables entail is central to the present study and guided the conceptualisation of the intervention.

The first variable refers to the textual features of learning materials that influence comprehension and memory. “Factors such as arrangement of ideas in texts, vocabulary, syntax, clarity of the author’s intentions and the reader’s interest in and familiarity with a text all have an effect on [learners’] learning” (Collins, 1994, par. 3). Knowledge of text structure is critical for reading to learn and various strategies are proposed by researchers to help learners read and comprehend informational texts (Bauman, 2002). These include hierarchical summaries, conceptual maps and thematic organisers designed to raise students’ awareness of structures of text (Buehl, 2014; Tarchi, 2010). Research suggests that “younger and less mature readers do not concentrate on textual features because they are not aware of the impact text structures have on learning” (Collins, 1994, par. 5). Knowledge of the effect of text structures on learning is prerequisite to the conscious control of strategies. The concept of mind mapping has been introduced into the South African curriculum for many years and most young learners are exposed to the basic principles of how to use it. Anecdotal evidence does, however, indicate that learners do not make the link between text structure and mapping. In addition, ambiguous words or confusions within the text affect cognitive processing, and novice readers will not necessarily adjust their reading rate for anomalous texts and an inconsistent sentence or passage might simply be skipped. This tendency was also demonstrated in the findings of the present study (see Section 5.3). The more experienced readers would have, hopefully, learned to return to the inconsistencies several times, comparing what they know with what is written in the text.

A further variable of metacognition in reading to learn pertains to the task that the reader is required to perform. For example, a different process is required to locate a specific detail in a text than that needed to write a critical analysis of the text (Armbruster, as cited in Collins, 1994). As with other facets of metacognition, mature and immature learners (maturity relates to experience of the learning process) differ with respect to their knowledge of and ability to control task variables. Self-regulated learning implies an adaptive process where learners adapt reading behaviour for attaining different learning goals, but to be adaptive, learners must have a clear notion of what the task requirements consist of (Harris, Graham, Urdan, McCormick, Sinatra & Sweller, 2012; Simpson & Nist, 2000). A study by Schellings and Broekkamp (2011) showed that tenth-graders have difficulty in verbalising task demands and, in line with previous work, experience limited awareness of task demands.

Earlier it was suggested that our starting point should be trying to answer the question of 'why comprehension fails'. The third variable proposed in research involves how to remedy comprehension failures, namely strategies. Knowledge of metacognitive strategies is imperative and how best to develop this awareness is a major focus of the present study. Research indicates that good and poor readers can be distinguished on the basis of effective strategy use and also the diversity of the strategies that they employ (Cubukcu, 2008). The good news is that readers can be taught to develop self-awareness and control of learning. In literature we find several strategies for improving comprehension, including forming a mental image, rereading, adjusting the rate of reading, self-questioning and summarising (Dimmitt & McCormick, 2012; Huff & Nietfeld, 2009).

A final category of metacognition in reading to learn is the awareness of the learner of his own characteristics (e.g. background knowledge, degree of interest, skills and deficiencies) and of how these affect learning (Collins, 1994). Research suggests, for instance, that successful learners tend to relate information in texts to previous knowledge, while less successful learners show little tendency to use their knowledge to clarify the text at hand (Harris et al., 2012; Kaefer, Neuman & Pinkham, 2015). Self-awareness is critical to developing independent learning. This entails knowing your learning style (see Section 2.5) and what motivates you to engage in a specific learning activity.

In conclusion, learner characteristics, such as text, tasks and strategies, are age- and experience-dependent. As noted in Section 2.5, "the development of metacognition appears to be linked to proficiency in learning" (Collins, 1994, par. 18), and knowledge of metacognitive processes precedes control. It can be argued that learners must first become aware of structures of text as well as knowledge of the task and their own characteristics as learners, before they can strategically control the learning process to optimise the influence of these factors (Armbruster, 1983). In her study on metacognition, Cockcroft (2014) goes so far as to conclude: "Children need to be taught strategies to deal with subject matter before they are taught the subject matter" (p. 24). These notions provided the motivation for the intervention in this research study, targeting the young learner at early intermediate level.

2.6.3 The expert learner – identifying metacognitive strategies

Metacognitive development is about becoming more of an expert at learning (Jackson, 2004). According to Cubukcu (2008), our current understanding of metacognitive strategies has been shaped significantly by research on what expert readers/learners do. Tercanlioglu (2004) expresses the hope that "if the strategies of more successful readers can be described and identified, it may be possible to train less successful learners to develop improved strategies" (p. 563).

Ertmer and Newby (1996) state that expert learners know how to learn. They define expert learners as follows (p. 6):

> [P]eople who use the knowledge they have gained of themselves as learners, of task requirements and of specific strategy use to deliberately select, control and monitor strategies needed to achieve desired learning goals. Expert learners notice when they are not learning and thus are likely to seek a strategic remedy when faced with learning difficulties, while novice learners, on the other hand, rarely reflect on their own performance and seldom evaluate or adjust their cognitive functioning to meet changing task demands or to correct unsuccessful performances.

Successful comprehension does not occur automatically, but depends on metacognitive processing, which Cubukcu (2004) refers to as "directed cognitive effort" (p. 85). Alexander and Jetton (as cited in Cubukcu, 2004) state that, during reading, metacognitive processing is expressed through strategies and these strategies are "procedural, purposeful, effortful, wilful, essential and facilitative in nature" (p. 85). To regulate and enhance learning from text, the skilled reader is actively engaged with the text and intentionally invokes a variety of consciously controlled strategies (Buehl, 2014; Pressley, 2000).

Nash-Ditzel (2010) reports on two landmark studies conducted by Pressley et al. (1992) and Paris, Cross and Lipson (1984), explicitly teaching metacognitive reading strategies to elementary students (similar to Intermediate Phase learners) to improve self-regulation. These research teams drew inspiration from Brown, Palinscar and Armbruster's (1984) research and implemented a variety of reading strategies with significant impact on learning behaviour. Paris et al. (as cited in Nash-Ditzel, 2010) implemented the following six strategies: "understanding the purpose of reading, activating relevant background knowledge, allocating attention to main ideas, critically evaluating, monitoring comprehension and drawing inferences" (p. 47). Pressley et al. (1992) utilised a slightly different set of strategies, namely promoting summarisation, prediction, visualisation, thinking aloud, story grammar analysis, text structure analysis, prior knowledge activation and self-questioning. The strategies used in the present study were derived from these and other studies, including the work of Jacobs and Paris (1987), Schmitt (1990) and Keene and Zimmermann (2007) (see Section 4.4.3.2).

In the late 1980s and 1990s, Pressley and Afflerbach (1995) reviewed various studies, cataloguing the strategies and responses self-reported by expert readers as they read, and they concluded that "good readers are massively strategic before, during, and after reading" (Pressley & Gaskins, 2006, p. 100). For instance, prior to reading, they do things such as clarifying their purpose for reading, gaining an overview of the text, activating their prior knowledge of the topic, and making a plan for how to read the text. While reading and after they finish reading, expert learners ask questions of the text, relate the information in the text to their previous understandings of the topic and reread, summarise and make notes to monitor their comprehension and clarify their understandings. Moreover, expert readers use the kinds of strategies just described without prompting from others. In other words, the strategic behaviours of expert comprehenders are self-regulated (Ertmer & Newby, 1996; Pressley, 1998, 2000). Expert learners also demonstrate flexibility of strategy use while reading text (Tercanlioglu, 2004) and Pressley and Gaskins (2006) refer here to “constructively responsive reading” (p. 100).

Buehl (2014) refers to various “comprehension processes that proficient readers employ” as they read to learn (p. 4). He reports on the seminal work on comprehension instruction of Keene and Zimmermann (2007) and highlights seven characteristic modes of thinking that are in constant interplay when an individual is engaged in understanding (Buehl, 2014, p. 4–6). See Table 2.1 below for a summary of these comprehension processes and a brief description of each element.

Table 2.1: Comprehension processes of proficient readers (adapted from Buehl, 2014, p. 5)

Comprehension process	**Description**
Make connections to prior knowledge	Reading comprehension results when readers can match what they already know (their schema) with new information and ideas in a text. Proficient readers activate prior knowledge before, during and after reading and they constantly evaluate how a text enhances or alters their previous understanding.
Generate questions	Comprehension is, to a significant degree, a process of inquiry. Proficient readers pose questions to themselves as they read. Asking questions is the art of carrying on an inner conversation with an author, as well as an internal dialogue within oneself.
Visualise and create sensory mental images	Comprehension involves breathing life experiences into the abstract language of written texts. Proficient readers use visual, auditory and other sensory connections to create mental images of an author’s message.
Make inferences	Much of what is to be understood in a text must be inferred. Authors rely on readers to contribute to the meaning of a text by linking their background knowledge to information in the text. In addition to acknowledging explicitly stated messages, proficient readers read between the lines to discern implicit meanings, make predictions and read with a critical eye.

Determine importance	Our memories quickly overload unless we can pare down a text to its essential ideas. Texts contain key ideas and concepts amid much background detail. Proficient readers strive to differentiate key ideas, themes and information from details so that they are not overwhelmed by the facts.
Synthesise	Proficient readers glean the essence of a text (determine importance) and organise these ideas into coherent summaries of meaning. Effective comprehension leads to new learning and the development of new schema (background knowledge). Proficient readers make evaluations, construct generalisations and draw conclusions from a text.
Monitor reading and apply fix-up strategies	Proficient readers watch themselves as they read and expect to make adjustments in their strategies to ensure that they are able to achieve a satisfactory understanding of a text.

For the purpose of the present study, it was decided to focus on the following six strategies or groups of related strategies: previewing, predicting and verifying; self-questioning; drawing on prior knowledge; purpose setting; summarising and drawing on mental images; and applying fix-up strategies. These strategies, which I refer to as metacomprehension strategies, were further allotted to the three stages in the reading process (Pressley & Afflerbach, 1995) – before, during and/or after reading. These stages parallel the three metacognitive processes of planning, regulating and evaluating (see Figure 2.5). Table 2.2 provides an outline of the metacomprehension strategies targeted in the present study (see also Table 5.3 for the storybook plan, detailing the inclusion of these strategies in the story text).

Table 2.2: Metacomprehension strategies included in the intervention

Strategy/Strategy group	**Behaviour indicator (example)**	**WHEN should the strategy be applied? Before/during/after reading text**
Previewing, predicting and verifying	"Before I begin reading, I read the heading and look at the pictures to predict what the text is about, and after I have read the informative piece, I think about what made me make good or bad predictions."	Before, during and after
Self-questioning	"Before I begin reading, I ask myself questions that I would like to have answered, and then, as I read through the text, I check to see if I can answer any of the questions."	Before, during and after
Drawing on prior knowledge	"While I am reading, I keep thinking of what I already know about the things and ideas in the text to help me connect the new information with my prior knowledge of the topic."	Before and during
Purpose setting	"After I've read the text, I check to see if I met my purpose for reading the text."	Before and after
Summarising and drawing on mental images	"After I've read the text, I retell the main points of what I have read about the topic so that I can check to see if I understand it, and I draw a mind map."	During and after
Applying fix-up strategies	"While I'm reading, I reread some parts or read ahead to see if I can figure out what is happening if things aren't making sense."	During and after

2.7 CONCLUSION

The objective of a literature review "is to provide a critical overview of existing knowledge of the main issues related to the study topic" (Klapwijk, 2011, p. 13). In this chapter, the concept of metacognition was discussed and specifically how it relates to learning from text. The factors that have an impact on the meaning-making process of reading an expository text were outlined and the chapter concluded with a description of 'the expert learner', highlighting what metacognitive knowledge young learners should develop to be more efficient at learning. The next chapter examines ways to impart this metacognitive knowledge to learners.

CHAPTER 3
DEVELOPING METACOGNITIVE AWARENESS – CONCEPTUALISING AN INTERVENTION

". . . And so I learned not from those who taught, but from those who talked with me." – St. Augustine (Fisher, 2005, p. 156)

3.1 INTRODUCTION

How can metacognitive awareness be developed in young learners? In this chapter, cognitive development and the contribution of neuroscience are outlined first, and Vygotsky's constructivism is discussed in detail. The chapter also relates metacognition to the broader area of general thinking skills and discusses the appropriateness of practising metacognition with young learners. Different approaches to the development of metacognition are dealt with and the elements of effective interventions are highlighted. The chapter concludes with a discussion of storytelling, and tentative design guidelines for a novel intervention approach are outlined. This chapter relates to Phase 2 of the research design (see Figure 3.1). The second research objective (see Section 1.4), namely the development of an intervention solution, is conceptualised.

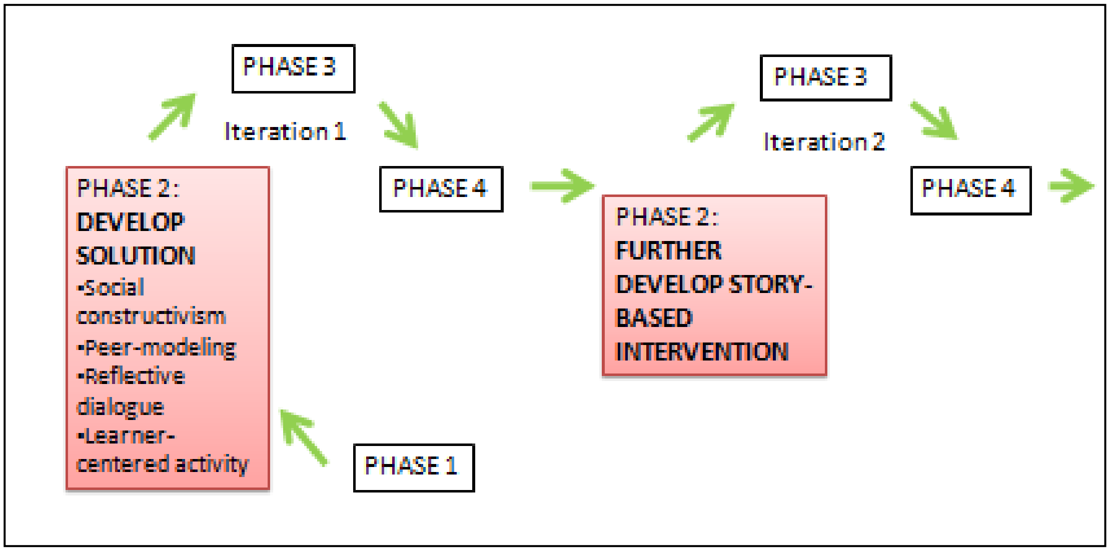


Figure 3.1: Research design – positioning Phase 2

3.2 COGNITIVE DEVELOPMENT AND NEUROSCIENCE

Central to the present study is the concept of development, and more specifically cognitive development. Development implies, in its simplest form, changes that occur in human beings and "cognitive development refers to changes in thinking, reasoning and decision making" (Woolfolk, 2013, p. 30). Setting the stage for a better understanding of cognitive development, I start off this chapter with a brief discussion of what we can learn from neuroscience in our quest to foster higher-order thinking.

We have, for instance, long been aware that people with frontal lobe damage lack feeling of knowing accuracy, but their recall and recognition are normal (Janowsky, Shimamura & Squire, 1989). These findings suggest that there might be distinct areas of the brain associated with different metacognitive tasks and that the frontal lobes are an essential structure in prospective monitoring judgements and for efficient allocation of self-paced study time during learning. Over the years, research in neuroscience has contributed to our understanding of how our brains work, also within the context of learning (Van Elsäcker-Bok, 2002; Veenman, 2015). From behavioural studies we know that pre-readers who can recognise phonological similarity (for example, that cat and hat rhyme, or that cat and cup share the first sound) become better readers (Goswarni, 2006), and imaging studies have shed light on how phonological decoding and literacy develops. Brain imaging research also revealed interesting differences among skilled and less skilled readers as they learn new vocabulary. Woolfolk (2013) relates one such study showing that "less skilled readers had trouble establishing high-quality representations of new vocabulary words in their brains" (p. 39). When these less skilled readers encountered the new word later, their brains often did not recognise that they had seen the word before, even though they had learned the words in an earlier lesson.

Research also indicates that the brain stores information in a use-dependent fashion. According to Perry and his colleagues, the more frequently a pattern of neural activation occurs, the stronger its internal representation will become, and these representations function as a processing template through which all new experiences are filtered (Perry, Pollard, Blakley, Baker & Vigilante, 1995). The present study was concerned with the young learners' still developing brain, where memory states organise neural systems that lead to trait development. What I have emphasised before is my conviction that early intervention could help circumvent the possible development of ineffective patterns of neural activation being over-stimulated (see Section 1.1).

In terms of the present study and its intervention focus, as worded by Woolfolk, "we know teaching can change the organization and structure of the brain" (2013, p. 37). Studies have shown differences in brain activity associated with instruction (Fisher, 2009). Important to note is that in all these studies the results depended on intensive instruction and often long-term strong support and practice (Bransford, et al., 1999), highlighting the intentional and purposeful process of an intervention leading to desired cognitive development. Veenman (2015) uses the term "prolonged training" in his writings on metacognitive development, emphasising the importance of repeated practice, spread over time (p. 17). Frey and Fisher (2010) remind us that reading is not innate or automatic and the brain has to be taught to read. The present study is directed at reading comprehension of expository text and the complex integration of brain systems is involved.

These research revelations speak to Vygotsky's view on cognitive development. Vygotsky maintained that "the outcomes of cognitive development are not simply a continuation of elementary functions and are not their mechanical combination, but a qualitatively new mental formation" (as cited in Gredler, 2012, p. 121). He stated that "ordered and comprehended perception, connected with thinking in words, is the complex product of a new synthesis in which visual impressions and processes of thinking are merged in a single alloy" (Vygotsky, as cited in Gredler, 2012, p. 122). Reading comprehension is a meaning-making process and the constructivist principle that new information must be linked to existing knowledge, in an ordered manner to construct meaning to a learner, is vital. The importance of schema and prior knowledge is included in the content of the story-based intervention, as I believe it is critical that learners gain an appreciation for how their brains work as backdrop to a better understanding of and control over their own learning process (see Table 5.3 and Addendum N).

According to Woolfolk (2013) we also have ample evidence that there is "a clear connection between the brain and [classroom] learning in the area of emotions and stress" and that "anxiety interferes with learning, whereas challenge, interest, and curiosity can support learning" (p. 39). This directly relates to what Berger (as cited in Woolfolk, 2013, p. 63) refers to as teaching in the "magic middle". Both Piaget and Vygotsky contended that learners should neither be bored nor frustrated in the learning process. Learners should be put in situations where they have to reach to understand, but where support from other learners or teachers are also available (see Section 3.3). Woolfolk (2013) mentions the early writings of Hunt and his belief that "disequilibrium must be kept 'just right' to encourage growth" (p. 61). In the findings of the present study, discussed in Chapter 5, the emotive aspect of learning came to the fore quite prominently.

Neuroscience research, therefore, provide us with pertinent information that has the potential to guide more effective education intervention and instruction. However, Murphy and Benton (2010) warn against teachers falling for overly simplistic 'brain-based' teaching, such as assuming that a child is either a right- or a left-brain learner. Woolfolk (2013) proposes that we consider more general guidelines proven over time and summarised a list of 10 principles from well-known researchers such as Dristol (2005), Sprenger (2010) and Wolfe (2010). Most applicable to the present study is the 10th general principle that she lists (Woolfolk, 2013, p. 42):

> Stories should be used in teaching. Stories engage many areas of the brain – memories, experiences, feelings, and beliefs. Stories also are organized and have a sequence –

beginning, middle, end – so they are easier to remember than unrelated or unorganized information.

3.3 IMPLICATIONS OF PIAGET AND VYGOTSKY'S THEORIES FOR METACOGNITIVE DEVELOPMENT

Russian psychologist Lev Vygotsky was a contemporary of Piaget. His own position on learning was not only influenced by Piaget's extensive work on understanding children's thinking, but he was also a new voice in the psychological literature who had "very different views about the major forces shaping learning and thinking" (Snowman & McCown, 2015, p. 49). The proposed intervention in the present study was based partly on these researchers' work and it is therefore prudent for me to further elaborate on the implications of their theories on learning and the development of metacognition. In Chapter 2, I explained the basic principles of Vygotsky's theory (see Section 2.2).

Piaget believed that "the main goal of education should be to help children learn how to learn" (Woolfolk, 2013, p. 60). Piaget was one of the first advocates for 'differentiated instruction' (see Hipsky, 2011 for further clarification). He believed that learners in any class will vary greatly in terms of the level of cognitive development and their academic knowledge, and maintained that if we understand children's thinking, we will be better able to match teaching methods to children's current knowledge and abilities (Woolfolk, 2013).

Piaget's fundamental contribution to current educational practice was, however, his insight that learning is a constructive process. Piaget (1964, p. 8) asserted that individuals constructed their own learning:

> Knowledge is not a copy of reality. To know an object, to know an event, is not simply to look at it and make a mental copy or image of it. To know an object is to act on it. To know is to modify, to transform the object, and to understand the process of this transformation, and as a consequence to understand the way the object is constructed.

Piaget's emphasis on active involvement and his notion of the schema have been and continue to be of great value in our understanding of reasoning and knowledge development. He referred to the schema as "an organized cluster of understandings related to a particular object, situation or concept" (Green, 2014, p. 15). Piaget claimed that schemata direct behaviour and thought, continuously developing and refining through a process of equilibration as individuals adapt to their environment. Piaget's beliefs about fixed developmental stages, limiting thinking at different ages, however, were seriously questioned in the past.

Vygotsky, like Piaget, promulgated the development of higher mental functions and deep learning. Woolfolk (2013) makes the statement that "Vygotsky probably would [have] appose[d] educational curricula that are an inch deep and a mile wide or seem like 'trivial pursuit'" (p. 62). Curriculum development per se falls outside the scope of the present study, but as the focus is on content area learning, it is important that we be reminded of the impact of what and how content is presented to learners (the content in the form of task and text variables – see Section 2.6.2). In South Africa in recent years we have gone through numerous curricula changes, with varying successes. A number of researchers have expressed concerns about current curricula internationally, based on Vygotskian perspectives (see Gredler, 2009; Stipek, 2006).

Vygotsky's viewpoints relate to direct teaching, the intentional use of modelling and/or the creation of a collaborative learning environment (Wink & Putney, 2002). Adding to the discussion in Section 2.2 on social constructivist theory, I would like to highlight an issue discussed in an article by Gredler (2012) on how Vygotsky's work relates to the classroom. In the first place, Gredler (2012) contends that the assessing of learners' ZPDs is important "to identify maturing intellectual functions" (p. 125). She lists four assessments in the ZPD that would address the cognitive processes essential in mastering subject matter concepts, including the learner's "level of cognitive awareness of his own mental processes" (see Gredler, 2012, p. 125). The present study not only incorporated the formal assessment of learners' metacognitive knowledge (see Section 4.4), but also had as its main focus the development of a learner's cognitive awareness of his own mental processes through the means of a story-based intervention. Identified by Vygotsky, the two cognitive processes that are important in any classroom approach with the aim of developing thinking are (1) the extent of the learner's conscious awareness of his own thinking and (2) understanding of the psychological nature of the task (Gredler, 2012).

Most appropriate to the present study, however, is Vygotsky's emphasis on psychological tools mediating all higher-order mental processes and his view that language is critical for cognitive development (Dristol, 2005). In essence, the process involves a more capable peer (in this study, Abe, the story character) exchanging ideas and ways of thinking about or representing concepts – such as doing mind maps as a way of organising facts – with a learner. These ideas and self-reflections expressed by Abe and his friends through the storytelling medium is not really 'co-created' as is proposed by the traditional Vygotskian model, but the learners' knowledge and values are still developed as a result of the interaction with the 'more knowledgeable other' (although the exchange is one-directional). Because of the exchange of signs and symbols and explanations, as Wertsch (2007) put it, learners in the present study reading the stories develop a cultural toolkit to make sense of and learn about learning and themselves as learners. In Vygotsky's theory, compared to Piaget, language is the most important symbol system in the toolkit. Vygotsky (1987) maintained that "thinking depends on speech, on the means of thinking, and on the child's socio-cultural experience" (p. 120). He particularly believed that private speech (talking to yourself) guides cognitive development. Rather than seeing private speech as a sign of immaturity, like Piaget did, Vygotsky suggested that this 'internal verbal thinking' plays an important role in cognitive development. These 'mutterings' "move children in stages toward self-regulation: the ability to plan, monitor, and guide your own thinking and problem solving" (Woolfolk, 2013, p. 58). Through storytelling, Abe's 'private speech' is explicated, similar to the 'think-aloud' technique (see Wilhelm, 2001), presumably providing support to learners in their ZPD. In the study I refer to the conscious verbalisations of thought processes (modelled by Abe) as metacognitive reflection (see Addendum N for an example of a story narrated by Abe).

3.4 THE DEVELOPMENTAL NATURE OF METACOGNITION

The developmental nature or modifiability of metacognition has been widely established in research (Dimmitt & McCormick, 2012; Kuhn, 1999; Veenman & Spaans, 2005). Metacognition develops with age and experience. In Section 1.2 I referred to Fisher (2007) explaining that older children demonstrate more effective learning behaviour partly because they have internalised a greater quantity of metacognitive information.

Schmitt (1990) reports on fourth-grade groups achieving significantly higher levels of strategy knowledge than third graders in each of the groups in her study. The significant growth in declarative strategy knowledge between third and fourth grade suggests that the development of metacognitive knowledge may be a developmental characteristic. Such growth is consistent with Paris and Jacobs's (1984) findings regarding differences between early elementary age groups' reading strategy awareness, noting increases in age cohorts. According to Kuhn (2000), young children's dawning awareness of mental functions "lies at one end of a developmental progression that eventuates in complex metaknowing capabilities that many adults do not master" (p. 178). Metacognition becomes more explicit, powerful and effective, as it comes to operate increasingly under the individual's conscious control during its extended developmental course.

Theory of mind research is particularly relevant to tracing the emergence of metacognition in young children (Dunlosky & Metcalfe, 2009). Theory of mind refers to "knowledge about mental life, such as the ability to comprehend our own mental states and activity and be able to attribute mental states to others" (Dimmitt & McCormick, 2012, p. 160). Theory of mind marks the start of metacognitive development (Veenman, 2015). Kuhn (2000) proposes that young children use words such as 'think' and 'know' already by age three and by age four they begin to understand that others may have different perspectives than they do, indicating that they have begun to build foundational understanding about the thinking process (theory of mind develops). Important to note, however, is that understanding awareness (metacognitive knowledge) of themselves and others as 'knowers' emerges in young children before control of processes (metacognitive regulation) (Dimmitt & McCormick, 2012).

Veenman (2015) indicated that metacognitive skilfulness emerges only at the age of eight to ten years, and expands during the years thereafter. Young children are less likely to display either the knowledge or the control components of metacognition that older children have gained and are able to verbalise. However, as children develop and gain experience with the demands of school, their understanding of the nature of memory becomes more sophisticated and their abilities to monitor and evaluate their learning performance increase (Dimmitt & McCormick, 2012). By adulthood, it is assumed that many adults can be reflective about their thinking and can verbalise the strategies they use to describe how they know what they know. In his recent review on metacognition, Veenman (2015) reminds us that metacognitive skills do not unfold at the same age – “planning and monitoring emerge early in development, while evaluation and reflection blossom later” (p. 14).

Some clash in opinion in research on the development of metacognition exists, relating to the question whether elementary aged children (school-age child to adolescence) “can or cannot benefit from, or are even able to experience, metacognitive activity” (Georghiades, 2004, p. 369). Piaget’s (1976) stage of formal operations led early researchers to predict that there would be little evidence of metacognition in learners before formal operational thought (reflection) developed. A decade later, Adey, Shayer and Yates (as cited in Georghiades, 2004) cast further doubt as to the “appropriateness of practising metacognition with children of young ages”, in an offering of research evidence of “11-year-old boys not benefiting from a series of intervention lessons that incorporated metacognitive elements, positive outcomes being restricted to girls of the same age, or to older age groups” (p. 369).

Many others, however, strongly advocate the engagement of young learners in metacognitive thinking. Gunstone (1994) uses the term ‘enhancing metacognition’ in his writings, and states that “all learners have metacognitive ideas and beliefs of some form” (p. 134). Scholars who favour the practice of metacognition early in learners’ school lives base their claims on evidence obtained from research with primary school aged children. Lodico et al. (1983) trained young children to monitor their performance while using different strategies and to explain how the strategy influenced their performance. Continuous feedback regarding their answers was provided throughout this training, and those who received this training were better able to derive the utility of the strategies, even after some time, frequently choosing the more effective strategy. Lipman (1985) implemented his P4C with young children starting at five years of age, and successfully promoted metacognition (see Section 3.8.1.2 for a discussion).

Georghiades (2004) “employed metacognition alongside normal science teaching with 11-year-olds, and presented material such as concept maps and annotated drawings produced by the learners during metacognitive activities” (p. 369). The findings clearly demonstrated signs of reflective thinking on their understanding and the processes of their learning. Increased learning awareness among eight- and nine-year-old learners who produced complex and revealing concept maps about their learning was recorded by Rudd (1992). Interestingly, Georghiades (2004) reported that Adey and his colleagues, after their initial sceptical research into early metacognitive intervention, redirected their efforts towards younger ages. Adey, Robertson and Venville (2002) found significantly greater gains in cognitive development of Year 1 primary school learners exposed to metacognitive instruction. Pappas, Ginsburg and Jiang (2003) established in their research clear evidence that young children begin to employ rudimentary forms of metacognition before the onset of formal schooling. Another study found that learners as young as four and five years old showed that they not only have metacognitive knowledge, but also could demonstrate metacognitive skilfulness (Wall, 2008). Veenman et al. (2006) therefore conclude that “our initial model of metacognitive development needs some revision” (p. 8). They claim that metacognitive knowledge and skills most likely already develop during preschool or early-school years at a very basic level, but become more sophisticated and academically orientated whenever formal education requires the explicit utilisation of a metacognitive repertoire.

Veenman et al. (2006, p. 8) mentioned “that metacognitive knowledge develops along a monotonic incremental line throughout the school years, parallel to the development of intellectual ability” of learners. From earlier comments on the relationship between intellect and metacognition, intelligence only gives learners a head start in metacognition, but it does not further affect its developmental course (see Section 2.3). In addition, it does seem that metacognitive skills initially develop in separate domains, and later on become generalised across domains (Veenman & Spaans, 2005; Veenman, 2015). The issue of domain-specific versus domain-general metacognitive training has always been contentious and the processes that are responsible for transfer across domains along the developmental trajectory are still open to debate (McCormick et al., 2013).

Vygotsky, however, placed very specific limitations on the thinking of the school-aged child. By age six (school age), the child can accurately select examples of concrete concepts such as a circle and Vygotsky referred to this level of thinking as thinking in pseudoconcepts, because at this level the child is not yet able to abstract and synthesise the concept attributes (Gredler, 2012). During the elementary school years, through instruction, a child starts to construct preconcepts, and Gredler (2012) explains that a preconcept is “a limited understanding of a true concept” (p. 123). The problem is that, despite the progression from pseudoconcepts to preconcepts, the child’s thinking is limited in the following two ways: (1)

Children answer questions intended to require thinking by recalling concrete examples or situations – a concept is mainly “the product of recollection”; and (2) the child “lacks an adequate understanding of his thought processes and, therefore, cannot fully master them” (Gredler, 2012, p. 124). Vygotsky maintained that this “underdevelopment of logical thinking consists of the child not being conscious of his own process of thinking” and he believed that this lack of conscious awareness persists until about the age of 12. This contention is exactly why I argue for a focus on supporting learners to become consciously aware of how they think. This awareness should be *intentionally* introduced to learners as early as possible, and in the present study I explored the feasibility of my conviction (see Section 6.2).

Adding to this discourse on developmental issues, Kegan (1994) presents a model of cognitive development from infancy to adulthood closely paralleling the multiple levels of abstraction in Nelson’s metacognitive model mentioned earlier (see Section 2.4). Kegan (1994) describes a process whereby children at first think only in terms of the object level and gradually progress in their thinking to what he calls third- or fourth-order consciousness. Concerning metacognition, each of the successive levels of consciousness requires a higher level of abstraction and a metaview of the preceding level. The first order of consciousness involves thinking about objects as separate elements. The second level is about organising those elements into categories. The third level is about relationships between categories. Finally, the fourth level is about organising these relationships. The sample group in the present study falls between the postulated third and fourth levels. Each successive level subsumes or encompasses the prior level – “[t]hat which was subject becomes object to the next level” (Kegan, 1994, p. 32). Mathe (2002) concludes that Kegan’s model is therefore almost a complete restatement of how Nelson (1996) views metacognition in developmental terms, using four levels instead of two.

Kegan’s (1994) work is significant for parents and teachers in that he stresses the importance of evaluating accurately children’s order of consciousness and creating ‘bridging strategies’ to help them move to the next level. These bridging strategies can be referred to as ‘interventions’, and researchers such as Swanson (1990) and Perkins and Grotzer (1997) studied these strategies that might help shift subjects from object-level problem solving to metalevel thinking, and propose that ‘think-aloud’ or ‘state-your-reason’ verbalisations facilitate the process. Learning to verbalise thoughts as a learner also played a major role in this study (see Section 1.3 for secondary question 1).

In conclusion, Flavell (1987) explains that the problem with young learners relates to them having conscious metacognitive experiences, but possibly not knowing how to interpret them well. Given the plethora of research indicating that metacognition might emerge earlier than initially contemplated, it can therefore be argued that the question at issue is not whether children have the potential to engage in metacognitive activities, rather it is one of finding the right ways and the right activities for initiating and enhancing such activity. The idea is, therefore, to help young learners to interpret metacognitive experiences, getting them to know what they mean and imply. The decision was made, in the present study, to target Grade 4 learners with an average age of 10. In the South African education system, learners at the early Intermediate Phase (Grade 4) encounter content subjects for the first time. It was important for me to introduce a more effective way of engaging with content area learning early on, before poor studying methods became habitual. In Chapter 6 I discuss the appropriateness of my decision (see Section 6.3.4) in answer to the secondary question 4 posed during Phase 1 (see Section 1.3).

3.5 THINKING METACOGNITIVELY

In Kluwe's (1982) description of metacognitive activities he refers to "the thinking subject" having some knowledge about his own thinking and that of other persons, and "the thinking subject" monitoring and regulating the course of his own thinking (p. 202). The strong link between metacognition and thinking is evident. "Metacognition is a mental skill that entails a great deal of thinking" (Georghiades, 2004, p. 369), and in this section, I have therefore felt it necessary to highlight the development of general thinking skills among young learners, as portrayed in literature.

Interest in improving learners' thinking skills goes back far beyond the coining of the term 'metacognition' in the 1970s. Georghiades (2004) relates the story of Alfred Binet, later to be known for his IQ tests, who "proposed a training system he called 'mental orthopaedics' aiming towards strengthening a variety of thinking skills, including attention, memory, perception, invention, analysis, judgement and will" (p. 368). The current trend to teach thinking skills can take on different forms, but regardless of the approach (e.g. subject-specific or embedded in the curriculum), Georghiades (2004) and others emphasise the importance of a systematic way that presupposes important structural changes of education. Perkins (1993) argues that "to teach for thinking, it is not enough to teach skills and strategies – we need to create a culture that 'enculturates' learners into good thinking practices" (p. 98). This idea of assisting children to become effective thinkers resulted in various promising cognitive enrichment approaches being launched internationally, of which some of the best known are the CoRT programme and the Six Thinking Hats (De Bono, 1991), Feuerstein's Instrumental Enrichment (FIE) (Feuerstein, 1980), P4C (Lipman, 1991) and more recently the thinking schools movement (Burden, 2009). These initiatives were specifically also introduced into the South African education system, although some to a limited extent and with varying success.

In education circles, Feuerstein's teaching principles are well known. He shares many of Vygotsky's ideas on cognitive development, believing that children's cognitive abilities are enhanced when learners acquire thinking skills through the mediation of an adult. Vygotsky's concept of the ZPD clarifies when and where Feuerstein's rich teachings about mediated learning can best be utilised – within the zone where learners truly need and can benefit from assistance. At the heart of almost all these theories related to the social construction of knowledge is that knowledge is first understood between the learner and mediator and only later internalised within the learner. Feuerstein's programme, Instrumental Enrichment, provides caregivers and teachers with a tool for effective mediation through which cultural knowledge can be transmitted (Feuerstein, 1980). Borman (2005) refers to this programme as an interactive and metacognitive approach to learning and teaching. Experts claim that it helps to teach thinking skills in a systematic, logical and practical way, and to develop the individual's cognitive abilities that are the foundation for higher mental processing (Borman, 2005; Green, 2000). Numerous scholars in education have been trained over the past two decades to utilise Feuerstein's principles, including many teachers and interested others in South Africa. Another widely used programme for direct teaching of thinking as a subject in schools is De Bono's CoRT programme. This programme fosters lateral thinking, which encourages coming up with new perceptions and new ideas, and is directly linked with creative thinking (De Bono, 1991). I have personal experience using De Bono's Six Thinking Hats concept, but within a corporate environment teaching conflict resolution.

The P4C approach campaigns for the practical teaching of philosophy in dialogue form (the community of inquiry). Lipman (1991) believes that children should be given the opportunity to practise thinking and debate questions and issues in a supportive and reflective context. The original P4C consists of a set of stories for children, each with a manual to assist teachers when using it in the classroom. It was designed for learners between 6 and 16 and has been used for more than 30 years in the USA and was adapted for use in over 30 countries, including South Africa (Borman, 2005; Green, 2014). The content of these stories is relevant to everyday happenings in the lives of the children, and they act as stimulus for the learners to engage in inquiry. As research on this particular approach to cognitive development is very relevant to the present study, more detail on Lipman's P4C is discussed in a following section (see Section 3.8.1.2).

In Table 3.1 I briefly summarised some of these ways of mediating and enhancing thinking in schools, as presented in Lena Green's book about thinking schools recently published (Green, 2014). She and her colleagues provide compelling arguments for the development of thinking (and metacognitive) skills in South African schools and worldwide. A thinking school can be described as follows (Moolla, 2014, p. 65):

> A learning community in which all members share a common language, where thinking strategies and tools are used across the curriculum and teachers and students have a sound understanding of their own learning; where all students are developing and demonstrating independent and cooperative learning skills; where the school generates high levels of achievement and an excitement and enthusiasm for learning.

A thinking school is therefore a community of people who share a common understanding and vision of the nature of high-quality learning and teaching for all learners. Those in thinking schools think deeply about their work and engage in reflective, active, critical and creative thinking. Moolla (2014) contends that teachers in thinking schools would typically be engaged in exploring ways to co-construct a meaningful and purposeful curriculum with associated activities, drawing on a wide range of learning opportunities. The concept of thinking schools is based on whole-school development, because the efforts of individual teachers are often difficult to sustain.

At the core of a thinking school is a thinking classroom with a teacher practising higher-order thinking. Moonsamy (2014, p. 59) explains that in a thinking classroom the teacher does everything that any good teacher does and, in addition:

- talks about the process of thinking and learning and encourages learners to do so;
- teaches learners a vocabulary of thinking words so that they can speak about their thinking more precisely;
- systematically mediates and gives practice in the cognitive skills that he perceives are needed to succeed at specific tasks;
- systematically mediates and gives practice in the metacognitive skills that will help learners use their cognitive skills in different contexts; and
- motivates learners to be fascinated by their own thinking processes and confident that they can develop and improve them.

The notion of a thinking classroom does not imply that thinking does not already take place, because thinking is involved whenever learning takes place. Thinking classrooms, however, do not occur automatically, and it should also not be assumed that effective thinking is always spontaneous. Moonsamy (2014) argues that “thinking classrooms can only be shaped if intentional and explicit mediation (from the teacher) supports the acquisition of cognitive skills and the creation of metacognitive awareness in students” (p. 49). In other words, metacognition needs to be intentionally mediated for learners to become able to think about their own thinking, and in the present study I conceptualised and tested one way of mediating metacognition and enhancing a thinking culture. The concept of mediating learning can simply be explained as occurring when a mediator (a teacher or, as in the present study, a story text) intervenes between whatever is being learned, the learner and the response to the learning. An effective mediator assists a learner in interpreting and giving meaning to the encounters with the subject or topic of learning.

Table 3.1: Ways of mediating and enhancing thinking in schools (Green, 2014)

	Author/ Source	Definition/Main characteristics	Research findings/ applications in South Africa
Habits of Mind	Costa & Kallick, 2014	"Habits of Mind" implies having a disposition towards behaving intelligently when confronted with problems to which we do not immediately know the answers. When employing Habits of Mind, we demonstrate that we are conscious of various patterns of thinking and that we can make a choice as to which will best serve us in a particular situation. The 16 Habits of Mind are drawn from research on human effectiveness, descriptions of remarkable performers and analyses of the characteristics of efficacious people, and one of these habits is metacognition – our ability to think about our thinking. They are the tools of disciplined choice making.	Some teachers in South Africa have been familiar with Habits of Mind for a number of years, but it is only recently that training has been available, and certain schools have opted for a whole-school approach. Internationally, research findings are very promising.
CoRT programme & Six Thinking Hats	Dr Edward de Bono http://www.debonoforschools.com	De Bono is most well known for the concept of lateral thinking, a more constructive and creative way of solving problems. He advocates the belief that thinking is a skill that can be developed, just like any area of expertise, and that the thinking tools he has developed are universally applicable, usable across all age groups as well as across all cultural groups. CoRT stands for the Cognitive Research Trust, and the goal of this work is to shift students' conventional thinking patterns and inspire them to put more focus and energy into 'operacy', design and action, using stimulating creative thinking techniques. The aim of CoRT is for people to develop an awareness of their own and others' thinking patterns, so that they can think about the world in which they live, enjoy better relationships, resolve conflict, make good decisions and solve problems more effectively.	His CoRT thinking tools and Six Thinking Hats have been taught directly or infused into the curricula of many schools and school districts all over the world since the 1970s. In South Africa, educationists, together with world leaders in the field of thinking skills instruction, have taken aspects of De Bono's "tool method" and adapted it for various contexts. They are currently used in a number of schools and with regard to the importance of a whole-school approach, it is mostly used in conjunction with other programmes. The research done in South African schools with regard to the introduction and development of thinking skills indicates that the Six Thinking Hats and CoRT 1 and CoRT 4 are the most common resources chosen. The appeal of Dr De Bono's thinking tools and methods lies in their simplicity, practicality and ingenuity. They provide educators with content for explicitly teaching thinking.
Cognitive Enrich-	Green-berg,	The Cognitive Enrichment Advantage approach (CEA) provides a framework or	Although the effectiveness of CEA have been proven by a

ment Advan-tage (CEA)	2014	roadmap for addressing the needs of: (a) empowering learners to understand the process of learning more clearly and how to develop personal strategies that address their specific needs, and (b) empowering teachers with a flexible framework to integrate best practice with the praxis of teaching. Praxis in teaching means understanding the relationship between myself as a teacher and my students, and this is at the heart of effective teaching. CEA provides a means for encouraging teachers' in-depth reflection on the integration of their praxis, while addressing personalised needs of individuals along with standardised needs across students.	number of studies internationally, implementing it proved challenging for various reasons. Greenberg (2014), however, makes a passionate plea for CEA-type interventions and comments: "By empowering teachers and students through focus on these hidden needs, I believe we can humanise the world of education. For it is there we can honour praxis; we can honour the dignity of teachers and their students, and rekindle their sometimes broken aspirations" (p. 195).
Feuer-stein's Instru-mental Enrich-ment (FIE)	Feuer-stein, 1980	FIE is a systematic cognitive development programme consisting of two sets of instruments that are free of specific subject matter, designed for subjects aged nine years up to adults. Feuerstein acknowledges the impact of cultural context on learning and strongly advocates mediated learning. He explains that there are two ways in which children can learn: by direct learning that often results in incidental trail-and-error learning, or by MLE (mediated learning experience), in which the role of a mediator is central and has been clearly defined. MLE happens when a parent, a teacher or a caregiver engages with children and renders them more sensitive to and aware of the incoming stimuli in order to interpret and understand the world around them. The aim is to help children construct their knowledge and understand themselves as thinkers and autonomous learners and ultimately benefit from direct learning experiences.	FIE was introduced into schools, technical colleges and colleges of education in South Africa during the latter part of the 1980s. Most recently (2008–2010), 600 people in business and industry as well as teachers were trained with public sector funding (SETA). Many projects and publications were generated using MLE and the FIE programme and showed significant gains, and results showed that it is possible to change teachers' attitudes towards underachieving learners or those with disabilities who learn differently. Because of the systemic nature of the work, which takes into account all sectors of society, it has relevance for South African society. There are, however, serious concerns about the cost of purchasing the instruments and teacher guides that are necessary for the training, as well as sustainability of the FIE programme in schools and colleges because of the effort and time burden.

In conclusion, Fisher (1998, p. 16) makes the connection between general thinking skills and metacognition:

> If we can bring the process of thinking and learning to a conscious level, and help learners to become more reflective, then we can help them to gain control or mastery over the

> organization of their learning. On this view effective learning is not just the manipulation of information so that it is integrated into an existing knowledge base, but also involves directing one's attention to what has been assimilated, understanding the relationship between the new information and what is already known, understanding the processes which facilitated this, and being aware when something new has actually been learned. It involves not only thinking, but a metacognitive process: thinking about thinking.

"Metacognitive skills are thinking skills requiring appropriate stimuli for their 'awakening' and gradual development" (Georghiades, 2004, p. 369). Georghiades (2004) maintains that metacognition is not something to be 'taught' to the learner in an 'outside–in' process, but rather it is a skill that can be developed in an 'inside–out' manner. This might at first glance seem contradicting to social constructivism, but I would argue that this reminds of Piaget's contention to create an appropriate level of disequilibrium, 'just right' to encourage growth (Woolfolk, 2013). The active construction of new knowledge does not happen within a vacuum and a learner's prior knowledge plays a determining role. Woolfolk (2013) explains that "disequilibrium is often set in motion quite naturally when the teacher or another learner (social mediation) suggests a new way of thinking about something" (p. 62). This is at the core of the research undertaken in the present study, which addresses the question whether a story-based intervention could provide the necessary 'awakening' among young learners to cultivate metacognitive awareness.

3.5.1 Automatic versus conscious awareness

Veenman et al. (2006) raise the following question: "Does metacognition by definition require conscious processing, or may metacognitive activities also appear on a less conscious level?" (p. 6) Following on the previous statement of Fisher (1998) about bringing the process of thinking and learning to a conscious level in an attempt to help learners become more reflective and gain control of their learning, the present study also aimed to explore this contentious issue in metacognition. Some researchers (e.g. Nelson, 1996) claim that metacognition must be conscious in order to represent higher-order processing, while others (Veenman, Prins & Elshout, 2002) allow less conscious processing to be metacognitive by nature.

To add to this, Bandura (as cited in Veenman et al., 2006) alerts to the possibility of metacognitive behaviour being modelled by teachers, parents or peers through observation and vicarious learning; that is, without much conscious processing of the modelled behaviour. Therefore, Veenman et al. (2006) raise another question in their review of research on metacognition in learning: “Would the automated self-instructions of checking oneself be less metacognitive or self-regulatory by nature relative to a metacognitive activity consciously decided upon?” (p. 6). This question relates to the philosophical contrast between self-determination versus externally controlled behaviour, but this discussion falls outside the scope of the present study. The present research, however, needed to address the aspect of conscious awareness of what we think and how we learn, particularly because the intervention was premised on the verbalisation of the learning process. Dimmitt and McCormick (2012) mentioned the research conducted by Annevirta and Vauras (2006) among young learners in which they defined metacognitive knowledge as “the ability to *verbally* refer to cognitive processes and metacognitive skills (own emphasis)” (p. 163). It is believed that expressing your thoughts and feelings, and verbalising metacognitive language as you engage in a learning task (making thinking explicit), would contribute to the development of metacognition. ‘Thinking aloud’ as an effective technique to develop metacognition is well researched (McCormick et al., 2013; Veenman, 2015). In this study the assumption is therefore made that to develop metacognitive knowledge, it is beneficial to bring the mental process of thinking to consciousness and intentional reflection is an important component in my conceptual framework (see Figure 2.5).

3.5.2 The language of thought

How then do we make thinking explicit? One way would be to express it through words – talking, writing, reading and reflecting on thought. “The language of thinking embraces the ways we describe our own and others’ mental states and mental processes.” (Tishman & Perkins, 1997, p. 369) Vygotsky viewed ‘thought’ as being expressed through words and language, and thoughts therefore exist because of the words we use in language (Gredler, 2012). This belief that language of thinking makes thinking ‘come alive’ by shaping and regulating conceptual development has profound implications for development research on metacognition in general and provides impetus for the present study's focus of using storytelling to develop metacognitive knowledge. What is this 'language of thinking'? What is its lexicon, how does it work and what role does it play in human development and education? In the following section, I primarily discuss Tishman and Perkins's (1997, pp. 368–374) response to these questions.

Tishman and Perkins (1997) maintain that we use the language of thinking when we characterise our own and others' mental states. We might say things like: "Mari thinks it will rain tomorrow"; "I suspect Karlo will need more time to prepare for the test". According to literature, the vocabulary of thinking can be roughly divided into terms that fill three different functions: terms that mark an epistemic stance or attitude towards a claim to knowledge (e.g. I believe that grasshoppers dream in colour), terms that describe an intellectual process or way of thinking (e.g. Jamie summarised the passage after rereading it), and terms that describe an intellectual product (e.g. I come to a conclusion or choose a specific option). The functions of these three groups of terms are related: intellectual processes tend to yield epistemic stances, which in turn yield intellectual products.

It is complicated to analytically disentangle the linguistic functions of language-of-thinking terminology, but it is also testimony to the efficacy and elegance of the language of thinking that we very easily understand these different functions when we experience them in context. Storytelling was chosen as a learning tool for the present research study, because metacognitive terms (thinking vocabulary) could easily be provided in text as part of the 'script' and within the appropriate context to ensure understanding and transfer. Another issue to mention is that language of thinking also expresses the affective side of cognition – the passions, emotions, motivations and attitudes that are an integral part of the experience of thinking and learning. A learner participating in Iteration 1, for instance, made the following comment: "When I started to read the text, I was unhappy and confused, but after reading, I understand better … Now I feel happy". Motivational beliefs also have an impact on metacognitive strategy use (Carr et al., 1991; Dimmitt & McCormick, 2012). Self-appraisal and the ability to identify or be made aware of our affective intent through the verbalisation of the attitudes that underpin our learning will improve self-management of our own learning. It is about being equipped with the vocabulary to explain what you think and feel while engaging in a learning activity.

The obvious and important purpose for language of thinking is therefore communication. We use the language-of-thinking process to communicate information about the character and intent of our mental states and processes in all sorts of everyday contexts, including a learning milieu. When we explain how we came to hold or reject a particular belief, or how we solved a problem, we are using the language of thinking. The problem, as I have stated before, is that young children lack the vocabulary to express themselves. Even if learners *are* aware of how they think and learn, they may not know how to verbalise the process. The present study attempted to address exactly this challenge by overtly using metacognitive language (vocabulary) in stories that are read to young learners or read by themselves, and in reflective conversations about the stories. Tishman and Perkins (1997) report on a somewhat similar study that was explicitly designed to determine whether it is possible to help children acquire a mental lexicon by using (adding) thinking terms in stories they normally would be reading in a literacy class. They found that the children who had intense exposure to mentalistic language subsequently used this language to a greater extent than the control group. However, their conceptual understanding of mental states, as indicated by false-belief prediction tasks, did not improve.

The present study proposes a different (instructional) design in order to overcome the lack of comprehension. We need young learners to not simply ‘produce’ more explicit metacognitive language, but also comprehend the metacognitive concepts and learning strategies they are exposed to, to encourage actual use and transfer. The content of the stories is *about* the learning process itself, providing authentic context, and the stories are written in the voice of a learner like themselves. By contextualising the stories and making learning the object of learning, it is postulated that metacognitive awareness will develop more effectively. Also coming into play here is what Tishman and Perkins (1997, p. 370) refer to as “the notion of dialects of thinking”: the issues of generality of thinking and the complexity of learning to think better. Some scholars have argued that good thinking is profoundly situated, as many believe that thinking at its best, and cognition more generally, is an inherently specialised enterprise. Tishman and Perkins (1997) make the statement that “the idea of general, powerful thinking skills and dispositions is misguided and teaching thinking in any general sense is a waste of time” (p. 372). This is a complex issue and should be debated in further research.

The complexity of learning to think better and becoming metacognitively aware is evident. I agree with other scholars that many school-based approaches to the teaching of thinking foreground a few strategies for problem solving and decision making and leave it at that, and although such efforts often do some good, they certainly underestimate the scope of the enterprise (Woolfolk, 2013). So-called study skills courses are plentiful, but the long-term outcomes are questionable, and we only need to look at the dismal national education results to wonder about the effectiveness of currently available approaches to helping learners become self-regulated for life (Moonsamy, 2014). The ideal is obviously to have learners spend hours a day in classrooms and at home, where the culture and language of thinking (metacognitive language) are commonplace so that they can become fully awake to their intellectual potential. Metacognition is best learnt through explicit modelling and this element played a central role in the present study.

To come back to the initial claim that thought is not only expressed in words but comes into existence through them, we need to conclude that the language of thinking does more than help us communicate. It shapes and regulates thought by providing concepts to guide our thinking, as Vygotsky's constructivist views purport. The notion that language shapes thought is not new, hence the well-known saying: "I can't know what I think until I hear what I say". The words we have available to us influence the way we think about the world, including the inner world of our own mental life. Metacognition involves stepping back from the flow of one's thought to better understand it, assess it and guide it (Tishman & Perkins, 1997). The connection between metacognition and the language of thinking is straightforward: The language of thinking simply provides the words and concepts with which thought evaluates and regulates itself. But, where does metacognitive language come from? Earlier, modelling metacognitive behaviour was mentioned, and reflective thinking can be explicitly modelled through words. Literacy affects *how* we reflect on our own thinking by introducing terms for talking about text – terms and phrases such as summarising, identifying main ideas and checking whether I comprehend – indicating metacognitive processes.

It can further be argued that written language, stabilised on paper, invites kinds of reflection not so natural to oral exchanges, because the written statement is more easily examined, challenged or affirmed. Does this mean that only people who read and write well can think metacognitively? To be literate is "to be competent to participate in a certain form of discourse, whether one can read or write or not" (Wright, 2012, p. 70). At a recent international conference on thinking schools of the International Association for Cognitive Education in Southern Africa (IACESA) held in Cape Town (16–19 February 2011), the Minister of Education at the time unfortunately made the statement that we need to first teach the Foundation Phase learners to read, write and be numerate, before we should spend time on teaching them to think. The displeased conference attendees seemed to agree with me that thinking skills training should start from birth, even before we utter our first words. Words and thoughts live through each other. Personally, I think this knee-jerk reaction was the result of a true concern for the desperate literacy problem in our country, but in doing so we throw away the baby with the bathwater.

The English language has a remarkable number of finely nuanced terms for describing thinking. For example, to form an opinion based on inconclusive evidence, we might consider any of the following words: guess, suppose, surmise, assume and speculate. At the same time, each term suggests a subtle but important difference in the relationship of evidence to opinion. The present study was done, however, in the mother tongue of the sample group, namely Afrikaans. It is important that young learners learn to express themselves, their thoughts and feelings in the language they know best. South Africa has 11 official languages, but English is the language in which most business is conducted and education offered. The fact that by far the majority of young learners in South Africa do not have the opportunity to converse in the education context in their mother tongue, particularly in higher grades, provides for additional challenges to fostering the competency of learning to learn. The language issue is a separate area of research and not within the scope of the present study. We can, however, not conduct research with storytelling and the use of thinking lexicon at the centre of the investigation without being reminded of the role language ability plays (see 5.5.1 and 6.5).

To conclude this discussion of the development of thinking skills, I should raise the important issue of the well-meaning but sometimes misguided effort of teachers and caregivers to make learning easier and more palatable by using language-of-thinking terminology that is lean and too simplistic or general. We tend to underestimate young learners' ability to understand and talk about 'the abstract'. Teachers will often ask learners to construct explanations, make hypotheses, draw inferences and so on without referring to these processes by name. Instead they use generic terms such as think, feel and opinion to cover a vast range of more nuanced cognitive states and activities. Often, the Afrikaans or Xhosa teacher might not even be aware of any existing term to define a specific process. Here we need to be creative as educators in our goal to help learners, irrespective of language preference, to develop an active metacognitive language. In general, often adults who are supposed to act as metacognitively aware role models simply lack the language to talk about their own learning and the confidence and ability to do so (Jackson, 2004). Even highly intellectual individuals within the education system have this challenge, as evidenced in Norman Jackson's article on metalearning.

3.6 CLASSROOM ENVIRONMENT, SOCIO-ECONOMIC CONTEXT AND METACOGNITIVE DEVELOPMENT

Socio-economic status (SES) has long been an important contextual factor in social science research on human development (Raviv, Kessenich & Morrison, 2004). Researchers combine variations in wealth, power, control over resources and prestige into this index called socio-economic status and different formulas for determining SES might lead to different outcomes (Sirin, 2005). Four general levels of SES can be identified: upper, middle, working and lower (Woolfolk, 2013). According to Macionis (as cited in Woolfolk, 2013), some of the characteristics defining these levels include income, occupation, education, home ownership, access to health services, neighbourhood (where you live), means of access to tertiary education for children and political power. In the present study, I do not specifically classify the two participating schools as high- or low-SES learner groups, but I do use a composite of SES indicators, namely parental education, occupation and income-to-needs to compare the two school groups in broad terms (see Section 4.4.2). The South African Department of Education defines SES in terms of "national quintiles" (Setoaba, 2011, p. 22) and in the present study I also refer to these national quintiles allocated to the participating schools to compare the two case studies that differ in terms of the broad socio-economic learning environment.

In general, research indicates that high-SES learners of all ethnic groups show higher levels of achievement on test scores and stay in school longer than low-SES learners (Woolfolk, 2013). Literature also shows that the longer the child is in poverty, the stronger the impact is on achievement (Ackerman, Brown & Izard, 2004). Evans (2004) and Jensen (2009) maintain that no single cause is to blame for the effects of low SES. Some of the variables that might explain the lower school achievement of these learners include dangerous or unhealthy home environments, exposure to violence, limited resources, family stress, interruptions in schooling, overcrowding, food shortage, homelessness and discrimination. Many of the learners from School B (ranked as a very poor community) in the present study are exposed to extremely challenging home environments. Alcoholism and domestic violence is commonplace. Very few live with their biological parents and about two-thirds of the learners come to school hungry – caregivers have no income or are seasonal workers with limited resources. During one of my sessions with the learners at School B, I asked the teacher why one of the boys does not show any response in class, even if the rest of the class is visibly engaged in the story (discussions). She then explained that this youngster witnessed his older brother being shot and after that, he seldom if ever talks. Poor children typically would not get the trauma support needed because of lack of financial resources and this is also the case with this learner.

The focus of this study is on developing metacognition in young learners at early intermediate level and specifically within content area learning – reading to learn. Reading ability and text comprehension bear a strong influence on academic achievement (Noble, Wolmetz, Ochs, Farah & McCanliss, 2006), and for learning to happen, an adequate literacy level is required. SES is predictive of both decoding and reading comprehension, and several studies suggest that SES differences in performance result from language difficulties (Baydar, Brooks-Gunn & Furstenberg, 1993; Bowey, 1995; Ginsburg & Pappas, 2004; Hoff, 2003). It is suggested that the relationship between the socio-economic environment and reading ability is influenced by reading-related experiences such as home literacy environment, degree of early print exposure and quality of early schooling (Hecht, Burgess, Torgesen, Wagner, & Rashotte, 2000). From literature we know that lower-SES learners' metacognition, particularly their awareness and expression of thinking, is less advanced than that of their middle- and upper-SES peers (Pappas et al., 2003). Higher-SES parents tend to engage their children in more elaborate discussions and idea generation than do other parents. Snowman and McCown (2015) specifically mention that "the interactions that occur between low-SES parents and their children tend to lack the characteristics of mediation" (p. 152) – the type of mediation that Vygotsky's theory of cognitive development subscribes to (see Section 3.3). In their study on environmental effects on language, Landry, Smith and Swank (2002) found that learners with faster rates of language growth had mothers who maintained their interests more often and were less likely to use highly directive behaviours.

Certain basic classroom conditions are necessary for any learning to take place (Donald, Lazarus & Lolwana, 2010). Moonsamy (2014) mentions that the physical learning environment should be safe and comfortable, but this does not necessarily need to be a traditional classroom setting with all the technological advancements available. "Children learning at home, or under a tree in good weather, can learn and be helped to think more effectively by a parent or teacher who understands a particular topic and is skilled at mediating thinking" (Moonsamy, 2014, p. 50). In the previous paragraphs I have addressed aspects of the psychosocial environment. Creating a supportive psychosocial environment for teaching and learning is crucial in fostering both the acquisition of new knowledge and the development of thinking. I remember a learner in School A during the first iteration of my research commenting about why he hates school: "The kids … they know I am slow with schoolwork and … I can't even run fast". I simply asked a probing question about how they go about studying for a test and he just volunteered this answer. Children who are afraid of being humiliated or mocked by peers or teachers cannot easily focus on the cognitive input presented to them, however well intended.

Moonsamy (2014) argues further that in a thinking classroom the teacher also pays attention to the cognitive environment. The importance of the classroom environment cannot be underestimated, as it remains the hub where cognitive and metacognitive engagement occurs. It should therefore be "a context that engages its learners and sparks curiosity and enthusiasm, motivating them to be consciously aware of their cognition (thinking processes) and metacognition (reflecting on how these processes are used)" (Moonsamy, 2014, p. 50). The reality in most classrooms, however, is not optimal, as I have mentioned in Chapter 1 as part of setting the scene for the present study (see Section 1.2).

To reiterate, partly as a result of South Africa's historical past, many inequities continue to exist despite the current programmes for redress. The classrooms in South African public schools are generally small and often overcrowded, with the learner–teacher ratio often not allowing individual attention or in-depth verbal discussions. Furthermore, I mentioned the teacher workload previously (see Section 1.2), owing to the demands of the curriculum, school and state departmental administration. A teacher that participated in the present study confirmed this perspective by stating: “I don’t have time to teach anything else, like thinking… I barely get through the lessons and then there’s the kids that struggle so much I also need to help them …” The one teacher also said that she feels the education system is not sympathetic, as she had to pay for all her studies on her own and still worked full-time. It is therefore understandable that teachers “express negative attitudes to cognitive education”, because the environment is not supportive of developing thinking skills in both learners and teachers (Moonsamy, 2014, p. 59).

3.7 APPROACHES TO THE DEVELOPMENT OF METACOGNITION IN YOUNG LEARNERS

From the deliberations in the previous chapter, it is clear that when learners are aware of their personal strengths and limitations as a learner, understand the learning process and engage in strategic metacognitive activities such as planning and monitoring, their learning is enhanced (Lin, 2001). The critical question is, however, *how* can metacognitive development be facilitated? What kind of intervention best fosters the development of metacognitive awareness among young learners learning from text?

Desoete (2001) comments on research providing evidence that educational interventions can produce positive effects of respectable magnitude, including for struggling learners, but that “not all treatments (interventions) were found equally effective” (p. 114). Swanson, Hoskyn and Lee’s (1999) meta-analysis revealed that combined models with both direct instruction and strategy training are the most effective. One-on-one instruction is less effective than when combined with group instruction, and sustained intervention over a long period of time (more than 32 sessions) is not necessarily more effective than more time-limited interventions (Desoete, 2001).

The bulk of existing research exploring strategy instruction suggests that metacognitive knowledge and strategy training is most effective “when taught initially through an explicit teacher-directed approach that includes modelling targeted strategies in context followed by opportunities for independent practice with feedback on the part of the learner" (Huff & Nietfeld, 2009, p. 162). In a discussion of the importance of metacognition for education, Schneider (2008) also highlights the impact of the teacher and mentions reciprocal instruction (teaching). This "interesting and effective approach to teaching knowledge about strategies" (Schneider, 2008, p. 118) was developed by Palincsar and Brown (1984), and teachers using reciprocal teaching assume more responsibility for strategy implementation early on and then gradually transfer control over to the learner. This approach is characterised by true dialogue, strategic processes that are made very overt, exposure to modelling of strategies and plenty of opportunities to practise techniques (Schneider, 2008).

Klopper (2012) used the widely supported teaching strategy known as transactional strategy instruction (see Roehler & Duffy, 1984) in her recent research on reading comprehension instruction within the South African context. Learner and teacher 'transactions with text' are at the heart of this form of instruction. Transactional strategy instruction is similar to the above-mentioned approach in that it also typically includes the following steps of explicit instruction: direct explanation, teacher modelling, guided practice and application. Direct explanation implies the teacher explains to learners why the metacognitive strategy of predicting, for instance, helps comprehension and when to apply the strategy. Then the teacher models, or demonstrates, how to apply the strategy, usually by 'thinking aloud' while reading the text that the learners are using. Guided practice means that the teacher guides and assists learners as they learn how and when to apply the strategy. The last step entails application. The teacher helps learners practise the strategy until they can apply it independently – gradual release of responsibility (providing scaffolding) (Pressley, 2002). Modelling is seen as a component of scaffolding and scaffolding means providing support to learners to bridge the gap between what they can do on their own and what they can do with guidance from others (Gama, 2004), typical of Vygotsky's social constructivism (see Burr, 2003, for further discussion). The critical feature of many approaches from literature, such as the aforementioned, seems to include having "mentors and models make covert thinking explicit" (Dimmitt & McCormick, 2012, p. 174).

In an action research study by Desautel (2009), reflective conversation, as well as goal setting, are emphasised as practices leading to successful self-reflection and the promotion of metacognitive development in young learners. Self-reflection, in the context of the present study, can be defined as a learner's reflection about his own knowledge and the learning process. 'To reflect' means "to think deeply or carefully about" (Gama, 2004, p. 24). Desautel (2009) specifically refers to the concept of "peer-to-peer reflective conversations" (p. 1998), which he successfully introduced in his class, but makes the important (and relevant to the present study) comment that oral language development was closely tied to the ability to participate in self-reflective activities (Desautel, 2009). In a similar vein, Boulware-Gooden et al. (2007) mention the challenge of what to do with poor decoders. They suggest pairing a stronger reader with a struggling reader/learner, working together in small groups, as a possible solution (Boulware-Gooden et al., 2007). Some of the learners involved in this research presented with very poor literacy levels (see Section 4.4.2). Peer modelling plays a critical role in the present study and transpires in various ways – in the text of the story itself and also in the way the learning tool can be used (see Section 6.4.3).

Fisher (1998) defines "teaching for metacognition" (which he refers to as "metateaching") as the mediation of metacognition to help children make explicit their thinking and learning for the purpose of self-appraisal and self-management (p. 9). He proposes that the language of thinking and learning should be made explicit and infused into the planning of teaching and into classroom discussion. This way of teaching aims to "*model the vocabulary* we want children to use in their own thinking and understanding of learning by using it ourselves to describe our teaching (own emphasis)" (Fisher, 1998, p. 9). Fisher (1998) also talks about the use of prompts and contends that children should be challenged to define the (metacognitive) terms in their own words. Young learners should be encouraged to probe deeper into what they say and think, and metacognitive questions can assist learners in becoming conscious of their thoughts and feelings, before, during and after an activity. "Enquiring into a child's thinking facilitates thinking" (Fisher, 1998, p. 10).

Lin (2001) adds to the discussion of what constitutes efficient interventions by proposing a framework for analysing metacognitive interventions. He maintains that researchers have adopted two basic approaches to supporting metacognitive development, namely (1) strategy training and (2) creating a supportive social environment (or social supports). There are also two kinds of content that are taught using these approaches, according to Lin (2001). They are knowledge of (a) a specific domain (e.g. science or reading comprehension) and (b) the self-as-learner. He discusses underlying instructional goals and design characteristics for each approach and content that is taught (see Lin, 2001), and specifically the use of modelling (including peer modelling) and prompting to help learners learn metacognitive strategies are highlighted. Lin (2001) further makes the point that it is "not enough to teach individuals only domain-specific strategies and expect them to develop knowledge about self-as-learner" (p. 28) (see Section 2.5). Learner self-knowledge is critical and should be nurtured with domain knowledge simultaneously.

Furthermore, Lin (2001) warns against "blind training" (p. 26). When learners are taught strategies without understanding why, when and how they are useful (conditional knowledge), the interventions have resulted in failures of understanding and transfer. This principle is echoed by Veenman et al. (2006): "informing learners about the usefulness of metacognitive activities to make them exert the initial extra effort" (p. 9). The present study focused on being aware. Having knowledge and a clear understanding of metacognitive comprehension strategies, I believe, lays the foundation for (precedes) the eventual habitual application of metacognitive skills when studying from text.

Dimmitt and McCormick (2012) mention that recent research on comprehension strategies has focused on context variables, and the social nature of the development of higher psychological functions such as metacognition have been discussed previously (see Section 3.2). According to Lin (2001), creating supportive social environments fostering the development of metacognition is vital. A collaborative effort between teachers, designers of learning, parents, and so forth is needed to build a supportive learning culture where, for instance, learners will engage in spontaneous reflection when they compare their work with that of others or are exposed to multiple perspectives in the classroom. "If students are provided with an environment where metacognitive mindfulness is valued and encouraged, then it is likely that students will eventually adopt the habit of *being reflective* (own emphasis)" (Lin, 2001, p. 32). Lin (2001) concludes his meta-analysis of metacognitive interventions by presenting the following set of interdependent design principles: (a) Provide frequent opportunities for learners to self-assess what they know and do not know; (b) Help learners articulate their own thinking; (c) Foster a shared understanding of the goals for metacognitive activities; and (d) Develop knowledge of the self-as-learner with respect to one's role in a specific culture (p. 34). Dimmitt and McCormick (2012) also present various principles from their extensive research on successful instructional models. Some of the instructional elements not yet mentioned include discussing how the brain works, modelling self-talk, orchestrating self-assessment and addressing motivation.

In a recent review on the importance of metacognition in the educational context, Veenman (2015) proposes three fundamental principles to ensure effective metacognitive development. One principle is *informed instruction*, which I already mentioned earlier in this section. Learners should understand the benefits of being metacognitive. “Only through explicit instruction of the Why, will [learners] continue to apply the acquired metacognititive skills autonomously” (Veenman, 2015, p. 16). A further principle is *embedding metacognitive instruction in the learning material*. Research has shown that abstract learning of metacognitive skills, such as in separate lessons of study skills, does not result in the learner actually applying the skills in the intended task contexts (Veenman, 2015). The story-based intervention proposed in the present study adheres to this principle of making the learner aware of “What to do When and How by relating metacognitive activities to the cognitive activities at the object level” (Veenman, 2015, p. 16). The third principle is *prolonged training*. In Section 2.3 I mentioned that the acquisition of metacognitive skills takes time.

To conclude this discussion on the approaches to the development of metacognition, I need to mention the concept of ‘transfer’ of knowledge and skills. The ultimate goal of any educational intervention is to have children “internalise and abstract/transfer the information and knowledge they have learned to new situations” (Marulis, 2014, p. 33). Grammer, Coffman and Ornstein (2013) recount that research evidence indicates that young children can successfully be trained to learn metacognitive strategies, but typically do not transfer these to other contexts. Marulis (2014) suggests that, when making explicit attributions or connections between metacognitive knowledge and metacognitive strategies (regulation), children are more likely to transfer the use of strategic learning behaviour. In the present study, I conceptualised the development of metacognition as a dynamic process with awareness and regulation in a reciprocal relationship, being mediated by conscious reflection (see Figure 2.5).

3.8 STORYTELLING AS A LEARNING TOOL

It is hard to imagine growing up in a world without stories. From the beginning of time, stories have filled a universal need for context and meaning. All cultures have their stories, many with universal themes, plots and imagery. Stories help us shape our understanding of the world and make meaningful connections with one another. Stories give us a sense of shared history and destiny and help us see our common foibles and predicaments. They help us confront our fears and formulate our hopes and aspirations (Gabriel, 1999).

If you want someone to pay attention, you start the conversation with “Let me tell you a story …” We all love a good story. The notion of stories, literature and narratives as tools for teaching goes back as far as the existence of the human race. Menkel-Meadow (2010) suggests that we tell each other stories not only about our lives, but in order to learn how to live. In the following section I explore why we use stories to teach and then conclude with a framework of how storytelling can be used specifically to develop metacognitive awareness in young learners.

3.8.1 The case for using stories to teach

Teachers are generally very positive towards the use of stories in teaching and the perception is that children become highly motivated learners within this approach (Ellis & Brewster, 2002). Working with illustrations (examples) provides a creative learning environment that children respond to. A storybook provides a child-centred universe where abstract concepts are symbolised within the text and images, and it provides an ideal context for literacy practice as well as linguistic acquisition (Wright, 1997). Storybooks are attractive, artistic and can capture the child’s interest. Stories can make vivid what is otherwise dull and hard to learn. The conceptual and linguistic level of a story can be adapted to the corresponding age and developmental level of the learner to ensure sustained motivation (Loukia, 2006). For lower levels, repeating structures, rhyme or cumulative text can easily be incorporated into story text. If the story is right for their developmental level and their interests, children soon know the story by heart and can repeat it with pride – something that does not happen so easily with a passage in a textbook, unless it is a song or rhyme. Borman (2005) adds that stories challenge both affective and cognitive abilities.

Storytelling and listening to stories are not a new methodology, but still one of the best. Stories are the way we naturally communicate with our children or among friends, and are therefore basic to our existence (Gabriel, 1999). It is easy to remember stories. I mentioned earlier (see Section 3.2) that neuroscience (memory research) suggests that we organise information in story form – narrative structure and sequence (Woolfolk, 2013). It is how we make sense of the world around us and it is how we communicate that understanding to another. “Stories allow us to bypass the linear and access whole brain learning” (Gabriel, 1999, para. 5). Our lives are flooded with media and media do little but tell stories, good and bad. Television, newspapers and YouTube are full of dramas, news stories, the extremely popular reality programmes, and of course fictional stories.

Stories are therefore uniquely compelling and particularly suited for conveying a message or contextualising an argument or model behaviour. Baldoni (2011), author of leadership literature, suggests that effective storytelling can serve anyone in leadership who seeks to persuade others to his or her point of view. Opinion-based rhetoric is often more polarising than persuasive, while statistics often go in one ear and out the other. But a careful blending of rhetoric and facts, woven into the right story, can change minds. Stories are powerful when put in the hands of leaders (and educators!) who know how to use them.

Stories are perfect for teaching young learners because they already love stories and are already motivated at the thought of listening to one (Ellis & Brewster, 2002). And when children listen to stories they are able to internalise what is presented in the text or, in the case of the present study, imitate the behaviour and thought processes modelled to them in the story. Another characteristic of stories as learning tools is that stories are contextual. Topics are not treated in isolation, but it is shown how they interact. The story as a teaching device has both strengths and weaknesses (see Section 6.5), but the bottom line is that stories are not merely illustrative anecdotes (although that is a very good way of using them). They have unique qualities that can profoundly influence the nature of learners’ learning. In Fisher’s (1998) words: “stories liberate us from the here and now, they are intellectual constructions but they are lifelike” (p. 96).

Loukia (2006) conducted research on teaching young learners through stories. He developed a parallel syllabus for Grade 4 learners in Greece, to develop English language proficiency, and claims that a "story-based framework of teaching and learning can be a very powerful tool" (Loukia, 2006, p. 34). He claims that learners between the ages of eight and ten are beginning to develop greater self-awareness and can start taking responsibility for their learning. He adds to the above delineation on reasons why storybooks should be used in teaching by reminding us that stories provide a flexible tool and that learners can read it over and over, with the repetition leading to reinforcement (Loukia, 2006). He proposed the following criteria for selecting a story as a teaching aid and I have used it to guide the development of the stories in the present study (see Section 5.2.2):

- Appropriate language level (vocabulary, structures, notions)
- Content (interesting, fun, motivating, memorable, participation)
- Visuals (attractive, relate to story text)
- Motivation (arouse curiosity, draw on personal experience)
- Learning potential (language skills and practice, metacognitive concepts explicated in text)
- Exploiting the learners' characteristics (consider short concentration span of age group, diversity and inclusive classroom environment, interests).

3.8.1.1 Bibliotherapy

Stories are used as development tool in the well-known area of psychology referred to as 'bibliotherapy'. Bibliotherapy is an adjunct to psychological interventions that incorporates appropriate storybooks or other written materials, usually intended to be read outside of psychotherapy sessions, into the intervention regimen (Weekes, 1996). The goal of bibliotherapy is to broaden and deepen the client's understanding of the particular problem that requires an intervention. The written materials may educate the client about a disorder, disability or behaviour problem itself or be used to increase the client's acceptance of a proposed treatment (Palmer, 2000; Rozalski, 2010). Many people find that the opportunity to read about their challenges outside the psychologist's office facilitates active participation in their treatment and promotes a stronger sense of personal responsibility for recovery. In addition, many are relieved to find that others have had the same disorder or 'problem' and have coped successfully with it or recovered from it. From the psychologist's standpoint, providing a client with specific information or assignments to be completed outside regular in-office sessions speeds up the progress of therapy (Weekes, 1996).

Bibliotherapy has been applied in a variety of settings to address many kinds of psychological problems (McCulliss, 2012). Practitioners have reported the successful use of bibliotherapy in treating eating disorders, anxiety and mood disorders, agoraphobia, alcohol and substance abuse, and stress-related physical disorders. Mitchell-Kamalie (2002), for instance, conducted research in a Western Cape school on bibliotherapy and its possible use with young children exposed to excessive violence. A popular form of bibliotherapy is when parents or teachers harness the power of stories to improve behaviour or address life challenges, such as sibling rivalry, bullying or divorce. Barancik (n.d.) reminds that telling your child what to do activates your child's wilfulness. Simply telling a child to pick up his toys or to make a mind map when studying does not explain and illustrate what the reasons for or benefits of the behaviour are. A well-chosen story makes the issue about some other child. Stories explain and allow children to listen and identify with the child in the story. In the present study I took advantage of this compelling principle of a young reader identifying with a story character. In the stories, Abe shares with children his own age his authentic reflective thoughts about learning and the challenges he experiences.

3.8.1.2 Philosophy for Children (P4C)

Lipman's (1991) thinking skills approach was mentioned earlier (see sections 1.2 and 3.5). He proposes the use of stories to provide a starting point, an initial stimulus, for children's enquiries. These stories promote questioning and discussion and are used in many countries to support the development of reasoning skills. The programme is consistent with a Vygotskian understanding of human development, involving the mediation of learners in the company of peers and adults within a 'community of inquiry'. The stories are the tools that stimulate the learners to engage in inquiry and many philosophical issues that have been debated over many years are included in Lipman's stories in a form accessible to children. The content is relevant to the child's context and serves to stimulate the philosophical discussion.

The original stories written by Lipman and his colleagues were set in a typical middle-class North American classroom with learners of the mid-20th century. Each storybook has sufficient chapters for use over a school year with a particular grade, and with texts designed for each grade. Green (2014, p. 128) explains that the 'stories' do not have a plot, but offer brief snapshots of classroom life and extracts from classroom conversations that hint at, but do not follow up on or resolve, important philosophical issues. Through the stories, a community of inquiry in action is modelled, and included in the story text are a wide range of philosophical questions. The stories present characters who consistently display different traits, thinking styles and perspectives with whom learners may identify. The accompanying manuals play an important role and provide a rich source of ideas about how issues might be explored, and extensive training of facilitators is advisable (Borman, 2005; Green, 2014).

Fisher (1999) developed a similar resource, First Stories for Thinking, aimed at developing the thinking, learning and literacy skills of young children. It offers 30 multi-cultural stories for children aged four to eight years to enjoy and to think about. Within a community of inquiry, young learners share a story and discuss it in a safe and stimulating environment, where they think for themselves and learn to value the thinking of others. One of the exciting aspects of community of inquiry is its unpredictability, but this aspect also limits the use of the concept in an environment where an adult or peer model, lack confidence or know-how.

The present study, however, specifically addresses the need for an approach that does not exclusively depend (although it always helps!) on external modelling of behaviour and mediation. The 'support structures', in the form of educated parents or well-trained teachers, can be desolate at times in our current school environment (Moonsamy, 2014). The modelling element is a prominent feature of the stories developed for the present study, but in the form of the characters in the stories themselves. With regard to social constructivist theory, the stories would be the tools of mediation, while the story characters model metacognitive reflective thought.

As mentioned before, P4C has been used extensively, also in South Africa. Research by people like Green (2005, 2006) and Borman (2005) resulted in the development of Stories for Thinking for local use, reflecting local context. The effectiveness of this approach to cognitive development was investigated and the findings indicate an increased awareness of and change in the cognitive behaviour in the learners and teachers involved (Borman, 2005). Similar in principle is Murris and Haynes's (2010) research, and they report successfully used and carefully selected picture books for all ages. The P4C approach, however, presents practical challenges regarding the affordability of imported resource materials and the complexity of the material. The stories, like the original set, are accompanied by a manual to help with the facilitation process, but Borman (2005) recommends that teachers be thoroughly trained. I believe that this is a major stumbling block to cognitive development in the current education context, because it would mean that only those learners with well-trained and highly skilled teachers will be able to benefit from a thinking skills programme such as P4C. Green (2014) also reports that often teachers find it difficult to sustain because of the demands and commitment the programme requires.

3.9 A STORY-BASED INTERVENTION TO DEVELOP METACOGNITIVE AWARENESS – TOWARDS DESIGN PRINCIPLES

As was explained in the first chapter, this enquiry grew out of a desire to help young learners to learn – strategic and more efficiently. In Phase 2 of this DBR study, a solution to the stated problem (see Section 1.3) was developed, informed by the literature review and evidence gathered during Phase 1. The design of the learning tool – a series of stories about learning – was guided by social constructivism and situated within the pragmatic paradigm.

The primary aim of a DBR study is to generate design principles for the development of a solution to an identified real-life problem (Plomp, 2007). To follow is a brief outline of the tentative design principles for the intervention proposed after the first iteration (see Section 5.2).

<u>Design principle 1:</u> A learner-centred intervention supports self-regulated learning.

Traditionally, teachers focused on what *they* did, and not on what the *learners* are learning. The learner-centred approach to teaching is nowadays preferred and shifts the role of the teachers from givers of information to facilitators of learning. Teacher-centred teaching often leads to passive learners, not taking responsibility for their own learning (Blumberg, 2008). A learner-centred intervention therefore places the emphasis on the person (young learner) who is doing the learning, and ultimately, self-regulated learning behaviour is encouraged. In Section 2.5.1, I quoted Zimmerman (2001), who defines self-regulated learners as active participants in their own learning. How do you encourage learners to actively participate in their own learning?

I started Chapter 2 off with a powerful quote from the educationist Malcolm Knowles and he also made the comment that learning should be one of the most joyful things one does (Knowles, 1975). Most children love a story. An engaging story (set of stories) about learning, written specifically for the young learner at his level, could facilitate self-regulated learning in a fun way.

<u>Design principle 2:</u> Make learning the object of learning and provide learners with the vocabulary to talk about how they learn.

Explicit teaching techniques are particularly effective for imparting metacognitive knowledge (Adler, 2000) and Fisher (1998) proposes that the language of learning and thinking vocabulary should be infused in the act of teaching. Why not embed metacognitive terminology into the text of a story and make the story about learners such as themselves learning about learning?

<u>Design principle 3:</u> Use peer modelling and self-reflective conversation to make metacognitive knowledge explicit to the learner.

Helping learners make sense of their learning means helping learners develop a more reflective mindset and the capacity to take ownership of the learning process (De A'Echevarria, 2010). Earlier in this chapter I summarised various approaches to the development of metacognition from previous research and the prominent role that modelling (part of scaffolding) play is clear (see Section 3.7). It is further important to relate the fact that the acts of reflection underpin metacognition (Kriewaldt, 2001). Ertmer and Newby (1996) state that "expert learners are strategic, self-regulated and reflective" (p. 10). The stories are written in the voice of young learners, such as themselves, self-reflecting on their metacognitive experiences. Abe and his friends (characters in the stories in this study) model metacognitive awareness and strategies, as well as self-reflection.

<u>Design principle 4:</u> Intervention should be contextually sensitive and function independently from a skilled facilitator.

Depending on the context or task, changes in how people think, believe or behave are dependent on a combination of one's inherited abilities, stages of development, individual differences, capabilities, experiences and environmental conditions (Alexander & Murphy, 2000). Learning does not happen in a vacuum and when we deal with the development of metacognitive knowledge, we need to be acutely mindful of contextual influences. The story content is relevant to the readers' current reality and interests (e.g. birthday parties, superheroes and soccer games against classmates). The learners involved in the present research study are Afrikaans-speaking and the stories were therefore also written in their mother tongue. In addition, the type of intervention is such that it can be flexibly adapted to the context; for instance, if a learner struggles with reading the text himself, he can be paired with another more proficient learner or the teacher/parent could read the stories out loud.

However, this example also brings to the surface a very important design guideline, namely that the learning tool proposed in the present study is conceptualised as independent from the teacher or caregiver's ability to model metacognitive awareness and skills. In my extensive investigation of existing learning tools and training programmes, it became evident that the success of most existing interventions is highly dependent on the capability and availability of a more proficient facilitator, usually a teacher and/or a parent. But what if they are not able, for various reasons, to model expert learning behaviour? Green (2014) suggests that this is more the norm than the exception.

<u>Design principle 5:</u> Various metacognitive aspects should be targeted in the intervention.

Developing metacognition is far more than simply teaching learners a few study skills to improve recall. From the literature review it is clear that metacognition comprises of various elements (see Section 2.4) and research evidence indicates that an integrated approach is more effective (see Section 3.5). For instance, I quoted Lin (2001) earlier, stating that it is "not enough" to teach strategies if the learner lacks an understanding of himself as learner (self-knowledge) (p. 28). Imel (2002) reiterates that according to the research on self-assessment, learners who are skilled in metacognitive self-assessment and are therefore aware of their abilities are more strategic and perform better than those who are unaware. In the present study, knowledge of a number of different metacognitive strategies was included, but also aspects of task and self-awareness (e.g. learning styles and motivational beliefs) (see Figure 2.6).

In an attempt to demonstrate how theory informed the drafting of these design principles, I present a review of general guidelines from literature and practice in Table 3.2. The development of the stories (intervention) informed by these design principles is discussed in the next chapter in Section 4.3.2.2.

Table 3.2: General guidelines for intervention design from metacognitive development theory and practice

Design principles – present study	**Literature/Practice**	**Source/Reference**
1. A learner-centred intervention supports self-regulated learning.	Reading comprehension is an active, meaning-making process of connecting new and prior knowledge.	Vygotsky (as cited in Gredler, 2009) (see Section 3.2)
	Learning is a constructive process.	Piaget and Vygotsky (see Section 3.3)
2. Make learning the object of learning and provide learners with the vocabulary to talk about how they learn.	"Enquiring into a child's thinking facilitates thinking."	Fisher, 1998 (see Section 3.7)
	Bringing metacognition to level of consciousness to gain control	Fisher, 1998; Nelson, 1996 (see Section 3.4)
	More knowledgeable other (e.g. peer) models how to apply metacognition through "think-alouds"; having a mentor making covert thinking explicit	Dimmitt & McCormick, 2012; Pressley, 2002 (see Section 3.7)
	Language is central to cognitive development – exchange of ideas and ways of thinking.	Vygotsky (see Section 3.3)
3. Use peer modelling and self-reflective conversation to make metacognitive	"[P]eer-to-peer reflective conversations" modelling self-reflection	Desautel, 2009 (see Section 3.7)
	Mediate within ZPD; assess current state of awareness to help bring learners into ZPD	Vygotsky (as cited in Gredler, 2009 (see Section 3.2)
	Creation of collaborative environment	Wink & Putney, 2002 (see Section 3.3)
	Learning is socially mediated and constructed –	Vygotsky (as cited in Louca-

knowledge explicit to the learner.	"[l]earning is fostered by the activity of others".	Papaleontiou, 2008) (see Section 2.2)
4. Intervention should be contextually sensitive and function independently from a skilled facilitator.	Creating a supportive social environment; collaborative effort	Lin, 2001 (see Section 3.7)
	Social context, including SES, have bearing on language difficulties and reading comprehension, and ultimate academic performance; lower-SES metacognitive awareness and expression of thinking is less advanced.	Pappas et al., 2003 (see Section 3.6)
	Differentiated learning	Piaget (as cited in Hipsky, 2011) (see Section 3.3)
5. Various metacognitive aspects should be targeted in the intervention.	Self-knowledge should be nurtured simultaneously with domain knowledge; "not enough to teach only strategies".	Lin, 2001, p. 28 (see Section 3.7)
	"Informing learners about the usefulness of metacognitive activities to make them exert the initial extra effort"	Veenman et al. (2006) (see Section 3.7)
	Metacognitive knowledge precedes metacognitive skills, and has a bi-directional relationship.	Brown (1978, 1987)

3.10 CONCLUSION

In Chapter 3, the 'how to' of developing metacognitive awareness among young learners was the focus. In the first two phases of this DBR study, the research problem was analysed and then a solution in the form of an intervention was conceptualised, realising Objective 1: To develop a story-based intervention in the form of a series of stories engaging learners in learning about and reflecting on themselves as learners and how they learn (see Section 1.4). The present study, however, comprised of two iterations (cycles) of development, namely enactment and evaluation, and in the final chapter of this thesis these five design principles outlined in the previous paragraphs are elaborated on, in response to exposure to another evaluative cycle (see Section 6.3).

CHAPTER 4
RESEARCH DESIGN AND METHODOLOGY

4.1 INTRODUCTION

"An educational psychology that is both usable in a practical sense and scientifically trustworthy cannot proceed without directly studying the phenomena it hopes to explain in its inherent messiness." – Sandoval & Bell, 2004, p. 199

In recent years, the importance of narrowing the chasm between research and practice has come to the fore. Research that is detached from practice "may not account for the influence of contexts, the emergent and complex nature of outcomes, and the incompleteness of knowledge about which factors are relevant for prediction" (Design-Based Research Collective [DBRC], 2003, p. 5). The present study was ultimately about addressing theoretical questions concerning the nature of learning metacognitively in a real, authentic context in collaboration with practitioners and going beyond the narrow measures of learning in an attempt to evaluate the effectiveness of an innovative intervention. To this end, a more pragmatic ideology, supported by a design-based approach with a combination of qualitative and quantitative research methods, was employed to investigate the research questions in the present study.

In this chapter, the research paradigm, design and methodology are discussed in detail. The DBR framework is defined and the characteristics are sketched. The specifics of the data-collection methods, as well as the unique research conditions and sample features, are explained. Chapter 4 coincides with Phase 3 (iterative cycles of testing and refinement of solution in practice), as illustrated in Figure 4.1.

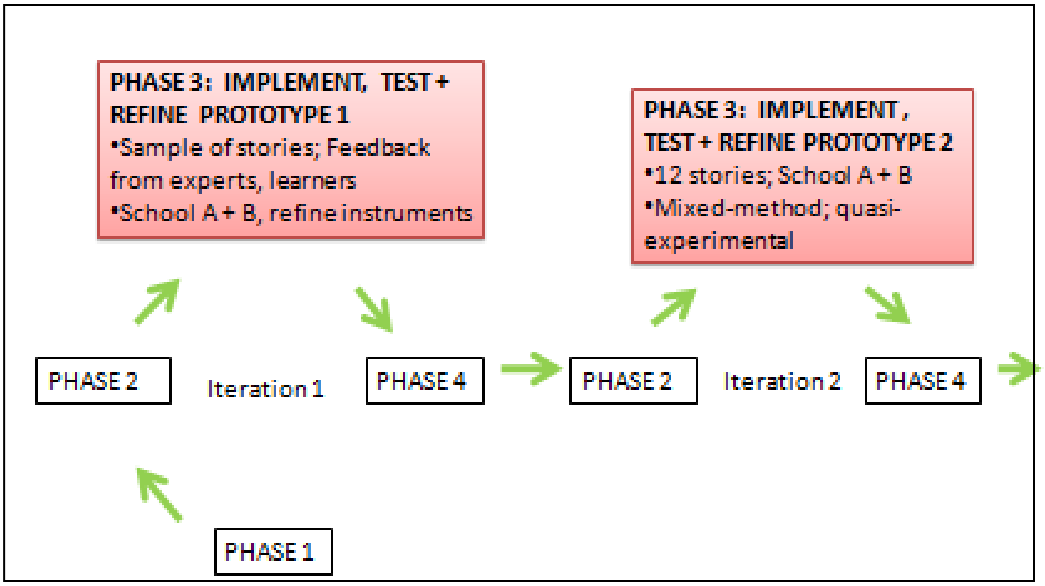


Figure 4.1: Research design – positioning Phase 3

4.2 RESEARCH PARADIGM

Because theoretical questions in education emerged from different conceptions and interpretations of social reality, different paradigms evolved, as one determines the criteria according to which one would select and define problems for inquiry. A paradigm can be defined as a worldview or belief system that guides researchers (Guba & Lincoln, 1994; Morgan, 2007). Thomas Kuhn (1970), who is known for coining the term 'paradigm', characterises it as an integrated cluster of substantive concepts, variables and problems attached with corresponding methodological approaches and tools. In addition, Weaver and Olson's (2006) definition of paradigm reveals how research could be affected and guided by a certain paradigm, by stating that "paradigms are patterns of beliefs and practices that regulate inquiry within a discipline by providing lenses, frames and processes through which investigation is accomplished" (p. 460).

A paradigm consists of the following components: ontology, epistemology, methodology and methods (Creswell, 2009; Guba & Lincoln, 1994; Scotland, 2012). Ontology is "the study of being" (Crotty, 1998, p. 10). Ontological assumptions are concerned with what constitutes reality. In other words, as a researcher one concludes whether there is a ‘real’ objective world out there, or whether reality is constructed through human relationships. Each paradigm has an epistemology – a set assumptions about the relationship between the ‘knower’ and the ‘known’ (Guba & Lincoln, 1994, p. 108) – how knowledge can be created, acquired and communicated (Scotland, 2012). For example, does the knower need to be ‘objective’ and affect the outcome as little as possible, or does the knower actively co-construct knowledge with others? In the present study, for instance, I leaned towards the latter epistemological stance.

“Different paradigms inherently contain differing ontological and epistemological views; therefore, they have differing assumptions of reality and knowledge that underpin their particular research approach” (Scotland, 2012, p. 9). This is reflected in their methodology and methods. Methodology is the strategy, approach or plan of action that lies behind the choice and use of particular methods (Crotty, 1998). Methodology is therefore concerned with why, what, from where, when and how data are collected and analysed. In the present study, I refer to the DBR approach as guiding my research design and I employed a case study research methodology. Methods, on the other hand, are the specific techniques and procedures used to collect and analyse data (Scotland, 2012), and here we refer to either qualitative or quantitative, or in the case of the present study, both data-collection categories.

In the field of education, several research paradigms exist, guiding different methods being used. Researchers with an objectivist epistemological preference tend to favour quantitative research methods, whereas researchers with a constructivist epistemological disposition lean towards qualitative research methods (Johnson & Christensen, 2004; Scotland, 2012). “For a long time, research purists have maintained that these two epistemological positions are mutually exclusive and that researchers should avoid mixing them in their research” (Javed, 2008, p. 75). Teddlie and Tashakkori (2003) however, proposed another research paradigm based on pragmatic ideology, concerned with practical consequences of an intervention and promoting mixed-method research. Feilzer (2010) explains that pragmatism sidesteps the contentious issues of truth and reality, and accepts, philosophically, that there are singular and multiple realities that are open to empirical inquiry and “orients itself toward solving practical problems in the real world” (p. 8). In order to position the pragmatic paradigm of the present study, I offer a summary of the main paradigms in social science research in Table 4.1.

Table 4.1: Summary of four different research paradigms (adopted from Anderson, n.d.)

PARADIGM	ONTOLOGY	EPISTEMOLOGY	METHOD
Positivism	Hidden rules govern teaching and learning process	Focus on reliable and valid tools to undercover rules	Quantitative
Interpretive/Constructivist	Reality is created by individuals in groups	Discover the underlying meaning of events and activities	Qualitative
Critical	Society is rife with inequalities and injustice	Helping uncover and empowering citizens	Ideological, review, civil actions
Pragmatic	Truth is what is useful; reality is the practical effects of ideas	The best method is one that solves problems	Mixed methods, design-based

The present study focuses on the practice of introducing a metacognitive awareness intervention (in the form of stories) in an authentic classroom environment and aims to explore both the qualitative aspects in terms of learner thoughts, feelings and behaviour in becoming aware of how they learn and the quantitative aspects in terms of metacognitive awareness indicators and reading comprehension on tests. Furthermore, positivist and post-positivist paradigms (see Lincoln & Guba, 2000 for definitions) “do not promote collaborative or participatory research where research is [orientated] towards bringing about change” (Javed, 2008, p. 81). The present study is participatory in the sense that I, as a researcher, directly participated in the design and implementation of the learning environment being researched and from the start, a collaborative approach was highlighted by involving teachers and learners in all the phases of the research process.

Javed (2008) contends that, “in educational research, pragmatism provides a sound epistemological base and offers an immediate and useful middle position [both] philosophically and methodologically” (p. 81). Johnson and Onwuegbuzie (2004) assert that pragmatism offers a “practical and outcome-oriented method of inquiry that is based on action and leads, iteratively, to further action and the elimination of doubt” (p. 17). Similar to Feilzer’s

(2009) earlier comment, Powell (2001) mentioned: "To a pragmatist, the mandate of science is not to find truth or reality, the existence of which are perpetually in dispute, but to facilitate human problem-solving" (p. 884).

Pragmatism allows the researcher to use multiple methods, different world views and assumptions as well as different forms of data collection and analysis, aiding in answering the research questions in a better way, not committing to one particular philosophy and reality (Creswell, 2003; Mertens, 2005, 2015). In this study I opted for a pragmatic paradigm, but more specifically supported by a DBR framework, and I used both qualitative and quantitative methods to generate data. Barab and Squire (2004) claim that cognition should be investigated "in context" (p. 1). "Cognition is not a thing located within the individual thinker but is a process that is distributed across the knower, the environment in which the knowing occurs, and the activity in which the learner participates" (Barab & Squire, 2004, p. 1). Learning, cognition, knowing and *context* are therefore irreducibly co-constituted and cannot be treated as isolated entities or processes. Brown (as cited in Barab & Squire, 2004, p. 1) insists that "research paradigms that simply examine these processes [learning] as isolated variables within laboratory or other impoverished contexts of participation will necessarily lead to an incomplete understanding of their relevance in more naturalistic settings" (p. 1).

Context matters in terms of learning and cognition, and within the pragmatic paradigm, the DBR framework advances design, research *and* practice concurrently (Joseph, 2004). In the next section, I introduce this useful research design.

4.3 INTRODUCING DESIGN-BASED RESEARCH

DBR can be defined as "a systematic but flexible methodology aimed to improve educational practices through iterative analysis, design, development, and implementation, based on collaboration among researchers and practitioners in real-world settings, and leading to contextually-sensitive design principles and theories" (Wang & Hannafin, 2005, p. 6). Bell (2004) contends that learning is too complex a phenomenon to be the sole territory of any one discipline, theoretical perspective or research method. DBR "is premised on the notion that we can learn important things about the nature and conditions of learning by attempting to engineer and sustain educational innovation in everyday settings" (Bell, 2004, p. 243) and this is exactly what this study aimed to do.

"DBR has its roots in the field of educational psychology" (Javed, 2008, p. 86) and is still to a great extent an emergent design. Brown (1992) and Collins (1992) were the early contributors to the definition and activation of DBR. They describe DBR as being concerned with both the design of a learning environment and the systematic study of this designed learning environment in a natural setting (Brown, 1992; Collins, 1992). Proponents of DBR particularly recommend it "for studies of classroom-based interventions where the purpose of the research is to actively participate in the design and implementation of an innovation in order to test and develop design" guidelines (Javed, 2008, p. 86). A continuous process of testing and revision characterises DBR, and this cyclic process is explicated in detail later in this chapter (see Section 4.4).

4.3.1 Characterising design-based research

The term 'design-based research' is also referred to in literature as 'design experiments' (Brown, 1992; Collins, 1992), 'design research' (Cobb, 2001), 'development research' (Van den Akker, 1999) and 'formative research' (Reigeluth & Frick, 1999). Wang and Hannafin (2005) maintain that "each has a slightly different focus, but the underlying goals and approaches are similar" (p. 5). Most importantly, DBR is relevant for educational practice, as it aims to develop research-based solutions for complex problems in educational practice.

The Design-Based Research Collective [4] (DBRC, 2003, p. 5) postulates the following characteristics of DBR:

- The goals of designing learning environments and developing 'conjectures', theories or 'prototheories' are closely linked.
- Development and research take place through continuous cycles of design, enactment, analysis and redesign.

[4] The Design-Based Research Collective (DBRC) is a group of faculty and researchers founded to examine, improve and practise DBR methods in education (see http://www.designbasedresearch.org).

- Research on design must lead to sharable theories that help communicate relevant implications to practitioners and other educational designers.
- Research must provide an account for how designs function in authentic settings. The account should focus on interactions that refine our understanding of the learning issues involved.
- Research relies on methods that can document and connect processes of enactment to outcomes of interest.

The above characteristics of DBR are somewhat differently reviewed by Wang and Hannafin (2005, p. 7) as being “pragmatic, grounded, interactive, iterative, and flexible, integrative, and contextual” (see Table 4.2 for an explanation of the five basic characteristics). In a following section (see Section 4.3.2), I present a narrative overview of the research process and I demonstrate in the discussion how I incorporated the above-mentioned characteristics into the present DBR research study.

Table 4.2: Characteristics of DBR (adapted from Wang & Hannafin, 2005, p. 7)

CHARACTERISTICS	EXPLANATIONS
Pragmatic	• DBR refines both theory and practice. • The value of theory is appraised by the extent to which principles inform and improve practice.
Grounded	• Design is theory-driven and grounded in relevant research, theory and practice. • Design is conducted in real-world settings and the design process is embedded in, and studied through, DBR.
Interactive, iterative and flexible	• Designers are involved in the design processes and work together with participants. • Processes are iterative cycles of analysis, design, implementation and redesign. • The initial plan is usually insufficiently detailed so that designers can make deliberate changes when necessary.
Integrative	• Mixed research methods are used to maximise the credibility of ongoing research. • Methods vary during different phases as new needs and issues emerge and the focus of the research evolves. • Rigor is purposefully maintained and discipline applied appropriate to the development phase.
Contextual	• The research process, research findings and changes from the initial plan are documented. • Research results are connected with the design process and the setting. • The content and depth of generated design principles vary. • Guidance for applying generated principles is needed.

DBR is often compared to traditional evaluation research and/or action research. Before I discuss the methodology used in the present DBR study, I need to clarify the ways in which DBR differs from other commonly used research approaches in education. Both action research and DBR are principally grounded in pragmatic epistemology and share common threads (Cobb, Confrey, diSessa, Lehrer & Schauble, 2003). Firstly, Javed (2008) explains that "both research approaches are naturalistic in the sense that they are concerned with action and reflection occurring in a real-life context or setting" (p. 85). Secondly, they are both participatory in the sense that the researcher is actively involved in the process of action or change. Anderson and Shattuck (2012) add that both approaches provide for the teacher to be a researcher, but in action research, the researcher is not an observer, whereas in DBR he can be an observer. Thirdly, there is an iterative process involved in both research approaches where there is a continuous cycle of planning, action and reflection (Opie, 2004). Action research, however, "is epistemologically closer to critical theory and places greater emphasis on social action and change", while DBR "is closer to post-positivist epistemology with an emphasis on empirical evidence in evaluating an intervention" (see Section 4.2) (Javed, 2008, p. 85). Furthermore, action research is based on active participation of all involved and is oriented towards collective action and social change; whereas DBR is concerned with active participation and collaboration for the purpose of extending our knowledge about innovative learning environments (Bakker & Van Eerde, 2014). It is this emphasis on designing an innovative learning environment and using mixed methods to inform findings that influenced the design of this study and the subsequent use of the DBR approach. DBR also advocates a more systematic study process.

In DBR, great value is placed on context. Traditional evaluation research differs in the ways context and interventions are problematised. In evaluation research, an intervention is measured against a set of standards and context is conceptualised as a set of factors that are independent of the intervention itself but that may influence its effects (DBRC, 2003). In contrast, DBR views a successful innovation as a joint product of the designed intervention and context. The intention of DBR in education is to inquire more broadly into the nature of learning in a complex system, to refine generative or predictive theories of learning (DBRC, 2003), and it therefore goes beyond perfecting a particular product. Rather than a particular programme, the present study generates design guidelines for a particular context.

McKenney and Reeves (2012, p. 97) provide the following comprehensive and clear definition of DBR, used in this study (my emphasis):

> […] situated in real educational contexts, focusing on the design and testing of interventions, using mixed methods, involving multiple iterations, stemming from partnership between researchers and practitioners, yielding design principles, *different from* action research, and concerned with an impact on practice, departing from a problem.

4.3.2 The design-based research approach: Principles and process

Mantei (2008) reminds us that the design-based researcher "uses findings from careful analysis of data collected during the interventions to contribute to the existing body of research to provide a deeper understanding of the problem as well as having practical applications for classroom teaching and learning experiences" (p. 132). This research study therefore aimed at doing two things (research objectives). Firstly, at the design level, its main objective was to develop and refine a series of stories engaging learners in learning about themselves as learners and reflecting on how they learn. Secondly, at the practice level, its main aim was to assess the feasibility and impact of the intervention on learner self-knowledge, metacognitive strategy awareness and comprehension performance (see Section 1.4).

As was mentioned earlier (see Section 4.3.1), DBR encompasses educational design processes and is, like all systematic instructional design processes, cyclical in character. "Analysis, design, evaluation and revision activities are iterated until a satisfying balance between ideals and realisation has been achieved" (Plomp, 2007, p. 13). This research process has been visualised by different researchers in various ways (see also McKenney, 2001; Wademan, 2005), but the present study used the four-phase approach of Reeves (2006), depicted in Figure 4.2 as reference point.

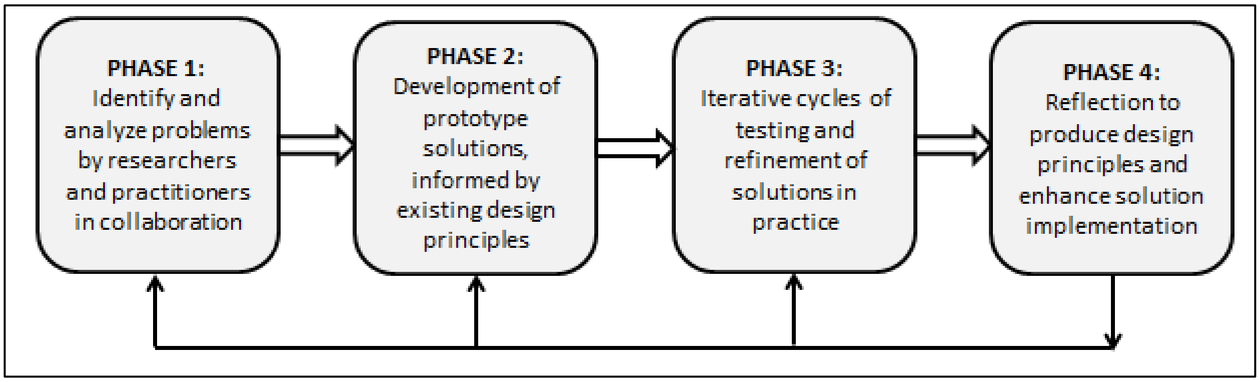


Figure 4.2: Design-based research approach (adapted from Reeves, 2006)

In the following sections, each of the phases is described in connection with this investigation of developing metacognitive awareness in young learners through a story-based intervention, and an overview of the design phases and iterations for this study is represented diagrammatically in Figure 4.3.

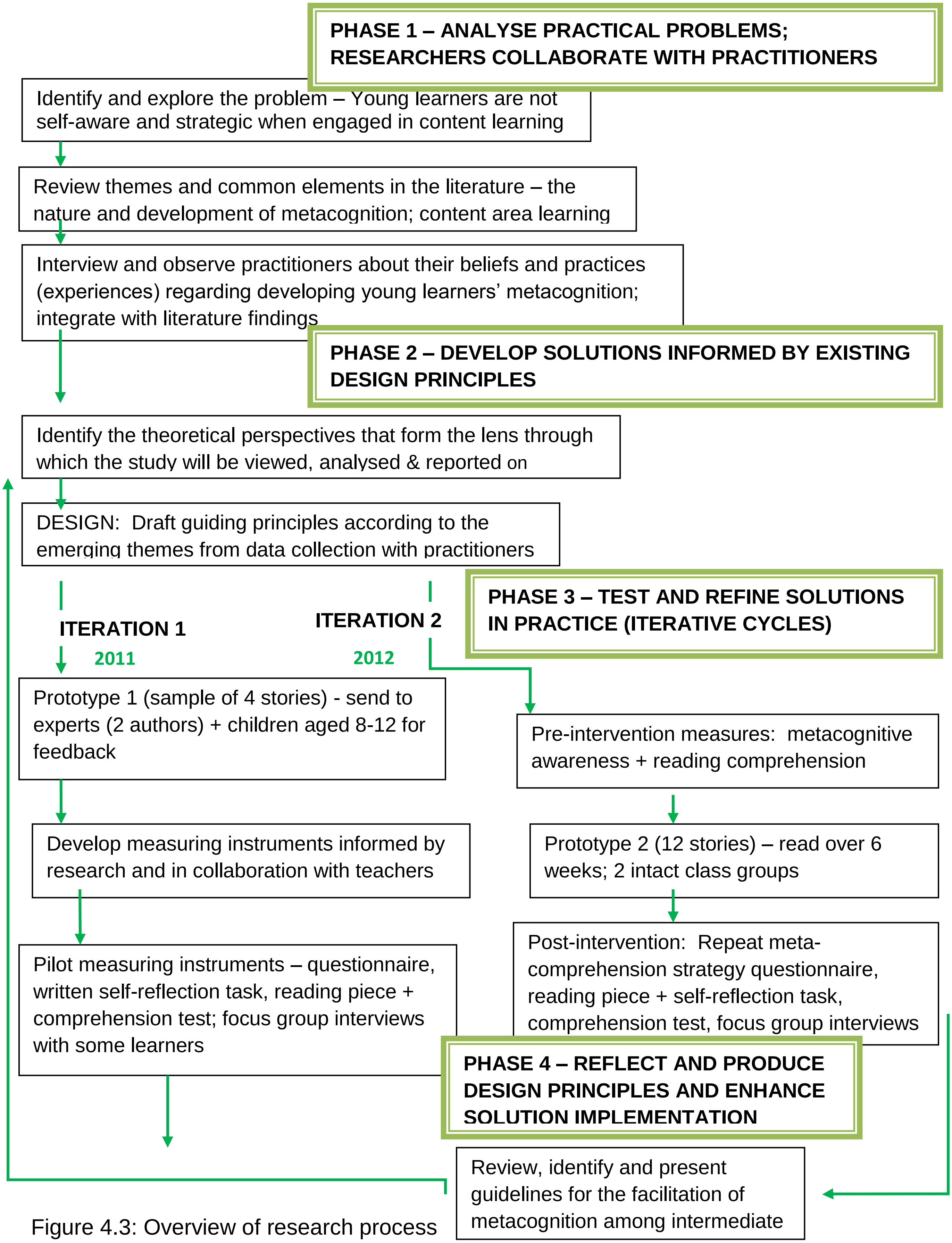


Figure 4.3: Overview of research process

4.3.2.1 Phase 1: Analyse practical problems; researchers and practitioners collaborate

Herrington et al. (2007) maintain that, for DBR in education, "the identification and exploration of a significant educational problem is a crucial first step, [because] it is this problem that creates a purpose for the research" (p. 4094). Ultimately, the creation and evaluation of a potential solution to this problem form the focus of the entire study. As a design-based researcher, it was important for me to start with the problem and then work towards a solution, informed by research, and not the other way around.

In order to formulate the fundamental purpose of this study, Phase 1 relied on meaningful collaboration with practitioners and literature from the start. The literature review process is critical in DBR because it not only performs "the usual functions associated with a review", but it also "facilitates the creation of draft design guidelines to inform the design and development of the intervention that will seek to address the identified problem" (Herrington et al., 2007, p. 4094). Herrington et al. (2007) further highlight the fact that the literature review is a continual process of identifying the conceptual underpinnings of the problem in order to assist in our understanding and prediction of solution elements. The literature review was comprehensively reported on in Chapter 2 and the intervention model was discussed in Chapter 3.

I identified experienced practitioners as well as learners and parents of learners with whom to collaborate very early on. I had enthusiastic support from the principals and teachers at the two schools that ultimately participated in the study and over time actively built a relationship with these schools. Various informal talks and semi-structured focus group sessions were held during this first phase and, in conjunction with the extensive literature study, I was able to formulate and refine the research problem and start conceptualising a possible solution (see Chapter 1).

In this study I argue for an innovative approach to develop metacognitive awareness. We know that metacognition is primarily developed through explicit instruction and modelling, and if neither of these is intentionally presented to a learner (feedback from Phase 1), metacognitive ability will most likely be delayed (Green, 2014). The explicit development of metacognitive awareness is essential, but how can this best be undertaken given the challenging and diverse educational environment in many South African schools? What if parents and peers are unable to model positive learning habits or the teacher lacks the necessary metacognitive awareness and approach to teaching? Metacognition is not new to the field of education and much research has been done on ways to develop metacognition (Lin, 2001), but why is metacognition not given the necessary pedagogical importance in practice? Many 'study skills programmes' are available on the market, but do these deliver? These programmes are often very expensive (and therefore exclusive) and they seldom teach metacognition, focussing on memorising techniques for recall (Woolfolk, 2013).

Another real problem that surfaced in Phase 1 is the time constraints of teachers. They have to work through the full curriculum and they have numerous other responsibilities on their calendars. Even those teachers that are aware of the need to teach metacognitively often perceive metacognitive awareness training as an 'add-on', time-consuming and considerable effort (Mooonsamy, 2014). What if a training tool can be created that is readily available, practical and inexpensive and that does not require a highly trained educationist to facilitate? What if learners at a young age, before bad habits and negative academic self-concepts develop, can learn how to verbalise their thoughts and be made aware of more effective ways to employ their mental resources to establish fertile ground for healthy learning habits as the academic challenges increase with age?

4.3.2.2 Phase 2: Develop solutions informed by existing design principles

In the second phase, a possible solution was proposed: explicitly teaching metacognitive awareness by means of and infusing the language of thinking and learning into an activity that most children love – a story. The aim is therefore to model the vocabulary, strategy use and self-knowledge we want children to draw on in their thinking and understanding of learning by explicitly incorporating it into the text of an entertaining 'story' they can read and reflect on in or outside class. Haynes (1997, p. 6) stated: "How can one be metacognitively aware or reflective without a language to think about oneself?" Metacognition is a mental process and notoriously difficult to assess, even with adults. To assess a young child's level of metacognitive knowledge and strategy use is extremely challenging, particularly because they struggle to express themselves adequately (Lai, 2011; Pintrich et al, 2000; Schraw &

Dennison, 1994). This type of story-based intervention therefore aims to help children verbalise their thought processes, increasing awareness and also making it easier to assess development. Better assessment in (design-based) research paves the way for better development.

Referring to Phase 2 of the DBR approach, Barab and Squire (2004) maintain that “design-based research suggests a pragmatic philosophical underpinning, one in which the value of a theory lies in its ability to produce changes in the world” (p. 6). As was mentioned earlier, explicit teaching techniques are effective for imparting metacognitive knowledge (Adler, 2000) and typically the following strategies would apply: direct explanation, teacher modelling (‘think-aloud’), guided practice and application. Following the previous argument of often ill-equipped teachers and parents, and a very diverse, inclusive classroom, one of the initial design principles proposed is that the intervention should not depend on an adult facilitator. The constructivist’s view of mediated learning fostered through interaction of the learner with more knowledgeable others (in this case peer modelling in the form of story characters) applies. Apart from peer modelling, metacognitive reflection (in the form of overt written dialogue) is a further theoretical cornerstone in the design of the intervention (see sections 3.9 and 6.3 for the full list of design guidelines).

In terms of the story content, it was important for me to thoroughly understand and research the concepts of text comprehension, language of thought and metacognitive strategy use – profiling the so-called expert learner (Ertmer & Newby, 1996) (see Section 2.6.3). The literature review gave structure and substance to the story-based intervention. Together with self-knowledge and task knowledge, metacognitive strategies make up the three elements defining metacognitive awareness (see Figure 2.6). I identified a list of metacognitive awareness (strategy) indicators from literature (see Jacobs & Paris, 1987; Miholic, 1994; Schmitt, 1990) and then refined the list in collaboration with the participating teachers, to end up with six metacognitive strategy groups in content area learning (see Section 2.6.3). (These six strategies presented in Table 2.1 also formed the backbone of the measuring instruments used – refer to Phase 3.)

As a novice to short story writing, particularly because I have never written for a young audience, I had to carefully plan all the elements (e.g. theme, characters and plot) of the stories to ensure that I achieve my goal of modelling metacognition through a story text.

During the first iteration, I received advice from two authors of children literature and they particularly said that I should try to bring humour into my stories and preferably write in the first person. One of them also added: “Your theme is the most important part of your work and everthing else comes second.” I further sent a sample of the stories (Prototype 1) to a number of children between the ages of 9 and 12 of parents I knew, for comment. They inter alia made remarks about the names of the characters and themes that interested them (e.g. soccer and superheroes). The class groups then followed and the participating teachers were also very helpful as sounding boards. The initial four stories were refined and I ended up writing 12 stories in total, as the idea was to deal with two stories a week and still complete the actual intervention within a doable six weeks.

The development of the short stories was therefore informed by a broad theoretical and evidence-based framework (see chapters 2 and 3). The intervention was structured not like a typical course textbook with a series of factual sessions about learning, but as a story about Abe, Annabel and their friends learning about what it means to be an expert learner. Activities were incorporated within the story and additional reflective questions with metacognitive prompts were posed in text. As mentioned earlier, it was important that the learners would be able to enjoy and learn from the storytelling without being dependent on a skilled facilitator. The stories have characters to whom they can relate and are about learners such as themselves explicitly learning how to learn (learning is the object of learning). They are taken on a journey (“Abe’s adventure”) of discovering the process of learning and self-knowledge by reflecting on facets of the story. Each story was developed to challenge and broaden learners’ thinking and learning, and every session focused on a theme (e.g. self-checking and monitoring during problem solving; identifying main ideas in text). Provision was therefore made in the design for learners to explicitly be provided with the means and terminology/vocabulary in their mother tongue (in this case Afrikaans) to explain (verbalise) their own thinking and learning process (see addendum N for an example of one of the stories).

The major theme or central idea of the stories is ‘learning about learning’ (metacognition). The main character (protagonist) is Abe (Abel in Afrikaans), who acts as narrator or storyteller. He reflects on his metacognitive experiences as a learner (first person). Further elements I had to consider in the development of the stories were the setting, tone, style and structure. Adding to the general theme of 'learning', most of the stories were set at school, but the home and playground were also incorporated. Because "the reader's response to the story is heavily influenced by the tone of the writer" (comment made by an author during informal interviewing), I consciously tried to give Abe a casual (familiar) tone. My challenge was to incorporate metacognitive vocabulary (language of thought) into the text, without losing the audience's attention. Finally, for each of the 12 stories a storyline or plot (sequence of events) was developed, linking the classic stages of a plot pattern together, from introduction, development through conflict and climax, to conclusion. In Figure 4.4 I present a mind map of the different story elements considered for Story 2 (see Addendum N). It is very important to mention at this stage that the aspiration of the intervention tool developed in the present research was not to produce a highly refined storybook, comparable with a professional author's attempt.

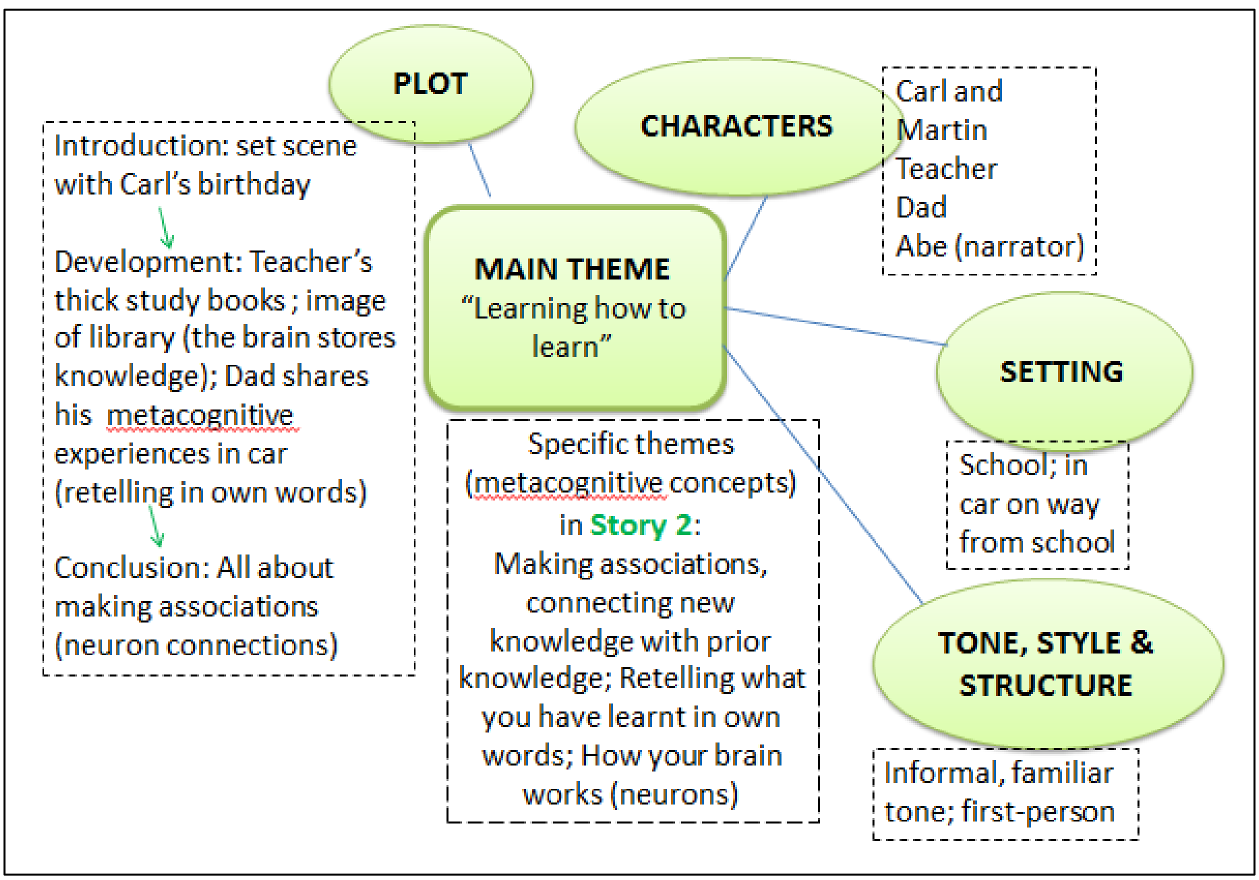


Figure 4.4: Developing the story elements (Story 2)

After the first phase of identifying the problem (from the literature and practice review), tentative design guidelines were put together informing the development of the first prototype (intervention). Further development took place in response to various micro-evaluative cycles, resulting in somewhat refined tentative design principles (see Section 3.9) informing Prototype 2. This story-based intervention was then field-tested to evaluate the impact on metacognitive awareness development of the participants during the second main iteration (see Figure 4.5 for a diagrammatic representation of the prototype development – Phase 2). In Chapter 6, I elaborate on the outcomes of the study and the refined design principles are outlined.

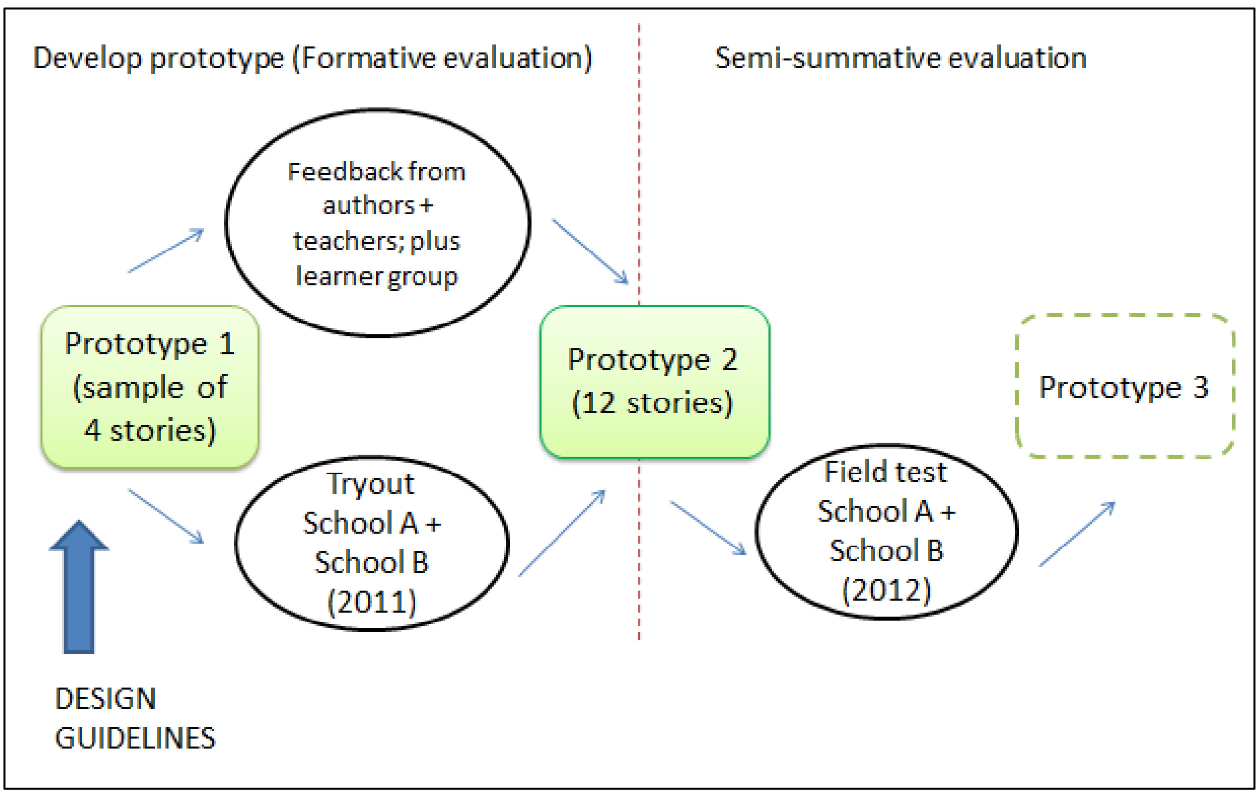


Figure 4.5: Diagrammatic representation of Phase 2 – development of intervention

4.3.2.3 Phase 3: Test and refine solutions in practice (iterative cycles)

Once the intervention has been designed and developed, the next phase of DBR encompasses the implementation and evaluation of the proposed solution in practice. Herrington et al. (2007, p. 4095) state that DBR is "not in itself a methodology, but a research approach. Both qualitative and quantitative methods" are utilised, but isolated variables are not emphasised. A design researcher attempts to study objects and processes as integral and meaningful phenomena (Herrington et al., 2007). This phase largely constituted the data-collection and analysis stage of the study and details of the implementation and evaluation of the proposed solution are provided in this chapter and in Chapter 5.

As was indicated earlier, DBR is typified by iterative cycles of analysis, design enactment and review (see Section 4.3.1). The present study had two main iterations (cycles) of testing and refinement (see Figure 4.3). The first iteration took place a year before the second, more comprehensive evaluative cycle, but the same two teachers and schools were involved, with different Grade 4 class groups (2011 and 2012). During the first iteration, the story-based intervention was developed with some collaboration between the participating teachers, Intermediate Phase learners and me as the designer/researcher. As stated earlier, in this iteration I consulted somewhat wider than the two schools, as I also collaborated with two published authors, and the draft stories as well as some of the measuring instruments were sent to a number of children between the ages of 9 and 12 of parents I knew, for comment. Its design and learning content were evaluated using a systematic implementation strategy, including the use of questionnaires and semi-structured interviews to obtain more formal feedback (see Section 4.4.3). In addition, informal feedback gained via classroom interaction with learners and discussions with collaborating teachers further enriched the findings. Feedback from this first iteration (see Section 5.2) was incorporated into the design of the intervention using a continuous editing and revision process (micro-evaluative cycles) and led to improvements in the second iteration.

The second iteration comprised of another iterative process of redesign, enactment, analysis and review (see Figure 4.3). During this iteration, various measures were used "to gain a deeper understanding of the factors affecting the design" and particularly "the effectiveness of the planned innovation" (Javed, 2008, p. 77). Along with the design and qualitative measures, another strand of inquiry was added to the research, namely a non-experimental pre- and post intervention study to measure change in two groups of particicpants, after the intervention, compare to before the intervention. The two groups of participants were surveyed at two time points – once before the intervention, and once afterwards. The non-experimental design was chosen, as participants were not randomly assigned and no control group was employed (Mertens, 2015). The purpose was to compare the metacognitive knowledge of the two learner groups that each engaged in the storytelling exercise before and after the intervention. I did not include a control group, but rather two different intact class groups, both receiving the same ‘treatment’. Multiple dependent pre- and post-intervention measurements made up the non-experimental design. Apart from their level of metacognitive strategy knowledge, these learners were also formally tested on reading comprehension before and after the intervention (see Section 4.4.3.3), including their ability to verbalise their thought processes while completing a reading comprehension exercise (written self-reflection) (see Section 4.4.3.4).

In addition, selected learners were interviewed before and after the story-based intervention (see Section 4.4.3.5). In consultation with the teachers, three smaller groups from each class of about four learners in each group were identified according to general academic performance. The same types of semi-structured questions were put to them before and after the intervention and very interesting data were generated. The outcomes from the two very different learner groups (socio-economic factors) were also contrasted for additional insight (see Section 5.5). As DBR is such a contextually sensitive research approach, the fact that the socio-economic factors were considered in the design of the intervention as well as the interpretation of data is critical. A detailed discussion of the specific instruments used in the evaluative cycles follows in Section 4.5 and in Chapter 5 the data analysis is outlined.

4.3.2.4 Phase 4: Reflect and produce design principles, and enhance solution implementation

The engagement with this recursive process resulted in an appreciation of the theoretical underpinnings of the guiding principles for the development of metacognitive awareness among Intermediate Phase learners through the use of a story-based intervention. DBR implies outputs in the form of both knowledge and products. The knowledge component takes the form of design principles (see Section 6.3), that is, “evidence-based heuristics that can inform future development and implementation decisions” (Herrington et al., 2007, p. 4095). On the other hand, as a design field, the dominant research goal is to solve teaching, learning and performance problems and the product of design is therefore viewed as a major output. Herrington et al. (2007) further draw attention to what they refer to as “societal outputs” (p. 4095). The collaborative nature of DBR enhances the professional development of all involved.

Phase 4 produced many reflective outputs in an attempt to solve the research problem identified in Phase 1 and these are presented in Chapter 6 (see Section 6.6). The study moved briefly through Phase 4 at the first iteration, tentative in its identification of design principles (see Section 3.9), to return to Phase 2 – the design of the development intervention. Emerging understandings were checked with practitioners and against existing literature as an improved development intervention was designed, implemented and then more thoroughly reflected on during a second iteration. Within the second iteration, additional opportunity for evaluative reflection was provided by the fact that two sample groups each repeated the storytelling sessions 12 times, although different themes were addressed each time. In the DBR framework we can refer to iterations to refine our design principles produced in Phase 4 and enhance the proposed solution.

4.4 RESEARCH METHODOLOGY

The research methods used are determined by the chosen paradigm (see Section 4.2) and in this study pragmatism supported the use of multiple methods, including different forms of data collection and analysis, to aid in a more contextually sensitive outcome with an action orientation. I therefore employed a comparative, instrumental case study (see Stake, 2003) methodology, utilising both qualitative and quantitative methods, in an attempt to address the second objective of the present study, namely assessing the impact of the story-based intervention on the development of metacognitive awareness.

A case study focuses on “a bounded system”, for example one individual, one group or one programme, with the aim of understanding and describing the ‘case’ in detail (Cohen, Manion & Morrison, 2007, p. 253). In case studies cause and effect can be verified, and Cohen et al. (2007) emphasise the important role that context plays in establishing cause and effect. In the present study the aim was to gain a deep understanding of the metacognitive awareness of young learners engaged in content area learning and to explore the effect of a metacognitive intervention in a real context. The study encompassed two schools as bounded systems. The contextual factors that had an impact on the learners of both School A and School B were therefore also considered.

Before I discuss the research population (see Section 4.4.2) and the data-collection process (see Section 4.4.3) in detail, it is important to first explicate the challenging issues of assessing metacognitive gain in young learners.

4.4.1 Assessing metacognition

Researchers have taken a number of different approaches to measuring the construct of metacognition and various diagnostic instruments are available (Desoete, 2008). According to McCormick et al. (2013) “some measures of metacognition include indices of actual performance, such as calibration techniques, where learners’ predictions are compared to their actual performance” (p. 75). Questionnaires, mostly asking learners to self-report on their usual metacognitive activities, are also widely used. These are typically out of context from any actual cognitive task. Other researchers have created their own informal measures to use in a specific context. McCormick et al. (2013) maintain that assessments of metacognition also “differ in terms of whether they are measures presented ‘offline’ (presented *before* or *after* task performance) or ‘online’ (presented *during* task performance)”. Questionnaires are easy to administer in larger groups, but Veenman (2015) points out that “people in general, but children in particular, are not objective judges of their own behaviour” and the answers on questionnaires appear to correlate poorly with actual learning behaviour (p. 15). Each method has its proponents and its characteristic strengths and weaknesses.

Interviews and think-aloud protocols are examples of verbal report methods and they are used to externalise metacognitive knowledge and processes. Interviews are retrospective (offline) verbalisations of metacognitive knowledge and control, while think-alouds are concurrent (online) verbalisations of thoughts and cognitive processes while performing a task. It is argued that online measures are more predictive of actual learning performance than offline measures (Veenman et al., 2006) and this is why I added a written self-reflection task similar to a think-aloud exercise that learners completed while carrying out a reading-to-learn activity.

In my quest to find out how metacognitive awareness can be measured, I discovered that most researchers, however, focused on developing questionnaires to assess metacognitive knowledge and behaviours. McCormick et al. (2013) speculate that the reason for this might be that questionnaires have the advantages of being easier to use with large groups of learners, are less time-consuming to score, and can be readily quantified for analysis. Various researchers, such as Richardson (2004) and Pintrich (2002), however, express concerns about the potential for response bias, specifically the social desirability of responses, and about whether or not the scores on questionnaires are closely related to learning outcomes. They suggest that, although aptitude and propensities can be assessed, questionnaires do not measure actual metacognitive performance. I specifically used the questionnaire in the present study to measure the learners' knowledge of metacomprehension strategies (see Section 4.4.3.2 and Addendum G).

Important to note at this point, however, is that the "identifying or measuring of metacognitive activity is a task that can prove highly problematic" (Georghiades, 2004, p. 374). Metacognition is an inner awareness or process rather than overt behaviour and often individuals are not aware of these processes. Brown (1987) maintains that it *is* possible for metacognition to be detected if the learner is able to effectively use or overtly describe such understanding. But very few learners have the ability to explain themselves (discuss general cognitive events) with enough clarity when abstract thought is involved. Even overt behaviour can be misinterpreted, for instance hesitating before answering a question can be either indicative of higher-order reflective thinking or of being unsure of the correct answer. Young learners' lack of verbal fluency or variation in adult–child use of language is one of the issues mentioned in literature (Schraw & Dennison, 1994). Younger learners also have a tendency for describing specific just-experienced events (Flavell, 1987; Garner & Alexander, 1989). Ultimately, most assessment tools available are “heavily dependent upon the subjective judgement of researchers” (Georghiades, 2004, p. 375). For instance, I prefer directly interacting with learners and would therefore perhaps favour semi-structured interviews, whereas another would give preference to a more clinical questionnaire or survey method.

Garner and Alexander (1989) recommend the use of multiple methods that do not share the same source of error, in order to measure ‘knowing about knowing’ more accurately. They suggest three ways of ascertaining what young learners know about their cognitions, namely (1) asking them, (2) having them think aloud while performing a task, and (3) asking them to teach another learner a good solution for a problem (Garner & Alexander, 1989). In the present study I have taken these suggestions to heart. In the first instance, I ‘asked them’ in the form of semi-structured interviews about their learning behaviour. I also employed ‘online’ self-reflection exercises similar to the think-aloud concept, when they were asked to write down their thoughts before, during and after performing a learning-to-read exercise. The third idea of Garner and Alexander (1989) refers to a form of peer modelling, and the modelling of effective metacognitive strategies is at the heart of the learning intervention proposed in this study.

4.4.2 Research population and sampling

Two intact Grade 4 class groups (27 + 33 learners – Iteration 2), along with their teachers, in two public schools in the Western Cape were actively involved in the study. The two schools are in the same physical area and although they differ drastically in size, more importantly the case studies also differ in terms of the broad socio-economic background of the learners that attend the two schools. School A is classified as a Quintile 5 school, while School B is Quintile 1. Quintile ranking determines the amount of funding that a school receives and the South African Department of Education allocates these ‘poverty rankings’ to schools annually, based on socio-economic status variables (Setoaba, 2011). Quintile 5 schools that serve more affluent communities receive the smallest allocation per learner, while a school such as School B, from a very poor community with far less resources, would need more funding.

According to the school principal, the majority of the parents of the learners from School A have a good income and almost all have some form of tertiary education. They provide learning support to their children and live close to the school. These learners (Iteration 2) scored an average of 80% for language and 78% for mathematics on the Annual National Assessment (ANA) in 2012, and their enthusiastic teacher had more than 30 years' teaching experience. School B can be referred to as a 'farm school', as most of these children reside on nearby farms or informal settlements, with many of their parents being seasonal workers on the farms. Quite a few of the children also reside at the children's home, being orphaned or having parents who are unable to care for them because of various reasons. They make use of bus transport and many receive their only meal per day at the school (part of a food scheme – see Addendum M). Alcohol and drug abuse is rampant and most of the parents do not have a senior certificate qualification (successfully completed 12 years of basic schooling). According to the teacher from School B, learning support from parents is limited. These learners scored an average of 48% for language and 41% for mathematics on the ANA (2012). The learners from School B had an equally enthusiastic teacher, but she had four years' experience and was still studying towards a teaching qualification at the time of this research. See Table 4.3 for a summary of the sample profile.

Table 4.3: Sample profile

	Grade 4 class from School A	Grade 4 class form School B
Location	Western Cape	Western Cape
School size (Class size)	1 500 (27)	240 (33)
Parent profile: Tertiary education	Majority have a form of tertiary education	Very few have completed Grade 12
Parent profile: Average income	Above average / middle class	Farm workers with seasonal income / poor, on food scheme
Teacher – experience	30 years' experience with degree and further development	4 years' experience as teacher in training, working towards degree

ANA 2012 – language score	80% class average	48% class average
ANA 2012 – mathematics	78% class average	41% class average
Quintile classification	Quintile 5	Quintile 1

In terms of sampling, it was essential that I first and foremost find a willing teacher at each school to actively participate in the research. The teachers played an important role throughout the research process, helping to implement and reflect on the process. Cohen et al. (2007) propose that various factors need to be considered in choosing a sample. In the first place, the *size* of the sample is important. The purpose of the present study was to investigate the effectiveness of an intervention on the development of metacognitive awareness. Both quantitative and qualitative data collection took place in order to achieve the purpose of the study and particularly the qualitative data-collection process implied that the sample had to be small enough. All the learners in the two Grade 4 class groups were included in order to obtain a rich understanding of the development of metacognitive awareness.

A second aspect the researcher has to consider in sampling is that of *representativeness*. “The researcher needs to determine the extent to which the sample represents the different subgroups of the population” (Cohen et al., 2007, p. 108). The subgroups of this study included age/grade level, home language and broad socio-economic background. The choice of the specific schools also depended on the *accessibility* of the samples and the permission to do research at these schools. Because both the schools were very close to where I personally reside, my decision was partly based on practicality/convenience. The last factor to take into account is the *sampling strategy*. In non-probability sampling, the participants are selected on the basis of their accessibility, but in the present study they were also selected based on the purposive personal judgement of the researcher. Because I approached the sampling process with a specific plan in mind, wanting also to explore the influence of the socio-economic context on the learning environment and impact on metacognitive development, my sampling strategy was purposive in nature. The class groups from School A and School B were similar in terms of language use, age of learners and geographical location, but very different in terms of other critical factors, as explained in this section (see Table 4.3).

4.4.3 Data-collection process and methods

Following a mixed-method approach embedded in the DBR framework, this study used both qualitative and quantitative measures to complement findings and draw meaningful conclusions. In the second iteration, the pre- and post-intervention data were compared. Semi-structured focus group interviews, questionnaires, written self-reflections and scores on comprehension tests from participating Intermediate Phase learners and informal feedback from teachers provided the data throughout Phase 3 (see Figure 4.3 and Table 4.4).

4.4.3.1 A synopsis

Phase 3 in the DBR process is about implementing the intervention and evaluating its effectiveness within an authentic context. The present study included two main iterations of testing. The focus of the first iteration (2011) was on the refining of the proposed intervention and the second iteration (2012) included more comprehensive assessment of the developed intervention through the use of various instruments (also see Figure 4.3). In Table 4.4, I provide a timeline review of the study, including the research activities during Phase 3. See Table 4.5 for a detailed week-by-week schedule communicated to the participating teachers of the actual intervention implementation during the second iteration.

Table 4.4: Timeline review of study

	YEAR 1 (2011) – Iteration 1	YEAR 2 (2012) – Iteration 2
PHASE 1 – Analysis of practical problems by researchers and practitioners	- Identify the research problem – "Young learners are not self-aware and strategic when engaged in content learning" - Review themes and common elements in the literature – the nature and development of metacognition; content area learning - Interview and observe practitioners about their beliefs and practices (experiences) regarding developing young learners' metacognition; integrate with literature findings	
PHASE 2 – Development of solutions informed by	- Identify the theoretical perspectives that form the lens through which the study will be viewed, analysed and reported	

existing design principles	- Design: Draft guiding principles according to the emerging themes and data collected with practitioners - Prototype 1 – write first four stories	- Refine the intervention according to data gathered during Iteration 1; write eight more stories (Prototype 2)
PHASE 3 – Iterative cycles of testing and refinement of solutions in practice	- Test Prototype 1 (sample of four stories) – Formative evaluation of intervention - Feedback from experts (two authors) - Feedback from children aged between 9 and 12 - Develop measuring instruments informed by research and in collaboration with teachers - Feedback from learners - Pilot the measuring instruments (August–September) – questionnaire, written self-reflection task, reading piece and comprehension test, focus group interviews with some learners - Feedback on level of metacognitive awareness provided	- Semi-summative evaluation of intervention; quasi-experimental design - Pre-intervention measures testing metacognitive awareness and comprehension ability (two-week period): Questionnaire A Reading-to-learn exercise 1 and written self-reflection task Comprehension test 1 Focus group interviews - Implement Prototype 2 (12 stories) over six-week period (6 August – 12 September), two intact learner groups - Post-intervention measures (over another two-week period after implementing the intervention): Questionnaire B Reading-to-learn exercise 2 and written self-reflection task Comprehension test 2 Focus group interviews
PHASE 4 – Reflection to produce design principles and enhance solution implementation	- Review, identify and conceptualise guidelines for the facilitation of metacognition among Inte rmediate Phase learners in content area learning	- Refine and present design principles for the intervention proposed in the present study

Table 4.5: Detailed weekly schedule

	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY
WEEK 1	16 July	17	18 Appointment – final arrangements; Drop off copies of all measuring instruments + booklets	19 Administer Questionnaire 1	20
WEEK 2	23 Introduce myself to classes	24 Reading piece 1 + Self-reflection 1; 2	25 Self-reflection 3	26 Test 1	27
WEEK 3	30 Interviews	31	1 Aug Interviews	2	3
WEEK 4	6 Start reading Story 1	7	8 Story 2	*9* *Womensday*	*10* *School holiday*
WEEK 5	13 Story 3	14	15 Story 4	16	17
WEEK 6	20 Story 5	21	22 Story 6	23	24
WEEK 7	27 Story 7	28	29 Story 8	30	31
WEEK 8	3 Sept Story 9	4	5 Story 10	6	7
WEEK 9	10 Story 11	11	12 Story 12	13	14
WEEK 10	17 Questionnaire 2	18	19 Interviews	20	21
WEEK 11	24 *Heritage day*	25	26	27	28
SEPTEMBER HOLIDAY BREAK (28 Sept – 7 Oct 2012)					
WEEK 1	8 Oct	9 Reading piece 2 + Self-reflection 1; 2	10 Self-reflection 3	11 Test 2	12

Before I discuss each of the measuring instruments employed in the present study separately and in more detail, I offer a brief synopsis of the data-collection process and explain how the implementation of the story-based intervention transpired, specifically during the second iteration. In Figure 4.6, a summary of the data-collection process during the second iteration is presented.

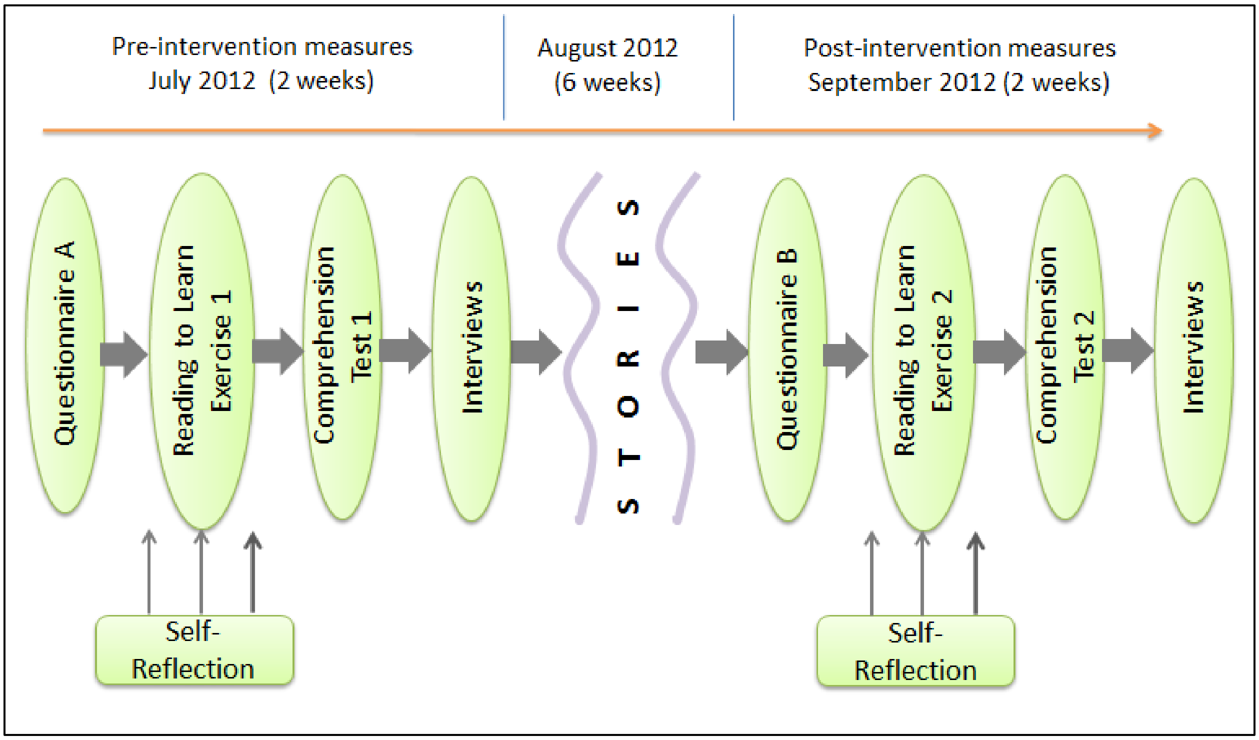


Figure 4.6: Data-collection process during Phase 3 – Iteration 2

First, all the learners were asked to complete the read-to-learn questionnaire (Addendum G) with 20 multiple-choice questions testing metacognitive strategy awareness in content learning. Then they were given a reading piece to work through and they wrote a comprehension test (Addendum H) on completion. Before, during and after reading the expository text, they completed written self-reflection tasks (Addendum I), expressing their thoughts and feelings about the learning process. The story-based intervention followed and was carried out during the third school term of 2012. The data-collection process was then repeated, as indicated in Figure 4.6, but the order of the questions in the questionnaires were changed and a new reading piece was selected for the comprehension test. Before and after the intervention, semi-structured focus group interviews (Addendum J) were conducted with the same three (two in the case of School B) small groups of learners in each class (see Section 4.4.3.5). Throughout the process that stretched over many months, I wrote down observations and the participating teachers were asked to do the same.

In terms of the actual intervention, the process included learners having 'story time' twice a week for about 20 minutes for a period of six weeks, followed by reflective discussion and practice for internalisation (e.g. rereading of stories) on the other days. All school classes have a period, usually in the beginning of every day, allocated specifically to reading (as prescribed by the Department of Education). The contextual realities of the school setup were taken into account and as researcher I was guided by the existing timetable and curriculum content, with the assessment and intervention (storytelling) done, as far as possible, to blend in with already existing structures. As was mentioned earlier, the idea was to test the practicality of this type of intervention. I explored the possibility of developing metacognitive awareness without dramatic interference, as one of the research conjectures was if teachers find the intervention too difficult, complex, time-consuming or effortful, they would simply not apply it in future, even if we can prove the benefits of it.

4.4.3.2 Developing the read-to-learn questionnaire (RLQ)

The development of the questionnaire used in the present study played a pivotal role in the research process by helping to clarify and define the concept of metacognitive awareness in content learning in terms of measurable behaviour indicators. After scrutinising several questionnaires that I considered using for this study (see previous discussion on assessment in 4.4.1), I found it necessary to develop my own questionnaire more appropriate for the context of the study. My starting point was the unique profile of the participating respondents: Grade 4 learners (average 10 years old), Afrikaans-speaking, and scholastic ability ranging from very proficient to really struggling academically. As far as I know, there are no questionnaires available in Afrikaans that measure metacognitive awareness in content learning (metacomprehension), appropriate for use by Intermediate Phase learners (10–12 years).

I needed an instrument to measure the level of metacognitive strategy awareness of young learners involved in text comprehension for the purpose of studying content. Metacomprehension is the awareness of one's state of reading comprehension. It involves monitoring understanding and using strategies that support understanding of what is being read. Gee (2000) defines metacomprehension as “knowing when text is not making sense, knowing what to do to restore meaning and doing it” (p. 24). In Chapter 2, I reported on research distinguishing between good and poor readers on the basis of effective strategy use and also the diversity of the strategies that learners employ (see Section 2.6.3). In the literature, several strategies for improving comprehension are reviewed, from drawing on mental images to adjusting the rate of reading and self-questioning (Armbruster, 1983; Klapwijk, 2011). Over the years, researchers have listed numerous strategies, each giving some strategies more prominence than others and coming up with various ways of organising or grouping them. Schumm (2006, p. 235), for instance, presents a so-called comprehension checklist, offering statements such as “ask for help when comprehension is difficult” and “uses titles, pictures, captions to predict text content”. As explained earlier (see Section 2.6.3), these reading comprehension strategies are grouped into three stages: *before* reading, *during* reading and strategies associated with *after*-reading activities. This structuring of strategic behaviour indicators mirrors what Pressley and Afflerbach (1995) refers to as *planning*, *monitoring* and *evaluating* type strategies (see Figure 2.5).

Paris et al. (as cited in Nash-Ditzel, 2010) refer to “the aspect of metacognition that allows learners to actively assess the variables involved in a certain task by planning, evaluating and regulating their own comprehension in strategic ways” as “self-management of thinking” (p. 46). Planning is when a reader determines which cognitive strategy would be most appropriate to use to reach a particular cognitive goal. When a learner identifies a word he does not know the meaning of, what does he do? “An assessment of the task, its difficulty relative to readers’ ability and effectiveness of a chosen strategy is called evaluative strategies” (Nash-Ditzel, 2010, p. 46). A learner might for instance consult a dictionary. Lastly, through regulation, readers monitor their progress and revise their strategic planning, depending on the outcome of their evaluation. For example, the learner struggles to find the word in the dictionary, but decides to ask for help from the teacher instead.

During the first iteration (see Table 4.4), I evaluated the functionality of a couple of widely used questionnaires, including the following:

- *Motivated Strategies for Learning Questionnaire (MSLQ)* (see McCormick et al., 2013)
- *Metacognitive Awareness Inventory (MAI)* (Schraw & Dennison, 1994)
- *Junior Metacognitive Awareness Inventory* (Sperling, Howard, Miller, & Murphy, 2002)

- *Metacognitive Awareness of Reading Strategies Inventory (MARSI)* (Mokhtari & Reichard, 2002)
- *Metacomprehension Strategy Index (MSI)* (Schmitt, 1990)
- *Index of Reading Awareness (IRA)* (Paris & Jacobs, 1984).

I asked four above-average-performing Afrikaans-speaking learners ranging from 10 to 16 years to complete some of the questionnaires available. Their feedback can be summed up by the following comment of one of the 'volunteers' in the focus group who completed the *MSLQ* and *MAI*: "It was easy, but far too long and boring. I guessed most of the answers. I don't really understand what they are talking about …" During my initial investigation, the self-report format showed to be not that effective with young learners, as all the respondents reported that they merely ticked off the options they thought would be the correct answers and did not really give a true reflection of their actual metacognitive behaviour. They simply did not understand most of the terminology and therefore guessed a lot of the items. Although they were not struggling to read the English (second language), they said they would prefer Afrikaans. In response I decided to rather use a multiple-choice design, to limit the items and to translate the questions into Afrikaans.

Eventually, the questionnaire used in this study (*Reading to Learn Questionnaire (RLQ) / Lees vir Leer-Vraelys (LLV)*) was partially based on the research done by Schmitt (1988, 1990) and her multiple-choice questionnaire, the *MSI*. I also incorporated the work of Miholic (1994) and Paris and Jacobs (1984) as basis for item development. The *MSI* is widely regarded as a valid means for measuring learners' metacognition for the purpose of designing instructional programmes (Israel, Bauserman, & Block, 2005) with reliability and validity data available. Schmitt (1988) found a statistically significant correlation between the questionnaire and the *IRA* ($r = 0{,}48$ $p < 0{,}001$), the measure devised by Paris et al. (1984) for third-grade learners who participated in a metacomprehension training study. Furthermore, Lonberger (1988) reported an *MSI* internal consistency value of 0,87 using the Kuder-Richardson Formula 20, and Pereira-Laird and Deane (1997) reported a Cronbach's alpha of 0,68 for the *MSI* when used to measure metacomprehension in intervention studies (see Schmitt, 1990, p. 64).

Although the *MSI* questionnaire is designed to measure awareness of strategies specific to narrative text comprehension, Schmitt (1990) points out that it is easy to adapt for expository text comprehension. She further explains that the results can be used to consider learners' individual strengths and weaknesses in metacognitive awareness, and the following questions with respect to types of strategies and conditional knowledge are considered (Schmitt, 1990):

- Which strategies were most well known?
- Are there differences among the before, during and after stages that might signal strengths/weaknesses?
- Are there patterns indicating difficulty with conditional knowledge for items that have distracters that are relevant for a different stage of reading?

The *RLQ* (Addendum G) was loosely modelled on the *MSI* in that it has a multiple-choice format and includes declarative and conditional knowledge of a variety of metacognitive behaviours that comprise of six broad categories. I adapted the categories to better suit expository text comprehension (see Section 2.6) and context, after considering other measuring instruments and verification by various educationists. It was important to develop a trustworthy (see Section 4.4.3) questionnaire that is still short enough for the age group under investigation, using simple statements in the participants' mother tongue (in this instance, Afrikaans) and taking only a few minutes to administer and score (see Section 4.5.1 for a discussion on the reliability analysis done for *RLQ*). The questionnaire consists of a total of 20 questions with three multiple-choice options each, grouped into three sections: before, during and after reading the text. A correct answer scored 1 and undecided or unanswered statements scored a zero mark. At the end, scores from 20 items were added to give a total for each category and a total out of 20 (see Figure 5.4). The six metacognitive strategy awareness categories or groups assessed in the *RLQ (LLV)* are presented in Table 2.1. See Figure 4.7 for an excerpt of the *RLQ (LLV)*, translated into English.

5. BEFORE I start reading, it is a good idea to:		
A. Use the headings and pictures to think about what I am reading.	*B. Sound the words I do not know until they make sense.*	*C. Practise to read the text out loud.*
6. WHILE I read, it is a good idea to:		
A. Read the content very slowly to ensure that I do not miss anything important.	*B. Think throughout why I am reading the text and about what I must do to reach my goal.*	*C. Think about how far I have already read and how much work I still need to go through.*

Figure 4.7: Excerpt of *RLQ* questions

4.4.3.3 Read-to-learn exercise and comprehension test

The study used a typical comprehension-type test to measure the learners' ability to read expository text with recall and comprehension. They were given a short informative piece to read on a topic such as penguins. The readings (one page long with a few pictures and subheadings) were chosen in consultation with the class teachers and the question papers were also checked for suitability (see Addendum H for an example). The tests were administered by the teachers themselves, just like per normal (the learners were familiar with writing comprehension tests). They were given enough time to read and study the material before the test was administered, and here the teacher played a leading role. Two different reading pieces were given to the learners to study before and after the intervention, but we tried to pitch it at the same level of complexity and kept it similar in format. The purpose of including this exercise was to assess possible development of metacognitive behaviour resulting in measurable improvement in text comprehension and recall. The test had a total score out of 20 (see next chapter for data analysis).

4.4.3.4 Written self-reflection responses while completing a learning task

Since the early years of research on metacognition, Brown (1978) challenged researchers "to quantify and quality the degree of awareness children have of their own mental operations" (p.

82). As was mentioned before, however, efforts to understand children's metacognitive processes have proved challenging (Meichenbaum, Burland, Gruson, & Cameron, 1985). Research indicates that "children are not good at describing their own thinking" (Sheppard et al., 1999, p. 3). Meichenbaum et al. (1985) make the statement that metacognitive behaviour is a dynamic interactive process and must therefore be measured *in progress* (see also Section 4.4.1). Brown (1978, 1987) strongly argues that evaluations of children's verbal reports of their cognitive process would help identify specific factors responsible for positive effects of training.

The learners in the present study were asked to write down (to reflect on) what they were thinking, feeling and doing *while* completing a learning activity that involved reading an informational piece. Based on the work of Pressley and Afflerbach (1995) (see Section 2.6), they were asked to respond at three stages: before, during and after they were given the page to read and study. "Student reflections on the thinking strategies are an important part of the assessment, as they provide a conscious application of metacognition." (Moonsamy, 2014, p. 56) I designed a form with a drawing of a child's face on and a 'thinking cloud' prompting the learner to write down any feelings and thoughts: "What is going on in your mind at this moment?" (See Figure 4.8 below for a translated example).

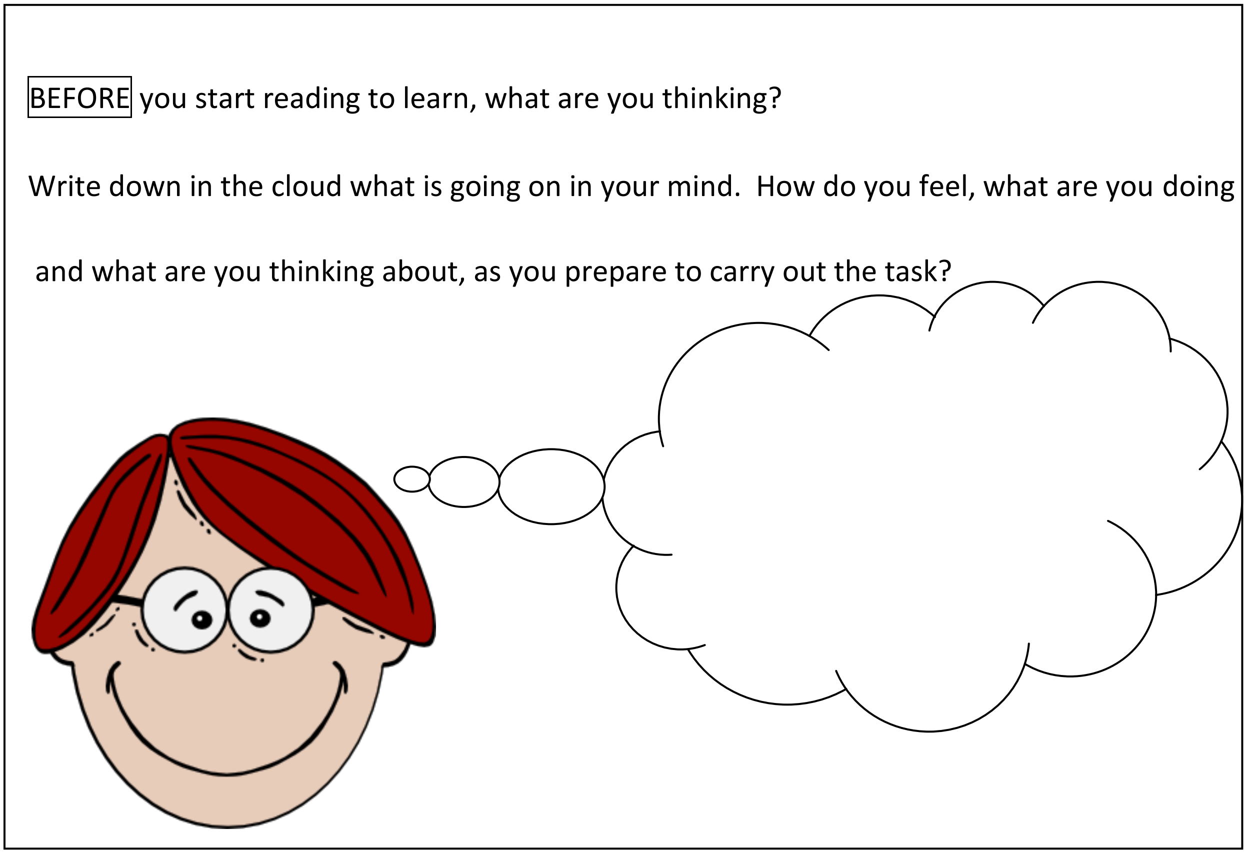


Figure 4.8: Sample of written self-reflection task (translated into English)

The seminal researcher Ann Brown (1980), however, warns that young learners may not be capable of the split mental focus required for simultaneously solving problems or comprehending text, and commenting on the process (Brown, Bransford, Ferrara, & Campione, 1983). Sheppard et al. (1999) mention Brown's contention that "other factors that may be interfering with children's descriptions of their thinking, such as their lack of experience with examining thinking and lack of vocabulary to describe it" (p. 4). This research study was designed to observe the influence of the story-based intervention intended to enhance exactly what is mentioned above, namely learners' awareness and descriptions of their thinking, by providing them with appropriate terminology. I was expecting an improvement of their ability to explain their cognitive behaviour after exposure to the language of thought explicitly embedded in the stories. This self-reflection activity was included also as a means to an end, because reflecting on our learning behaviour is being metacognitive – a strategic skill to be developed. In a previous deliberation (see Section 4.4.1), I mentioned the preference for 'online' measurement voiced by Veenman et al. (2006). This written self-reflection task is similar to a think-aloud exercise. Because I also included semi-structured focus group interviews (see Section 4.4.3.5) in my instrument battery, I decided to opt for a *written* verbalisation format.

4.4.3.5 Semi-structured focus group interviews

Focus group interviews with selected learners were used as a further data-collection method in order to gain comprehensive insight into their opinions, experiences and metacognitive knowledge. Focus group interviews are semi-structured discussions with groups of between 4 and 12 people for the purpose of exploring a particular set of issues (Tong, Sainsbury & Craig, 2007). In this study, the interviews took place after all the other assessments were done, both before and after the intervention (Iteration 2 – see Figure 4.4). I employed purposeful sampling to select the interviewees. Purposeful sampling occurs when participants are selected because of some characteristic (Mertens, 2015; Patton, 2001) and in this case it was their past academic performance. The participating teacher at each school was asked to identify three small groups of three to five learners in their class, according to their average academic performance (high-, average- and low-achieving), and they were invited for interviews in their respective small groups (five in total). I conducted all the focus group interviews myself, and they were recorded on a digital video recorder and transcribed verbatim (see Addendum K).

The focus group interview with the learners followed a semi-structured format and interviewees were probed for clarity on how they learn. The focus groups followed an "interview guide approach", where the researcher used "a set of predetermined questions" with the interviewees but allowed the interview to follow a conversational path" in order to gain an in-depth understanding of the issues at hand (Johnson & Turner, 2003, p. 305). During focus group interviews, participants are encouraged to interact with one another, but the facilitator must ensure that they answer questions individually (Collins, 2012). This interaction allows participants to explore and clarify individual and shared perspectives, and focus group interviews enable respondents to build on the comments of others. Tremblay, Hevner and

Berndt (2010) consider focus group interviews to be an appropriate evaluation technique for DBR projects, also because they are sufficiently flexible to accommodate a wide range of design topics and domains. As researcher, I was placed in direct contact with potential users (Grade 4 learners) of the designed artefact as well as with domain experts in the form of the teachers.

Metacognitive interviews are often criticised because they take place at a time distant from the actual processing and therefore might be less accurate sources of information (Veenman et al., 2006). “One way to make interviews more adjacent to actual processing situations is to include hypothetical situations designed to elicit responses in the interview protocol” (McCormick et al., 2013, p. 72). I sometimes had to sketch scenarios or give examples to stimulate recall, but as a researcher I was constantly aware of the risk of being judgemental during the interview process. I consciously avoided comments that could influence learners’ responses to interview questions, such as “This might be a difficult question …”.

Originally, the interview guide contained five primary questions, but I later added three more questions after feedback from the teachers and learners during the first iteration. The questions were designed to explore the young learners’ awareness of strategic reading and metacognitive thinking while studying from text. Two types of focus group interviews in DBR are proposed in literature, namely exploratory focus groups that are used for the design and refinement of an artefact and confirmatory focus groups that are used to explore or confirm the value of an artefact in an authentic setting (Tremblay et al., 2010). To include the focus group interviews (see addenda K and L for the interview guide and verbatim transcript of one of the interviews – Afrikaans) proved to be advantageous in its confirmatory function, but also because additional contextually sensitive information was gathered, which did not surface as a result of the other instruments. The focus group interviews yielded rich data (see sections 5.3.1.4 and 5.4.2.4).

Some questions asked during in the interview included:

- Have you recently done well in a test or do you know anyone doing really well in class? Why do you think you or the other person did really well? What makes a learner perform well at school?
- Do you like to study and why / why not?

- When your teacher gives you the assignment to read text for study purposes, what do you do first?
- What do you do to make sure you remember what you read?

4.5 ADVANCING CREDIBLE ASSERTIONS

The measures of validity and reliability indicate quality and trustworthiness of a research study. The likelihood that our interpretation of the results accurately reflects the truth of the theory and hypotheses under examination points to the *validity* of the research, while *reliability* refers to the extent to which a measurement can be replicated (Hoadley, 2004; Hunter & Brewer, 2003). The objective of any research attempt is to conduct scientifically sound research to ensure credible assertions (see Shavelson & Towne, 2002 for principles of scientific research). Barab and Squire (2004, p. 7) report on Schoenfeld's (1992) claim that "a sound methodological argument in the social sciences should touch on issues of *trustworthiness, credibility,* and *usefulness* as well as the range of contexts in which the researcher believes the assertions should extend (own emphasis)".

Trustworthiness and credibility are akin to reliability and validity, while usefulness refers to generalisability and external validity. Barab and Squire (2004) remind us that the use of objective and quantitative methods is not necessarily a prerequisite to demonstrate the aforementioned. In the present study, I employed both qualitative and quantitative measures. DBR "treats the notion of quality and trustworthiness somewhat differently from purely quantitative and qualitative research" (DBRC, 2003, p. 5). DBR depends on techniques such as "thick descriptive datasets, systematic analysis of data with careful defined measures, and consensus building within the field around interpretations of data" (DBRC, 2003, p. 7). McKenney and Reeves (2012) make the important comment that DBR uses "existing quantitative and qualitative research methods" and follows "established norms" for sampling, data collection and data analysis (p. 98). "It is not so much the methods as it is the *goals* that set DBR apart from other genres of research" (McKenney & Reeves, 2012, p. 98). In this vain, Barab and Squire (2003) state that our goal, as applied researchers engaged in doing design work, is "to directly impact practice while advancing theory that will be of use to others" (p. 8).

For design researchers, ‘consequentiality’ is therefore an essential criterion for determining the significance of a particular study. Barab and Squire (2003) raise the difficulty of ‘claiming usefulness’. It is easy to demonstrate learning gains (e.g. improved comprehension test results in the present study) or show that statistical differences have been achieved, but to prove usefulness or consequentiality of work is much more challenging. Consequential validity has to do with the changes it produces in a given system, and in the present study I was acutely aware of the holistic nature and impact that context had on the possible changes the study generated (see Chapter 6 for more on output).

Internal validity is about the quality of the data and soundness of reasoning that lead to conclusions, and Bakker and Van Eerde (2014) define internal reliability as the degree of how independently of the researcher the data are collected. In the present study, I consciously used triangulation of multiple data sources, data type, method and evaluator. In terms of methods, I obtained data from sources ranging from a questionnaire (quantitative) to self-reflection tasks (qualitative) and more informal observation notes (see Chapter 5 for data analysis). Triangulation is a method used to check and establish validity by analysing a research question from multiple perspectives. Patton (as cited in Guion, Diehl & McDonald, 2002) “cautions that it is a common misconception that the goal of triangulation is to arrive at consistency across data sources or approaches; in fact, such inconsistencies may be likely given the relative strengths of different approaches” (p. 1). Rather than viewing these inconsistencies as weakening the evidence, it could be regarded as an opportunity to uncover deeper meaning in the data. In Chapter 5, I present my findings, including the inconsistencies.

Thick description of the research process, procedures and findings is another way to improve the quality of the research and Gasson (2004) mentions that “providing an in-depth description of all methods used to collect and analyse data” allow for “integrity of research results” to be scrutinised (p. 89). Furthermore, Bakker and Van Eerde (2014) advise that data collection by objective devices such as audio and video registrations contribute to internal reliability. In the present study I video recorded and transcribed the interviews I conducted. In an attempt to assure the study measured what was actually intended, throughout the data-collection process I encouraged honest responses from the participants, I established a rapport with all involved and they were made aware of their right to withdraw at any time without disclosing a reason. I frequently had debriefing sessions and my supervisors and the participating teachers assisted with scrutiny of the research project. In addition, previous research findings were examined and I left what Wimmer and Dominick (2006) calls an "audit trail" (record of original data) to help build credibility. During the analysis phase of the research, I constantly reflected on the literature to identify parallels and to facilitate the accurate interpretation of findings.

In this study I have therefore taken particular care to present the design and intervention clearly, describing the history and practice of the researcher and the context within which this intervention is located. The research has involved a number of interested parties and care was taken to systematically document the practice in an ongoing manner. As the research took place at two schools close to where I reside and because of my historical involvement with the schools other than on a research level, regular contact and access to feedback from the participants were easy. I took field notes during my visits, mainly to understand the context better. I also asked the teachers to make notes and communicate with me via e-mail anything they deemed relevant to the research. I was therefore able to clarify my personal perspective and possible effect it could have on outcomes in a reflexive manner.

Adding to the discussion on validity, Hoadley (2004) talks about "alignment" and argues that "the emphasis on partnerships and iteration in the DBR process increases the alignment of theory, design, practice and measurement over time in complex realistic settings" such as the classroom (p. 204). And herein lies the benefit of DBR, as Javed (2008) reminds us that "this kind of alignment is not possible in simple single experimental design research" (p. 112). On the one hand, there is the issue of alignment of the treatment with the theory, and Hoadley (2004) characterises this alignment as treatment validity. He asserts that we need to ensure that the "treatments we create accurately align with the theories they are representing" (Hoadley, 2004, p. 204). On the other hand, Hoadley (2004, p. 205) is also concerned about methodological alignment and notes that "the process of forcing the same people to engage the theory, the implementation of intervention and the measurement of outcomes encourages a greater degree of methodological alignment". This alignment is crucial for establishing systemic validity in DBR. According to Hoadley (2004), to achieve "true systemic validity our studies must inform our theories, which must inform practice" (p. 205).

Both treatment and methodological alignment were present in this research study. The design of a story-based intervention developing metacognitive strategic content area learning and its implementation at intermediate level classroom contexts was based on metacognitive learning theories (e.g. peer modelling in social constructivism) and used assumptions that aligned with theories of metacomprehension development and strategy use relevant to young learners' education contexts. The study used a partnership approach where the researcher/designer and teachers worked collaboratively and were jointly responsible for designing and implementing the intervention (methodological alignment).

Coming back to my earlier comment about generalisability as criterion for external validity, Bakker and Van Eerde (2014) maintain that the challenge is to present the results in such a way that others can adjust them to their local contingencies. Because DBR follows a holistic approach, context-bound by nature, and does not emphasise isolated variables, Van den Akker, Gravemeijer, McKenney and Nieveen (2006) point out that "DBR does not usually strive towards context-free generalizations" (p. 5). If an effort to generalising is made, it is an analytical (not statistical) generalisation. As was previously stated, the purpose of this DBR study was partly to generate design principles for the development of a story-based intervention, and Bakker and Van Eerde (2014) argue that "if lessons learnt (design principles) in one DBR study are successfully applied in other studies, this is a sign of successful generalisation" (p. 25).

Barab and Squire (2004) further problematised the issue of generalisability by suggesting that claims are based on researcher-influenced contexts and as such may not be generalisable to other contexts of implementation where the researcher does not so directly influence the context. Because, as a design-based researcher, I was involved in the process of intervention as a participant observer and because I played an active role in manipulating the environment I studied, it was imperative for me to describe and monitor ways in which the results may have been influenced by my own agenda. Hoadley (2004) asserts that "design based researchers not only document their perspective or starting point, but must also document any plausibly relevant interventional strategies used not only by participants observed, but also by the researcher herself or himself" (p. 205) (see Section 4.7 for a further deliberation on this DBR challenge).

Another source of ensuring rigor in DBR is its reliance on repetition of analyses across cycles of enactment (DBRC, 2003), combined with the multiple methods mentioned earlier. Cobb et al. (2003) point out that DBR "does not exclude controlled laboratory experiment from its methods" (p. 9) and Hoadley (2004) advises that DBR "should not be seen as a pre-scientific method that is interested in mere hypothesis generation" (p. 210). The experimental paradigm is viewed in literature as a powerful means for conferring causal relations in areas where controlled experimentation may be used to adequately test a hypothesis (Hoadley, 2004). Brown (as cited in DBRC, 2003) argues that "experimental methods, when used in conjunction with useful qualitative methods, can be very helpful by assisting in the identification of relevant contextual factors, aiding in mechanisms (not just relationships) and enriching our understanding of the nature of the intervention itself" (p. 5).

I employed a non-experimental, pre- and post study design during the second cycle of research to gain a better understanding of the relationship between the learners' awareness of metacomprehension strategies and to determine whether the treatment (intervention) had any effect on their metacognitive knowledge. I also tested their level of comprehension and recall before and after the intervention by quantitative meansI compared the performance of the two class groups with each other, highlighting the influence of socio-economic context. Although experimental design follows the criteria of internal and causal validity, the goal of this research was only to gain an understanding of a particular intervention as it unfolds in a particular setting and to develop (tentative) design principles applicable to particular contexts, and therefore, addressing generalisability criteria was not paramount. In the next section, I elaborate on the psychometric properties of the *RLQ*.

4.5.1 STATISTICAL ANALYSIS OF THE QUESTIONNAIRE

Reliability analysis of the *Read to Learn Questionnaire,* assessing knowledge, used in the present study was done by testing for differences in knowledge score between correct and incorrect responses for each of the 20 questions (see Section 4.4.3.2 for discussion on the development of the *RLQ*). For this purpose one-way analysis was conducted.

The one-way analysis of variance (ANOVA) is used to determine whether there are any significant differences between the means of two or more independent groups (Pietersen & Maree, 2010). Normal probability plots were investigated to determine the normality of the data (quantitative variable is normally distributed in each population), and it was found to be acceptable. If there were no significant differences found between correct and incorrect responses, it would indicate questions that could not distinguish between high and low knowledge. ANOVA makes use of an F-test to detect significant differences. Two important values produced by an ANOVA are the test statistic (F-value) and the *p*-value, and I report on these va lues in Table 4.6 (Time 1) and Table 4.7 (Time 2).

Table 4.6: Statistical analysis of *RLQ* (Time 1 – Before the intervention)

QUESTIONS on RLQ (see Appendix…)	**Mean & standard deviation for incorrect answers**	**Mean & standard deviation for correct answers**	**ANOVA**
1	5,0 (2,6)	9,1 (1,8)	F(1,47) = 33,3 p ≤ 0,01
2	4,9 (3,1)	8,0 (2,1)	F(1,47) = 17 p ≤ 0,01
3	5,6 (2,9)	9,2 (1,8)	F(1,47) = 15,4 p ≤ 0,01
4	6,0 (2,8)	9,5 (3,4)	F(1,47) = 8,2 p ≤ 0,01
5	6,0 (3,0)	8,4 (2,8)	F(1,47) = 4,3 p 0,04
6	6,2 (3,1)	7,7 (2,5)	F (1,47) = 1,5 p = 0,22
7	5,6 (2,9)	7,3 (3,0)	F (1,47) = 4,2 p = 0,05
8	6,3 (3,1)	6,8 (3,1)	F(1,47) = 0,1 p = 0,72
9	5,6 (3,1)	8,4 (2,1)	F(1,47) = 9,6 p ≤ 0,01
10	6,3 (3,1)	6,7 (2,9)	F(1,47) = 0,1 p = 0,72
11	5,9 (3,1)	7,7 (2,7)	F(1,47) = 3,9 p = 0,05
12	5,6 (3,2)	7,7 (2,2)	F(1,47) = 6,0 p = 0,02
13	5,3 (3,2)	7,6 (2,4)	F(1,47) = 7,3 p ≤ 0,01
14	5,4 (3,1)	8,0 (2,2)	F(1,47) = 10,3 p ≤ 0,01
15	5,6 (2,5)	7,0 (3,4)	F(1,47) = 2,8 p = 0,10
16	5,9 (3,1)	7,3 (2,9)	F(1,47) = 2,2 p = 0,14
17	5,6 (2,8)	8,4 (2,7)	F(1,47) = 10,5 p ≤ 0,01
18	6,1 (3,2)	7,6 (1,8)	F(1,47) = 2,0 p = 0,16
19	4,4 (2,6)	7,9 (2,5)	F(1,47) = 23,2 p ≤0,01
20	5,8 (3,2)	7,5 (2,6)	F(1,47) = 3,9 p = 0,06

Significance: * p<0.05

Table 4.7: Statistical analysis of *RLQ* (Time 2 – After the intervention)

QUESTIONS on RLQ (see Appendix…)	Mean & standard deviation for incorrect answers	Mean & standard deviation for correct answers	ANOVA
1	5,9 (2,9)	11,5 (3,3)	F(1,55) = 41,5 p ≤ 0,01
2	7,2 (3,0)	11,1 (4,2)	F(1,55) = 15,8 p ≤ 0,01
3	7,6 (3,2)	11,7 (4,2)	F(1,55) = 17,1 p ≤ 0,01
4	8,0 (3,7)	11,4 (4,1)	F(1,55) = 10,1 p ≤ 0,01
5	6,9 (3,0)	10,6 (4,1)	F(1,55) = 12,6 p ≤ 0,01
6	8,8 (3,8)	10,8 (4,9)	F(1,55) = 2,4 p = 0,13
7	7,0 (3,1)	11,0 (4,1)	F(1,55) = 16,4 p ≤ 0,01
8	8,9 (4,1)	9,9 (4,2)	F(1,55) = 0,8 p = 0,38
9	6,2 (2,6)	11,8 (3,5)	F(1,55) = 44,5 p ≤ 0,01
10	7,7 (3,6)	11,5 (4,0)	F(1,55) = 14,2 p ≤ 0,01
11	8,8 (3,9)	11,2 (4,6)	F(1,55) = 3,8 p = 0,06
12	7,3 (3,7)	10,7 (3,9)	F(1,55) = 10,6 p ≤ 0,01
13	7,2 (3,4)	11,8 (3,6)	F(1,55) = 25,5 p ≤ 0,01
14	6,9 (3,6)	10,8 (3,8)	F(1,55) = 15,0 p ≤ 0,01
15	6,9 (3,3)	11,1 (3,9)	F(1,55) = 18,0 p ≤ 0,01
16	7,3 (3,5)	11,7 (3,7)	F(1,55) = 2,3 p ≤ 0,01
17	9,1 (4,1)	9,9 (4,4)	F(1,55) = 0,5 p = 0,49
18	7,2 (3,3)	11,1 (4,0)	F(1,55) = 16,5 p ≤ 0,01
19	8,3 (3,9)	11,1 (4,1)	F(1,55) = 6,7 p ≤ 0,01
20	7,8 (3,4)	11,9 (4,1)	F(1,55) = 15,7 p ≤ 0,01

Significance: * $p<0.05$

Although most of the questions had an acceptable *p*-value of ≤ 0,05, a few potentially problematic questions were identified. If both the data sets, for time 1 and time 2, are considered, then questions 6 and 8 are identified with unacceptable *p*-values. Question 6 ($p = 0,22$ and $p = 0,13$ respectively) assesses knowledge of the metacognitive strategy of "goal setting" and question 8 ($p = 0,72$ and $p = 0,38$) assesses "previewing" (see Appendix G). The assumption can therefore be made that these two questions can not distinguish between low and high knowledge, but because only 2 of the 20 questions indicated poor distinguishing ability, the total scores and usability of the measuring instrument is satisfactory.

4.6 ETHICAL CONSIDERATIONS

Research that involves human participants, particularly young children, raises unique and complex issues, and Wassenaar (2006) maintains that "research ethics should be a fundamental concern of all social science researchers in planning, designing, implementing, and reporting research with human participants" (p. 61). In South Africa, research ethics committees were established at all the large higher education institutions to promote ethical conduct and further scientific inquiry. Therefore, clearance for this research was obtained from the Research Ethics Committee (Humanities) of Stellenbosch University and permission from the Western Cape Education Department as the gatekeeper of schools in the province (refer to addenda A and B). My conduct as researcher during the present study was further guided by four ethical research principles, as set by the Human Sciences Research Council (HSRC, n.d.),[5] and I will now briefly elaborate on each:

In the first place, the principle of *respect and protection* meant that I undertook research 'with' and not 'on' the identified community. The research design (DBR) by nature leant itself to a particularly participatory format and I involved and collaborated with all the participants from the start of the research to ensure that they are treated with due respect. To protect the autonomy and welfare of the participants, I obtained informed consent in writing from the relevant principals, teachers and parents, and assent from the learners (see addenda C, D, E and F). Constitutionally, a 'child' means a person under the age of 18 years, and I was

[5] See http://www.hsrc.ac.za/en/about/research-ethics/code-of-research-ethics

particularly cognisant to observe the international norms of avoiding harm, providing benefit wherever possible and acting justly with the groups of learners (average age 10 years) that participated in my study. The parents (or guardians) were asked to provide legal consent in writing and I made sure that everyone involved understood what the research aimed to do and how the process will unfold. All involved were made aware that participation was completely voluntary and they could withdraw at any time without having to provide reasons and with no consequences to them. The study did not involve any harmful physical activity or emotionally hazardous conduct, so no additional steps needed to be taken in this regard.

Furthermore, the information obtained in the course of the research that may have revealed the identity of a participant or an institution was treated as confidential. In this thesis, I report on the research findings relating to specific individuals in a way that protects the personal dignity and right to privacy of these participants. For instance, all responses to the measuring instruments were coded during analysis (e.g. K2 indicates a learner from School A). I tried to reduce possible prejudice during analysis of the data of the focus group interviews, for example, by videotaping the events.

The second principle concerns *transparency*. Before undertaking any research, the researcher should ensure that the participants are clearly briefed on the aims and the implications of the research as well as the possible outcomes and benefits of the research. This was done informally during the first few meetings with the participating teachers, as well as formally in written consent documents, which all involved were asked to sign. By communicating my findings in this research report, I subscribed to the principles of honesty, transparency and scrutiny by the public and my peers.

In the third place, I conducted my research with *scientific and academic professionalism*, by not abusing my position as researcher for personal power or gain, and by striving to achieve the highest possible level of scientific quality in my research. Engaging with children in research, as is the case in the present study, and seeking their perspectives are complex processes. Researchers warn that “to do this effectively, we must be wary of approaches that position listening to children’s voices and promoting children’s participation as tokenistic processes that do little to enhance children’s experiences” (Dockett, Einarsdottir & Perry, 2009, p. 295). Dockett et al. (2009) present some of the ethical tensions they have experienced in different research contexts, in an aim to highlight the questions and issues that we find problematic. Ultimately, what I have also come to realise is that researchers, research contexts and research participants have an impact on the nature of the research conducted and the identified research outcomes, but that “this does not negate our obligation to conduct methodologically rigorous and ethically sound research” (Dockett et al., 2009, p. 295). As we recognise the ethical tensions inherent in seeking consent and assent for children’s engagement in research, the need for ongoing reflexivity is reiterated.

The final principle is that of *accountability*, and starts with a clear research mandate. In Chapter 1, I outlined the research problem and expected outcomes (see Section 1.3). The objectives, providing direction and scope to the research, were made clear to all involved at the beginning of the research and the parties all agreed to the specifics of the process. In the documents provided to the participants, I made it clear that the participants had the right to request information from me as the researcher at the conclusion of the research or at any stage in the course of the research, provided that it does not jeopardise the scientific integrity of the study.

4.7 THE CHALLENGES ASSOCIATED WITH DESIGN-BASED RESEARCH

DBR is, however, not without controversy. Still regarded as an emerging methodology by many, DBR has both advantages and limitations. In essence, what makes DBR so uniquely advantageous also contributes to the dilemmas. DBR is conducted in close collaboration with educational practice (Plomp, 2007).

McKenney, Nieveen and Van den Akker (2006) make reference to the challenge of being the researcher but at the same time also the designer, the evaluator and the implementer. To compensate for this potential conflict of interest, I made the research open to professional scrutiny and critique by people outside the research project. In this regard, I made presentations at a local (Education Students' Regional Research Conference, 27–28 September 2013) and an international conference (28th International Congress of Applied Psychology, 2014). Furthermore, "a good quality of research design" is proposed by Plomp (2007, p. 31) to address this dilemma. In Section 4.5 I explained my use of triangulation and systematic documentation, analysis and reflection of the research process and results. Particular care was taken "to apply a variety of methods and tactics" (Plomp, 2007, p. 31), such as using my friends' children to provide initial critical comment on the story characters and topics they would like to see included, combined with the professional opinion of two published authors of youth literature.

In addition, because DBR is conducted in real-world settings, the design researcher is challenged by real-world complexities and complications. Plomp (2007) mentions that often the researcher is "a cultural stranger" in the research setting, with participants being hesitant to open up to the researcher "coming from the outside" (p. 31). DBRC (2003) even makes the comment that the success of the innovation and knowledge gained from (the) study depends in part on being able to sustain the partnership between researchers and teachers. Earlier I indicated that I had the good fortune of building a very positive and professional relationship over a long period of time with all the parties involved, which I believed contributed to the successful completion of the research. However, McKenney et al. (2006) also point to the benefit of being more "objective as an outsider". I do believe that my insider perspective, which resulted in a thorough understanding of the actual learning context, outweighed the possible lack of objectivity in the present study.

Lastly, the challenge of adaptability had to be addressed in the present study. Given that DBR is a cyclic process, taking place in authentic settings, each iteration or microcycle within the main iteration resulted in a new adapted version of the design (see Figure 4.4). Adaptability also refers to my conduct as researcher. Plomp (2007) states that strong organisational and "communicative capabilities on behalf of the researcher, as well as sound understanding of the research process" so that careful changes and choices that maximise value and minimise "threats to quality" are made, are required (p. 32) . In the present study, together with the participating teachers, we often had to reassess our plans (see Chapter 5).

4.8 CONCLUSION

"The research process, then, is not a clear cut sequence of procedures following a neat pattern, but a messy interaction between the conceptual and empirical world" (Bryman & Burgess, 2002, p. 2). In this chapter, the pragmatic paradigm, DBR and the methodology used in the study were systematically outlined. The specific research context was explained and the iterative nature of the research process was detailed. In the concluding paragraphs, the focus fell on the quality and trustworthiness of the research process employed. In the next chapter, the results from the data analysis are presented.

CHAPTER 5
DATA ANALYSIS AND RESEARCH FINDINGS

"Data are just summaries of thousands of stories – tell a few of those stories to help make the data meaningful." – Chip & Dan Heath[6]

5.1 INTRODUCTION

In the previous chapter, the research design and methodology were outlined and the cyclic process was detailed. The first objective of the present study was to develop an intervention (see Section 4.3.2.2 for the process outlined), after which the proposed solution to the identified problem was exposed to various evaluative measures in an attempt to refine the intervention further. The second objective was to assess the effectiveness of this story-based intervention. In Chapter 5, I present the research findings and, to relate to the quote above, 'tell the stories to help make the data meaningful'. Together with Chapter 4 (methodology of the implementation) this chapter represents Phase 3 (enactment and analysis) in the DBR approach (Reeves, 2006) (see Figure 5.1).

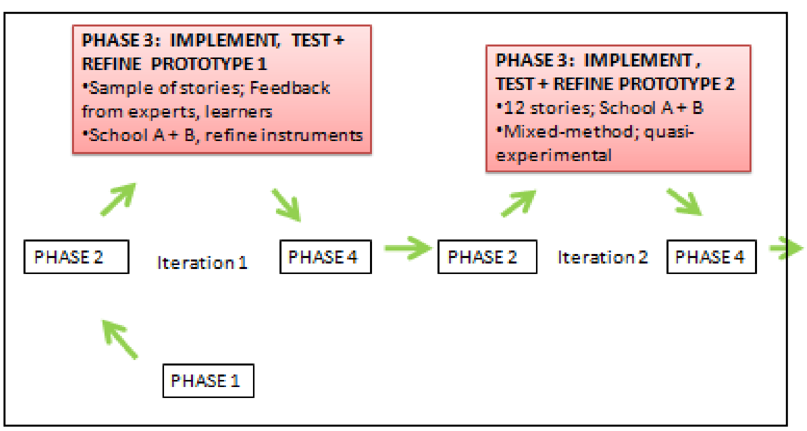


Figure 5.1: Research design – positioning Phase 3

[6] Authors of *Made to Stick*, http://www.analyticshero.com/2012/10/25/31-essential-quotes-on-analytics-and-data/

The research process and procedures are presented systematically and in two parts. In the first part (Section 5.2), I briefly discuss the first iteration, documenting the output in each phase of the research process preceding the second, more formalised, iteration of data collection. The focus of Iteration 1 was on the development of the story-based intervention, including the development of measuring instruments for use during the second iteration. In the second part (Section 5.3), I report on the findings during the second iteration, addressing the second research objective. In Figure 5.2 the data-collection processes during both iterations are depicted.

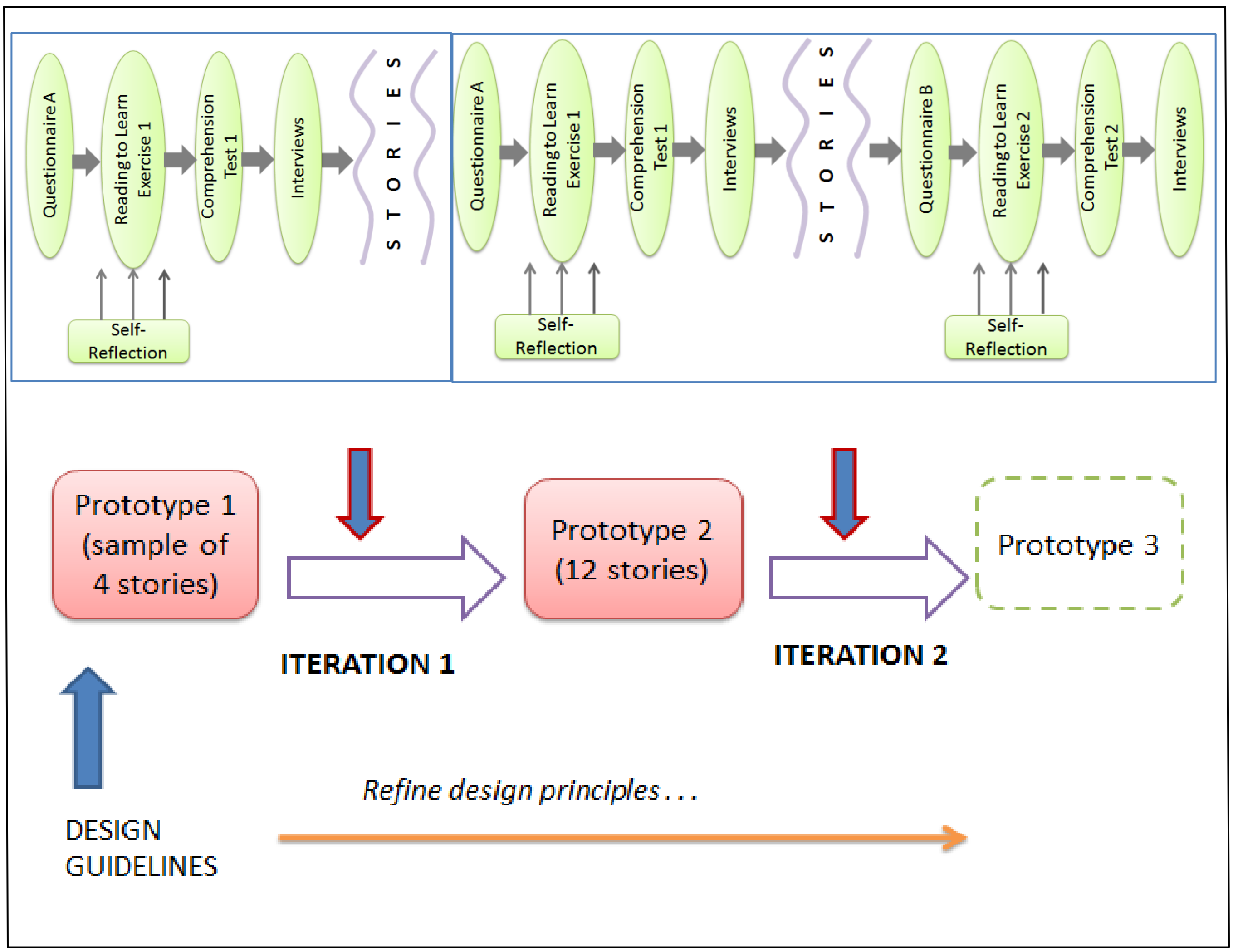


Figure 5.2: Overview of evaluative cycles and data-collection process

5.2 RESEARCH ITERATION 1

The first iteration took place in 2011, but even before I formally engaged the teachers and learners of the two schools in this particular study, I was already familiar with the school environments because of prior involvement. I officially approached the principals of the two schools, as well as the Grade 4 teachers, explained my research intent and asked whether any teachers would be interested in joining me on this journey. One of the teachers of School A, together with the teacher responsible for the Grade 4 class of School B, enthusiastically volunteered to get involved. Throughout the two years I received great support from the participating teachers, advancing the collaborative nature of the research design.

5.2.1 Phase 1: Problem analysis

In Chapter 1, I explained the rationale behind carrying out this study (see Section 1.2). The problem of learners' lack of metacognitive knowledge has been haunting me for a long time. The identification and exploration of the research problem provided the purpose for this study (Harrington et al., 2007). As mentioned in Chapter 4, the study was participatory in nature from the start, as I consulted with practitioners to determine and formulate the actual research question (see Section 1.3) to be addressed. Part of Phase 1 was also a comprehensive literature review (see chapters 2 and 3), assisting in my understanding of the theoretical concepts informing the development of the intervention.

In the preceding chapter (see Section 4.3.2.1) I touch on some of the "conjectures" (Sandoval & Bell, 2004, p. 214) about the design, based on theory and practice. Sandoval and Bell (2004) point out that "designed learning environments embody design conjectures about how to support learning in a specific context that are themselves based on theoretical conjectures of how learning occurs in particular domains" (p. 215). The main issue this research focused on was the concept of metacognitive awareness in young learners when they engage in content learning, within an authentic classroom context. As was explained earlier, there is a perception among teachers that metacognitive skills training is a time-consuming venture and an add-on to the standard curriculum (Moonsamy, 2014). The challenge was therefore to design a learning intervention that would not add to the teachers' and learners' already overwhelming workload and fit into the existing timetable of a school. The assumption was made that if we develop an intervention that is received positively by the participants, because it is enjoyable and age-appropriate and has a flexible timeframe, sustainable impact would be more plausible. This goal of developing a learning environment conducive to fostering metacognitive awareness was closely tied to my conjectures about the design and the context of intervention.

For example, another basic conjecture in terms of design was that if we develop entertaining stories, told by young people the learners can directly relate to, the metacognitive learning principles they hear (read) about will be more palatable. In terms of learning context and the designed environment, I proposed that learners should read the stories with embedded metacognitive concepts (or teachers/parents could read them to the learners) within the normal school timetable (e.g. 20 minutes early each morning set aside for reading, as prescribed by the Department of Education) and in the authentic classroom setting. In this way, everyone involved would find it easier to incorporate metacognitive awareness training into content learning at school, but the stories are also 'portable' and offer a flexible timeframe, as they could take the storybook home to read it in their own time.

It was also during this first phase, in discussions with the participating teachers, that the unique general learner profiles (see Section 4.4.2) of each of the schools came to the fore. I consequently decided to include the possible impact of the socio-economic context, assuming that socio-economic environmental factors would have an influence on metacognitive development. These conjectures are closely related to the research questions (see Section 1.3) on exploring how young learners can be supported to be more metacognitively aware through a story-based intervention under authentic conditions.

5.2.2 Phase 2: Develop solution

How can young learners successfully acquire metacognitive awareness? How can we help learners become strategic learners? These are not new issues in education, but I needed to come up with an innovative solution to this long-standing problem. The approaches used in the past to help learners understand the learning process and themselves as learners better seemed not to reap the expected positive results (Gooden, 2012; Moonsamy, 2014; Woolfolk, 2013). As stated earlier, I explored ideas from other practitioners in education and parents of children that crossed my path. I studied the literature to gain a conceptual understanding of metacognitive development. I was also made aware of the very diverse and inclusive school environment in which learning takes place within the South African context, with huge disparity in terms of resources still rife. The solution had to be flexible in terms of time and space, and should not be reliant on the ability of the teacher or parent to facilitate learning. The proposed solution had to be in a format fitting the audience (Grade 4 learners), relating to their unique interests to ensure maximum engagement in the process. These were some of the conjectures mentioned earlier (see Section 5.2.1) that led to the idea of using stories to develop metacognitive knowledge in young learners. Most children love a good story and the success of storytelling as educational tool is well known (Ellis & Brewster, 2002). The conceptualisation and development of the story-based intervention are documented in Chapter 3 of this study (also see Section 4.3.2.2). For an excerpt of one of the stories, see Addendum N.

On a personal level, this phase of the research process was very enjoyable because of the creativity involved in the writing process. Writing a narrative text for young children was new to me, so it was by no means an easy process. But I consulted with two published authors of children’s books and read many of the stories that are currently popular among the learners at the participating schools. Reading the stories to my own children also helped, because they were quick to tell me if a particular story was “boring” or “confusing”. Initially, I only developed the first four stories and then tested their suitability. Some of the feedback included that the stories should not be too long and that I should cater for both genders in terms of the content. One of the biggest challenges in writing these stories was that I needed to explicitly embed abstract and difficult metacognitive concepts into the text without losing the narrative slant and keeping the young reader engaged.

5.2.3 Phase 3: Test and refine

The proposed solution needed to be tested in practice and the research design supported the use of both qualitative and quantitative methods in this continuous evaluative process (see Section 4.4). During the first iteration, a sample of the stories (four stories) was subjected to continuous micro-evaluative cycles. Data were gathered from various sources and a pilot of Prototype 1 at the two participating schools also reaped valuable information (Figure 5.2). Some of the feedback included the following:

- The text should be in direct speech (young learner tells a story).
- Humour should be brought into the stories (engaging).
- Topics of interest to the target group should be dealt with (e.g. friends and superheroes).
- The stories should be short and the style of writing uncomplicated.

One of the teachers said: “They [learners] lose interest very quickly when we read stories, so you must try to keep their interest by bringing in humour or keeping it very short …”. During the expert review (see Section 4.3.2.3) I was advised to use direct speech, but eventually I opted to write in the first person, still giving the learner ‘a direct voice’, but in a style with which I felt more comfortable in writing – storytelling mode. One of the learners made the following comment about the main character: “I like Abe … I think he looks funny with his hair … I think he has lots of friends at school”. Relating to the story and the characters in the story was important and the feedback I received was noted and the stories adopted accordingly. For a summary of the findings during this evaluation process of Prototype 1, see Table 5.3 (Section 5.2.4).

Also during this phase (Iteration 1), various measuring instruments were developed to measure learners’ ability to reflect on their metacognitive awareness as well as text comprehension. The measuring instruments were only administered once during this first iteration (see Figure 5.2). The two class groups (2011) were first asked to complete the questionnaire (see Section 4.4.3.2) evaluating their knowledge about metacomprehension strategy use in content learning. During this first iteration, the teacher from School B reported that she started reading the questions and multiple options out loud to the class, when she realised some were struggling to read or understand what was expected from them. Already then I realised that reading ability might be an issue during the research process.

In consultation with the teachers, an expository reading piece was chosen and given to the learners to study. They were told that they will be tested on their ability to comprehend and recall what they have read in the piece, but care was taken not to make them anxious. Then, at the beginning (before), during and on completion (after) of the reading-to-learn exercise (reading the piece), the learners were given a written self-reflection task to carry out (see Section 4.4.3.4). Furthermore, a comprehension test was developed, again in consultation with the participating teachers, and then administered by the teachers themselves (see Section 4.4.3.3). The main reason for administering these measuring instruments during this iteration was to evaluate their usability and tweak any administrative problems for future use (Iteration 2). For instance, any terminology that elicited confusion on the part of the users (learners) was relooked at. I made a couple of changes to the wording used in the questionnaire during this iteration and I refined the self-reflection task.

Lastly, I asked the teachers to select three groups of about three to five learners in each group, according to their general scholastic performance, and I then had brief semi-structured focus group interviews with these learners (see Section 4.4.3.5). After these brief interviews, I added a few questions to my initial list. I felt it was important to broaden my questioning to cover the comprehensive definition of metacognitive knowledge (see Section 2.5) and not just focus on the strategy component already tested by the questionnaire. For instance, the learners shared with me (without my prompting them) why they thought a certain learner in their class excelled at school work (epistemological beliefs).

Usability refers to the ease with which an instrument can be administered and interpreted by the participant and scored/interpreted by the researcher (Dinglasan, n.d.). The instruments and data-collection methods employed in the study were measured against four criteria, and the results are presented in Table 5.1.

Table 5.1: Assessing the usability of measuring instruments during Iteration 1

	Questionnaire (RLQ)	**Reading piece / expository text (NOT measuring instrument as such)**	**Comprehension test**	**Written self-reflection task (X 3)**	**Focus group interviews**
(1) How long will it take to administer?	10 minutes Teachers were positive about appropriate level Learners were comfortable with multiple-choice format; not too long; no one complained about difficulty; some seemed to complete without reading first (guessing answers)	One page; 2–3 unknown words noted by learners; one group struggled to read and took considerable time completing the task, but not related to reading piece selected per se In consultation with the teachers, learners were given 20 minutes twice a day to study	10–20 minutes Structure of test questions and length based on one of the teacher's tests she gave me as an example Some learners complained about the test ("I hate tests!")	2 minutes per task Administered while reading the text (before, during and after); reading ability thus has impact	15 minutes per group, depending on talk-ativeness Setup of videotaping took a few more minutes
(2) Are the directions clear?	One of the teachers suggested a small change to the wording Only two learners asked	N/A	Yes Only four learners asked for clarification of question	Yes Corrected two spelling mistakes	Added three more questions; questions required some clarification – more

	what to do; a few from School B, however, looked confused but did not ask for help				prompting
(3) How easy is it to score?	Easy (researcher)	N/A	Relatively easy (teachers)	Effortful Tried to identify themes from varied responses	Difficult From transcript-tions, coding to identify themes
(4) Have any problems been reported by others who used similar methods?		Reading ability and prior knowledge about topic plays a role incomprehen-sion?		Expressing themselves not easy for all, made many spelling mistakes confusing intepretation of data	Subjectivity; young learners struggle to express themselves verbally

5.2.4 Phase 4: Reflect and tentative design principles

This stage refers to the final phase of the first design research cycle. The focus of this iteration was on addressing the first research objective, namely to develop an innovative, learner-centred training intervention, based on the idea of modelling expert learner thinking and behaviour through storytelling and self-reflection. At this stage, analysis of data collected from teachers and learners during the implementation of a sample of the stories developed aided the refinement of my initial conjectures and led to tentative design guidelines (see Section 3.9) for further development of the stories. I conclude this discussion of the first iteration by presenting a summary of the data-collection process, analysis procedures and findings (refinement of story-based intervention) in Table 5.2.

Table 5.2: A summary of data collection and analysis (Iteration 1)

Research activity / data-collection method	Method of analysis	Examples of feedback
Expert review (two authors of children's books)	Simply took notes while they gave feedback on sample stories and use of writing style and text structure complexity in general	"Use humour" "Write in first person" "Characterising important to personalise stories … and provide context"
Learner volunteer group	Asked for any feedback (no structured questions were put to them)	"Nice stories" "I like Abe, but Anabel seems a bit difficult" "No, the stories were not too long … are there more?"
Collaboration with teachers	Notes taken; debriefing after most sessions	"Children struggle to focus but if you read it out loud, they keep quiet … they like you"
School A – intact Grade 4 class 2011 (n = 25)	Observations were written down; scrutinised notes for repeated themes	"Learners enjoy the stories"
School B – intact Grade 4 class 2011 (n = 30)	Observations were written down; scrutinised notes for repeated themes	"Some learners do not read the text …it is as if they wait for me [teacher] to do it for them" "Some learners asked me yesterday when will I read them another Abe story. They love these reading sessions."

5.3 RESEARCH ITERATION 2

I spent the rest of 2011 and the first few months of 2012 primarily refining the stories. I planned to implement the story-based intervention during the third term (July–September 2012) and again this was a collaborative decision involving the two teachers who acted as partners in this research. By that time, the teachers knew the new cohort of learners better, the learners had time to settle into the grade and they had some exposure to content area learning. I sat down with the teachers and we worked out a time schedule of how the data would be collected before and after the actual implementation of the story-based intervention (see Table 4.5). As mentioned earlier (see Section 4.4.3.1), it was very important to implement the intervention within the normal school timetable and in an authentic classroom context. The teachers assisted me with the data collection before and after the intervention, while I read all the stories to the learners myself. We covered two stories per week for each class group and the full implementation (12 stories) took six weeks (see Table 4.4). No special arrangements were made to allocate additional time for this activity, as it simply slotted into the normal time allocated for reading by the Department of Education. In Table 5.3, I present the layout of the set of 12 stories that were implemented during the second iteration.

Table 5.3: Storybook plan – metacognitive elements per chapter

CHAPTER HEADING (In Afrikaans)	METACOGNITIVE ELEMENT COVERED
1. Abel leer van homself as leerder [Abe learns about himself as a learner]	Who am I (as learner)? Self-knowledge; learning styles; how do I learn?
2. ’n Biblioteek in Abel se kop [A library in Abe’s head]	Connecting with prior knowledge; retell in own words; how the brain stores information
3. Op jul merke, gereed, gaan! [On your marks, get set, go!]	Learning is a process: planning, monitoring and evaluating steps; what is a strategy?
4. Abel en die pikkewyne [Abe and the penguins]	Predicting, expectations and verifying
5. Tannie San en die vlieg [Aunty Sue and the fly]	Prior knowledge; associations
6. Abel val maar klim weer op [Abe falls off but gets back on again]	Persistence; epistemological beliefs, putting in the effort
7. Abel is kwaad [Abe is angry]	Purpose setting; self-management

8. Anabel se uitdaging [Anabel's challenge]	Think-aloud technique; being strategic, how? Asking questions; self-questioning
9. Skorrie die seerower en sy papegaai [Skorrie the pirate and his parrot]	Problem solving; comprehend, not memorise; repeat in own words; summarise, main ideas
10. Van pannekoek en pienk skape [Of pancakes and pink sheep]	Rhyme; comprehend the goal of reading; independent learning; thinking in pictures; focus
11. Jan-Jan se slang en Zander eet sy wortels [Jan-Jan's snake and Zander eats his carrots]	Practising problem solving; fix-up strategies; time management
12. Vier vingers en 'n duim, stop, som op en rym [Four fingers and a thumb, stop, summarise and rhyme]	Prediction; expectations; practice makes perfect; fix-up strategies; time management; organise

In the second iteration, it was decided to test the learners on their metacognitive knowledge and comprehension ability not only before the story-based intervention, but also after the intervention (see Figure 5.3). This provided the opportunity to determine whether the intervention had an impact on developing metacognitive awareness and to what extent (second research objective). In the next sections, I present the data collected during Iteration 2. Results from the two case studies (schools A and B) are presented separately. I start off each time I present School A's findings with a brief general explanation of the measures used in both case studies, and then address the specific detail of each case. I conclude the chapter with a comparison of the results from both schools. The data-collection process during this semi-experimental part of the research design is presented in Figure 5.3 below.

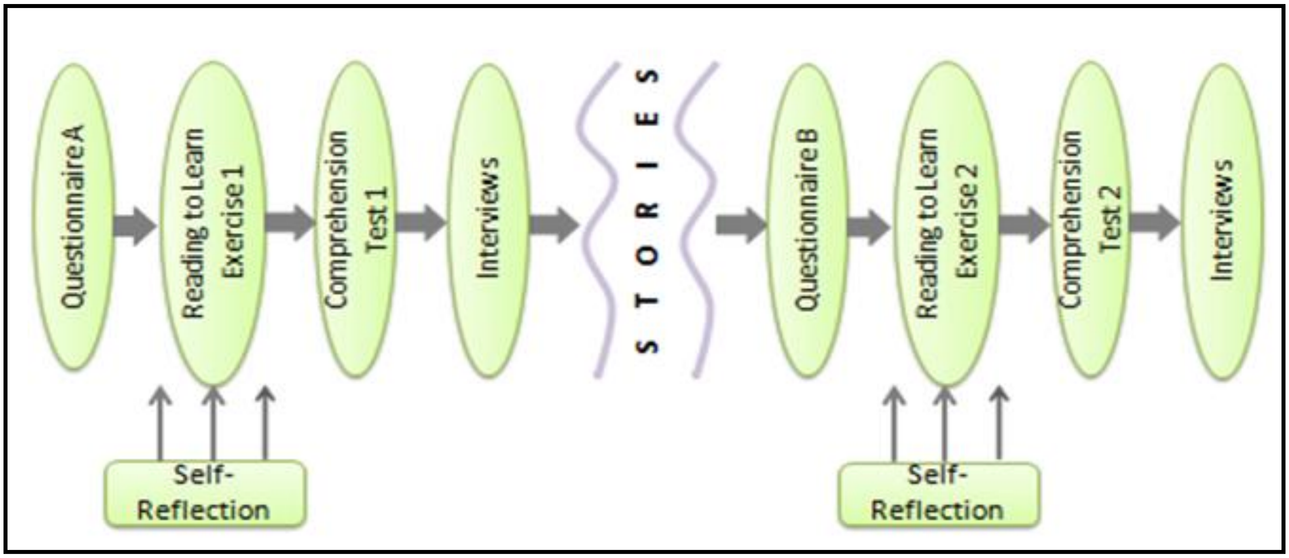


Figure 5.3: Data-collection process during Phase 3 – Iteration 2 (both schools)

5.3.1 EVALUATING THE INTERVENTION (PHASE 3) – SCHOOL A

5.3.1.1 Questionnaire

In the previous chapter I explained the process of developing the *RLQ* (see Section 4.4.3.2 and addendum G). It consists of 20 multiple-choice questions, grouped into three sections: before, during and after reading the text. A correct answer scored 1 and an undecided or unanswered statement scored a zero mark. At the end, scores from the 20 items were added to give a total for each category (six metacognitive strategy clusters) and a total out of 20 (see Figure 5.4 for an example of the scoring system).

INTERPRETING THE *RLQ*:

The results of the RLQ can be used to help learners evaluate their awareness (knowledge) of metacognitive learning strategies in content area comprehension. Following is an RLQ class record for a hypothetical Grade 4 learner. Included are the learners' scores for each of the six clusters of items, total RLQ score and the comprehension percentile. RLQ results can be interpreted both quantitatively and qualitatively.

RLQ scores for Grade 4 class

	P/V	Que	PK	Pur	S/MI	FU	Total	Percentage
	(4)	(3)	(3)	(3)	(5)	(2)	20	

Example:

Jamie

3	1	2	1	3	1	11	55%

Observations: A capable student and a good decoder, but he has difficulty in many comprehension tasks; does not always seem to apply skills well. Lack of knowledge of purpose setting and self-questioning is particularly apparent.

Key:	*Scoring solution:*
P/V = Previewing, predicting and verifying	1C, 5A, 8A, 17B
Que = Self-questioning	2A, 10B, 20B
PK = Drawing from prior knowledge	3B, 9A, 18A
Pur = Purpose setting	4C, 6B, 15C
S/MI = Summarizing and drawing on mental images	7C, 12B, 13C, 16A, 19B
FU = Applying fix-up strategies	11C, 14A

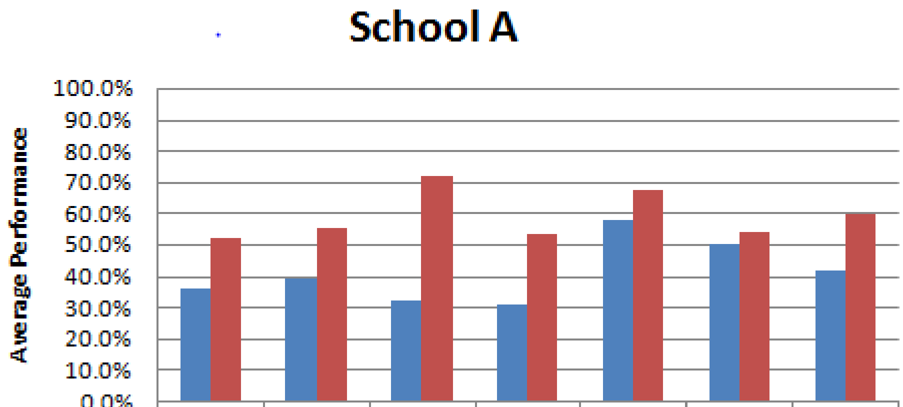
Figure 5.4: Scoring of the *RLQ*

The *RLQ (LLV)* was administered right at the beginning of the research process and then again after the intervention and all the other measures. The same questions were administered to the learners, but the order of the questions was changed (*RLQ 1* and *RLQ 2*). The purpose of the questionnaire was to evaluate a learner's awareness of metacognitive strategy use in content learning. More specifically, learners were tested on their knowledge of the following metacomprehension strategies:

- Previewing, predicting and verifying (P/V)
- Self-questioning (Que)
- Drawing on prior knowledge (PK)
- Purpose setting (Pur)
- Summarising and drawing on mental images (S/MI)
- Applying fix-up strategies (FU)

On *RLQ 1* (administered before the intervention), the Grade 4's of School A (from the more affluent community) scored the highest on "summarising and drawing on mental images", and "purpose setting" received the lowest average score (n = 27). "Applying fix-up strategies" and "self-questioning" seemed, at this stage, strategies the learners are more familiar with than "drawing on prior knowledge" and "previewing, predicting and verifying" (see Addendum L for data sets).

When the questionnaire (*RLQ 2*) was administered again (n = 27) after the intervention, higher scores on *all* items were recorded. "Drawing on prior knowledge" received the most significant increase (39,5%). Out of a possible score of 20, the average performance on the first testing opportunity was 8,4 and it increased to 11,9 after the intervention (41,9% improvement) (see Figure 5.5). 'Improvement' was calculated as follows: difference between two scores / original test score.



	P/V	Que	PK	Pur	S/MI	FU	Total
RLQ1	36.1%	39.5%	32.1%	30.9%	57.8%	50.0%	42.0%
RLQ2	51.9%	55.6%	71.6%	53.1%	67.4%	53.7%	59.6%

Figure 5.5: Results on *RLQ 1* and *RLQ 2* – School A

5.3.1.2 Written self-reflection task

In a further attempt to assess the learners' metacognitive knowledge and specifically their ability to articulate what they think, they were asked to complete a written self-reflection task before, during and after they read the expository reading piece (see Section 4.4.3.4). As was mentioned earlier, this exercise was not only included to gather data but also because it would possibly demonstrate the essential metacognitive concept of 'self-reflection' to the participating learners first-hand (a training tool). I anticipated that the data would support my findings on the questionnaires, but that additional information about the learners and their thought processes would also be obtained. The self-reflection task was scored by using the frequency of responses reflecting metacognitive awareness before, during and after reading the expository text. For a review of the written reflections of the learners in School A *before* the intervention, refer to Table 5.5, and for a review of the reflections *after* the intervention, see Table 5.6.

Table 5.4: School A – self-reflection task (*before* the intervention; Iteration 2)

METACOGNITIVE KNOWLEDGE AND STRATEGIES EXPLICITLY EMBEDDED IN STORIES	FREQUENCY OF RESPONSES (BEFORE, DURING AND AFTER READING TO LEARN) n = 27			EXAMPLES
	Before	During	After	
Learner self-knowledge – learning styles; interests and abilities; know what I know and what I am struggling with	****		******	"I must concentrate and pay attention and should not let my mind wander" – K7 "I like reading. I can do the assignment" – K27 "History is one of my best subjects" – K16 "…I don't really understand everything." – K2
How brain works at neuron level; storing information – making associations / connecting new knowledge to prior knowledge				
The learning process: Learning is a strategic process; planning (before reading), monitoring (during), evaluating (after read); reading is an action / engage in active process				
Previewing – look through page / think about pictures, headings; predicting and verifying predictions – what have I learned?	*****	*		"I look at the picture and then try to see what it is about" – K20 "I now think about what is going to happen in this piece" – K17
Epistemological beliefs (learner): persistence, hard work ensures success				
Fix-up strategies if comprehension breaks down – ask for help; back-checking or using context; adjusting reading rate; rereading			****	"I think I must read through it again to remember it" – K1 "… and ask a parent to explain the words to me that I don't understand" – K6
Purpose setting – have a plan; how do I ensure understanding			**	"I am going to read through the piece a few more times and make sure I remember the important things" –K3 "I am going to make summaries. I am going to read through it twice to understand " – K4 "I write down everything I remember" – K15
Asking questions (self-questioning and periodic self-monitoring)	*		***	"I wonder who Henry Ford is?" – K14 "I ask myself questions" – K15 "Does a Ford company still exist?" – K22
Summarising and drawing from mental images (visualise); identify main ideas (underline);	*	**	******	"… I underline the important words " – K6 "… and I start summarising in my head everything I must learn" –K8

retell in own words; rhyming				"… I draw a mind map" – K8
Synthesise (stop and check understanding) – continuous monitoring; think aloud		*	**	"I concentrate and make sure that I read and think correctly" –K7
ADDITIONAL THEMES				
Task/text variables	*	*****		"The reading assignment is too long" – K14 "It is very interesting! And there are easy words" – K10
Social context/environment				
Affective variable – motivation; emotions	******** ***	******* *******	***	"I am excited about reading the piece" – K15 "I'm not really in the mood for this" – K12 "I'm afraid I might not understand it and then I will have to write a test" – K2 "I am going to try my best" – K13 "… I feel tense " – K25 "I hope I don't have to write a test on this …" – K26
Irrelevant to task	**			"I think about horses and sing songs in my head" – K10 "I am thinking about playing computer games" – K1

Before the intervention (exposure to metacognitive knowledge and language of thought explicitly embedded in stories), "summarising and drawing from mental images" received the highest frequency of responses (n = 9). This corresponds with the data from the questionnaire also administered before the intervention (*RLQ 1*) (see Section 5.3.1.1). Only a few learners knew about "previewing, predicting and verifying predictions" as one works through an expository piece (n = 6), while the other metacognitive indicators introduced in the story text, such as "self-questioning" and "fix-up strategies", only received nominal consideration. Noteworthy, however, is the high number of references made to emotional state of mind (n = 28). They also seem to possess some level of self-knowledge and the text or task variables influence how they perceive the learning process.

After the learners were exposed to metacognitive knowledge through the storytelling intervention, the number of references to "purpose setting", "posing questions" as well as "previewing and predicting" increased dramatically (see Table 5.2). The way the brain stores information through associations and connecting with previously stored knowledge was covered extensively in the stories. The notion of connecting new knowledge with prior knowledge therefore featured quite prominently in the learners' utterances. One learner (K6) stated: "I connect what I already know with what I learn now" (see Figure 5.6).

Figure 5.6: Self-reflection task – Learner K6

Table 5.5: School A – self-reflection task (*after* the intervention; Iteration 2)

METACOGNITIVE KNOWLEDGE AND STRATEGIES EXPLICITLY EMBEDDED IN STORIES	**FREQUENCY OF RESPONSES (BEFORE, DURING AND AFTER READING TO LEARN) n = 27**			**EXAMPLES**
	Before	**During**	**After**	
Learner self-knowledge – learning styles; interests and abilities; know what I know and what I am struggling with			*	"Some of the words [in the reading] are a bit too difficult for me" – K12
How brain works at neuron level; storing information – making	******	***	*	"I know penguins cannot fly …" – K13 "… think about all the knowledge I have

associations / connecting new knowledge to prior knowledge				on penguins" – K20 "I must remember what I already know and connect that to the new stuff" – K17 "I make associations" – K23
The learning process: Learning is a strategic process; planning (before reading), monitoring (during), evaluating (after read); reading is an action / engage in active process				
Previewing – look through page / think about pictures, headings; predicting and verifying predictions – what have I learned?	******* * *****	*		"Predict what you will read about by looking at the title" –K26 "I look at the pictures. Penguins …" – K25
Epistemological beliefs (learner): persistence, hard work ensures success				
Fix-up strategies if comprehension breaks down – ask for help; back-checking or using context; adjusting reading rate; rereading		****		"I say the words out loud if I don't understand them" – K1
Purpose setting – have a plan; how do I ensure understanding	**	***	**	"… and I think about my goal" – K23 "First I encircle the words I don't know …" – K16 "What was the purpose of the reading?" – K26
Asking questions (self-questioning and periodic self-monitoring)	**	*	****	"Do penguins swim in cold water?" – K17 "I think of questions" – K24
Summarising and drawing from mental images (visualise); identify main ideas (underline); retell in own words; rhyming		****	****** * *	"I underline the main ideas" – K6 "I must now connect the new stuff with the old stuff and I must underline them" – K4 "… a mind map …" – K10 "I look for the main points and repeat them to myself" – K25
Synthesise (stop and check understanding) – continuous monitoring; think aloud	*	*	*	"I read a sentence and then think about what I just read" – K2
ADDITIONAL THEMES				
Task/text variables	*	**		"This is an interesting story" – K27 "There are many new facts in the story …" – K15
Social context/environment				
Affective variable – motivation; emotions	**	*******	****	"I am excited about reading" – K3 "I am not in the mood for reading today" – K12
Irrelevant to task				

5.3.1.3 Comprehension test

Learners were given ample time (at the teachers' discretion) to read and study a one-page expository reading piece, after which they were asked to complete a question paper similar to what they are used to (they are familiar with writing comprehension tests) within a limited timeframe and without referring back to the page. Two different expository reading pieces, but similar in terms of complexity level, were given to the learners before and after the intervention. Only two learners out of a class group of 27 asked for some assistance while reading the pages and they simply wanted the teacher to clarify a word with which they were unfamiliar. The teacher reported that they seemed to enjoy the reading material and a few immediately took out their colour pens and underlined certain phrases. Some even drew mind maps, although very simplistic in nature, without prompting. I later discovered that the teacher exposed them to mind maps earlier in the year. Interestingly, the same learners that demonstrated active learning strategies such as asking for help from the teacher when a word is confusing or summarising information using mind maps, during the first reading-to-learn exercise, displayed the same behaviour during the second testing opportunity. However, the teacher and I did not witness any marked increase in observable metacognitive behaviour from any other learners after the intervention.

On the first reading piece, the average score out of 20 for the class from School A (n = 26) was only 5,6 (28,1%), but after the intervention, the average performance on the comprehension test significantly increased to an average of 14,3 (71,3%). A noteworthy increase was evident for all learners in this group (see Figure 5.7 and Addendum L). One of the learners were absent on the day the first comprehension test was administered and I therefore excluded this learner's second mark from the data analysis.

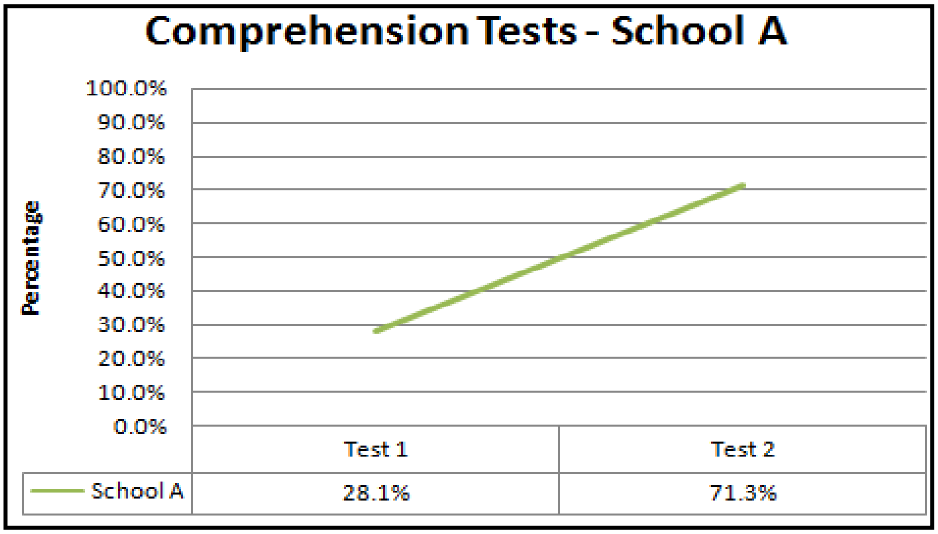


Figure 5.7: Results from comprehension tests – School A

5.3.1.4 Semi-structured focus group interviews

The final data-collection opportunity presented itself in the form of semi-structured focus group interviews with selected learners. Three small groups of learners – high-achieving (n = 5), average (n = 4) and a third group of low-achieving learners (n = 4) – were interviewed before and after the intervention. I tried to pose the same set of questions (see Addendum J) to all the groups, but I was guided by what they wanted to share with me on the day (see Section 4.4.3.5). As stated earlier, and as was the case with the written self-reflection task, this instrument elicited rich data pertaining to how the learners perceived themselves within the learning process and interesting contextual issues were documented. In the next section I highlight some of the more prominent findings (see Addendum K for an excerpt of the transcribed interviews).

All the learners struggled to explain *how* they learn from text, but more so before the intervention, and the academically weaker learners (low-achieving) had the most difficulty expressing themselves. Most learners simply said that they read and reread the information until they thought they would remember the facts. No significant increase in metacognitive knowledge was noted after the intervention. This was unexpected, because all the other measuring instruments showed a marked improvement. The only metacomprehension strategy the learners mentioned without any prompting was "summarising" – identifying key phrases and drawing a mind map. This finding corresponds with the other results on both the questionnaire and the self-reflection task (see sections 5.3.1.1 and 5.3.1.2). The learners also talked about underlining or circling unknown words quite frequently. This seems to be a technique taught to them by their Grade 3 teacher. Interestingly, the learners in one of the groups (average-performing) all confessed that, although they underlined the unknown or difficult words, they did nothing to clarify their meaning afterwards (fix-up strategies). They simply read the page again in preparation for the test, still unsure of certain phrases in the text. The low-achieving learners were visibly more uneasy and less self-assured during the interviews, compared to the stronger learners (high-achieving). Continuous prompting was needed to elicit a discussion about themselves as learners, and this group did not refer to any metacognitive strategies during both the interviews.

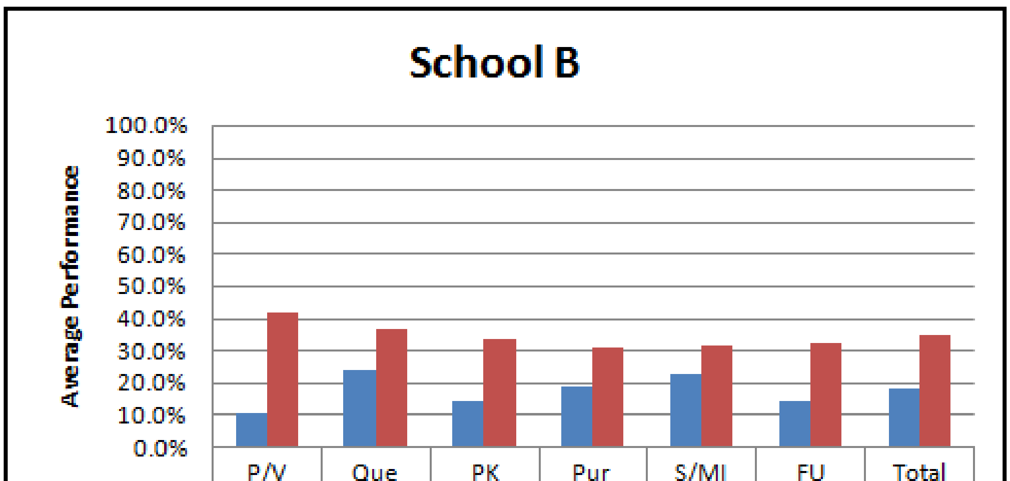
In the interview I also asked the groups why some learners perform better than others in tests. Initially, mixed responses were received, with some saying that some people are good at most things and are born intelligent, but after the intervention they all agreed that only hard work will ensure success. From research we know that more sophisticated epistemological beliefs positively relate to metacognitive awareness (Hofer, 2004).

In addition, two noteworthy contextual issues came to the fore during the interviews. The first concerns the parental support the learners received and the second issue was about motivation to learn. I asked the learners how they prepare for a test and most immediately said that a parent would ask them questions. They are therefore aware of the strategy to use questioning, but not self-questioning as a reflective tactic. Interestingly, the high-performing learners all admitted that they are dependent on their parents (particularly their mothers) to help them study and will feel ill-prepared if they had no support from a parent. The other learners were less dependent on parental support and a few commented that their au pairs help them. One girl said that her parents were divorced and never had time to help her study, while two boys said that their parents worked very long hours and therefore could not help them with schoolwork. Motivation to learn plays a major role in academic performance (Carr et al., 1991; Hofer, 2004). The high-achievers are performance-driven, and during the interview they spoke about their desire to achieve – “get the best marks in class”.

5.4.2 EVALUATING THE INTERVENTION (PHASE 3) – SCHOOL B

5.4.2.1 Questionnaire

The class group from School B performed on average really poorly on the *RLQ*. On *RLQ* 1 (administered before the intervention), the learners scored the highest on “summarising and drawing on mental images” and “self-questioning”. “Previewing, predicting and verifying” received the lowest average score (see Figure 5.6). The scores are so low on this instrument that one might conclude that these learners are unfamiliar with most of the strategies they were tested on. When the questionnaire was administered again after the intervention (*RLQ 2*), an increase on *all* items was observed, but the scores were still very low. The most significant increase (31,3% difference) was on the “previewing, predicting and verifying” indicator, and “drawing on prior knowledge” also had a marked increased response (19%) (see Figure 5.8). The average total score out of a possible 20 increased from 3,4 to 6,5 (94% improvement after the intervention). I discarded five learners’ scores because of either incomplete answers or absence at the time the questionnaires were administered (n = 28) (see Addendum L).



	P/V	Que	PK	Pur	S/MI	FU	Total
RLQ1	10.7%	23.8%	14.3%	19.0%	22.9%	14.3%	17.9%
RLQ2	42.0%	36.9%	33.3%	31.0%	31.4%	32.1%	34.6%

Figure 5.8: Results on *RLQ 1* and *RLQ 2* – School B

5.4.2.2 Self-reflection task

The learners from School B struggled to successfully complete the written self-reflection exercise. Very little data concerning metacognitive awareness were obtained. The fact that they have a very low literacy rate had a direct impact on the effectiveness of this instrument. Young children in general battle to express themselves in terms of their thoughts and emotions, but these youngsters have additional challenges. Their inability to articulate and write down what they think, are supported by literature on learners from poor communities (see Section 3.6).

Before the intervention (see Table 5.6), "previewing" received the most mention, and after the intervention (see Table 5.7), "prior knowledge" was the most popular response. These results do not coincide with the results from the questionnaire (see Section 5.4.2.1). It is important to note that the poor literacy ability of particularly the learners from School B might not be clearly reflected in the examples of responses listed in Tables 5.6 and 5.7. The scanty vocabulary, the often incorrect syntax and frequent spelling mistakes were somewhat lost in translation.

Table 5.6: School B – self-reflection task (*before* the intervention; Iteration 2)

METACOGNITIVE KNOWLEDGE AND STRATEGIES EXPLICITLY EMBEDDED IN STORIES	**FREQUENCY OF RESPONSES (BEFORE, DURING AND AFTER READING TO LEARN) n = 33**			**EXAMPLES**
	Before	**During**	**After**	
Learner self-knowledge – learning styles; interests and abilities; know what I know and what I am struggling with		**		"There are words I don't understand " – V19
How brain works at neuron level; storing information – making associations / connecting new knowledge to prior knowledge				
The learning process: Learning is a strategic process; planning (before reading), monitoring (during), evaluating (after read); reading is an action / engage in active process				
Previewing – look through page / think about pictures, headings;	******* **			"I wonder what this story is about" – V25

predicting and verifying predictions – what have I learned?				
Epistemological beliefs (learner): persistence, hard work ensures success				
Fix-up strategies if comprehension breaks down – ask for help; back-checking or using context; adjusting reading rate; rereading		**		"… I encircle the words I don't understand" – V29
Purpose setting – have a plan; how do I ensure understanding				
Asking questions (self-questioning and periodic self-monitoring)				
Summarising and drawing from mental images (visualise); identify main ideas (underline); retell in own words; rhyming			*	"I remember about Henry who took cars apart, I underlined" – V11
Synthesise (stop and check understanding) – continuous monitoring; think aloud				
ADDITIONAL THEMES				
Task/text variables			*	"This is an interesting story" – V3
Social context/environment		***		"My stomach is full" – V18 "I am very happy because my mom bought me something" – V26 "They are bothering me" – V25
Affective variable – motivation; emotions	*******	******* **	**	"I feel happy" – V33 "I am scared" – V24
Irrelevant to task	****	*	*	"… It is nice here at school we don't want to ask for money we also want to work" – V15 "I look forward to Maths" – V12 "… the weather is nice" – V21 "I am looking forward to playing at Tiffany's house this afternoon" – V11 "We played a great game of soccer this morning " – V21

Table 5.7: School B – self-reflection task (*after* the intervention; Iteration 2)

METACOGNITIVE KNOWLEDGE AND STRATEGIES EXPLICITLY EMBEDDED IN STORIES	FREQUENCY OF RESPONSES (BEFORE, DURING AND AFTER READING TO LEARN) n = 33			EXAMPLES
	Before	During	After	
Learner self-knowledge – learning styles; interests and abilities; know what I know and what I am struggling with				
How brain works at neuron level; storing information – making associations / connecting new knowledge to prior knowledge		*	*****	"While I read, I look for new information to place with the old information" – V23 "After reading the story I connected a lot of new knowledge with the old knowledge" – V4
The learning process: Learning is a strategic process; planning (before reading), monitoring (during), evaluating (after read); reading is an action / engage in active process				
Previewing – look through page / think about pictures, headings; predicting and verifying predictions – what have I learned?	**			"… I first look at the picture …" – V10
Epistemological beliefs (learner): persistence, hard work ensures success				
Fix-up strategies if comprehension breaks down – ask for help; back-checking or using context; adjusting reading rate; rereading				
Purpose setting – have a plan; how do I ensure understanding				
Asking questions (self-questioning and periodic self-monitoring)			*	"I ask questions" – V29
Summarising and drawing from mental images (visualise); identify main ideas (underline); retell in own words; rhyming		*	**	"I look at the main idea in the story" – V27 "After reading through the story, I go through it again and look at my keywords" – V6
Synthesise (stop and check understanding) – continuous monitoring; think aloud				
ADDITIONAL THEMES				
Task/text variables		*		"There are difficult words in the story" – V32
Social context/environment	****	*	***	"We have to keep quiet. Teacher scolds us." – V18 "I feel happy because I am safe at school"

				– V30 "I feel happy because teacher doesn't scold me" – V16 "While we read, we talk a lot and we don't listen to Teacher" – V15
Affective variable – motivation; emotions	******** *	****	*	"I feel very happy about what I am going to read now" – V26 "I am happy because no one is cross with me today" – V3 "After I get beaten, I am angry" – V24
Irrelevant to task	*	*		"I feel unhappy, because I couldn't sleep last night. It felt like something climbed into my bed" – V22 "I am studying to become a policeman" – V24

Although not much information on the learners' metacognitive awareness levels was obtained by means of this instrument, important contextual data emerged. Most of the remarks concerned either their emotional state or social and learning environments. Comments totally irrelevant to the task at hand were also quite frequent, particularly when the exercise was done for the first time. Apart from the normal school and learning challenges, these learners face numerous additional difficulties. These reflection sheets provided a platform for them to honestly share some of these hardships. One boy simply stated: "After I get beaten, I am angry" and another said: "I am happy because no one is cross with me today". One of the boys wrote the same sentence down every time the self-reflection sheet was handed to him, namely: "I am happy because I am now safely at school" (Abuse and neglect). Based on my personal experience and observation, the 'unfriendly, confrontational' atmosphere is extended to the classroom. Quite a number of learners commented on the teacher scolding them. I also observed this ineffective (personal opinion) way of disciplining the learners, but the issue of discipline is a complex one and falls outside the scope of this study. It is important, however, that we take note of the weight the environment and affective variable play concerning the learning process. Another theme that emerged also relates to their unique socioeconomic environment and has to do with the fact that, if it was not for a feeding scheme, most of these learners will not have anything to eat (see Figure 5.9 and Addendum M – "Going to class hungry"). Two of the comments reads as follows: "I am surprised that I get to eat every day" (see Figure 5.9 below), and "I am full (have eaten)".

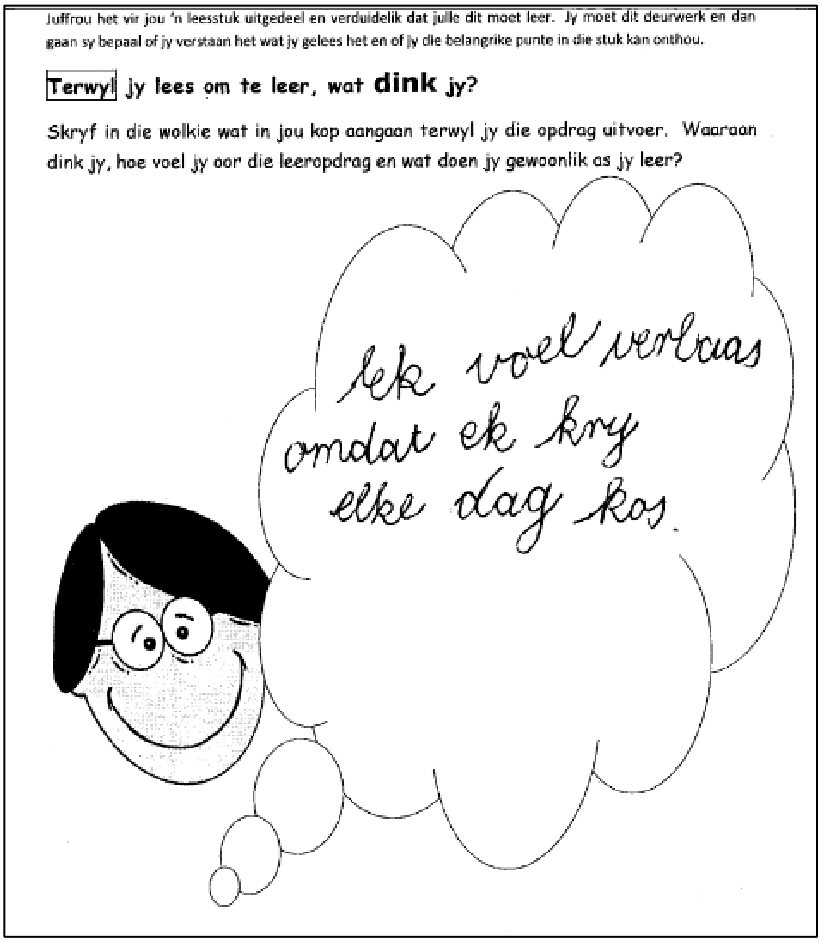


Figure 5.9: Self-reflection task – Learner V14

5.4.2.3 Comprehension test

In 2012 33 learners were enrolled in the Grade 4 class at School B. Absenteeism is, however, very high at the school for various reasons, including challenging socio-economic circumstances. I had to exclude 10 learners' scores from the comprehension tests data, because one or both of the tests were not written. One of the learners (V3) whose score I had to exclude from the data achieved the highest score in the class, but he was absent when the first test was administered. I also had to discard his questionnaire scores, because he only completed one of the questionnaires. This was a shame because he also outperformed his classmates on the metacognitive strategies instrument.

I have tried to ensure that the same procedure transpired at both schools as far as possible, but in some cases we had to adapt to the unique environments. The literacy level of this class group was extremely low (see Section 4.4.2) and the teacher had to help them read the expository piece. Most of the learners read using a ruler or a finger to keep track of where they are. None of them tried to summarise the material and when I asked them if they know what a mind map was, I only got confusing looks. What some of them did, however, was to circle all the words in the reading piece that they did not know or understand or that were difficult to spell. This was a strategy the teacher taught them earlier in the language class. It was clear to me that some of the learners simply could not read at all, just staring at the page, and the teacher confirmed my suspicion. When we administered the second comprehension test, the teacher suggested we rather have a so-called open-book test – the learners could refer to the page while completing the test, but still we limited the time.

On the first reading piece the average score out of 20 for the class (n = 23) was 3,5 (17,4%). After the intervention, a slight increase was observed – the average out of 20 was 8,6 (43,2%). All the learners individually improved their marks on the comprehension test (see Figure 5.10 and Addendum L).

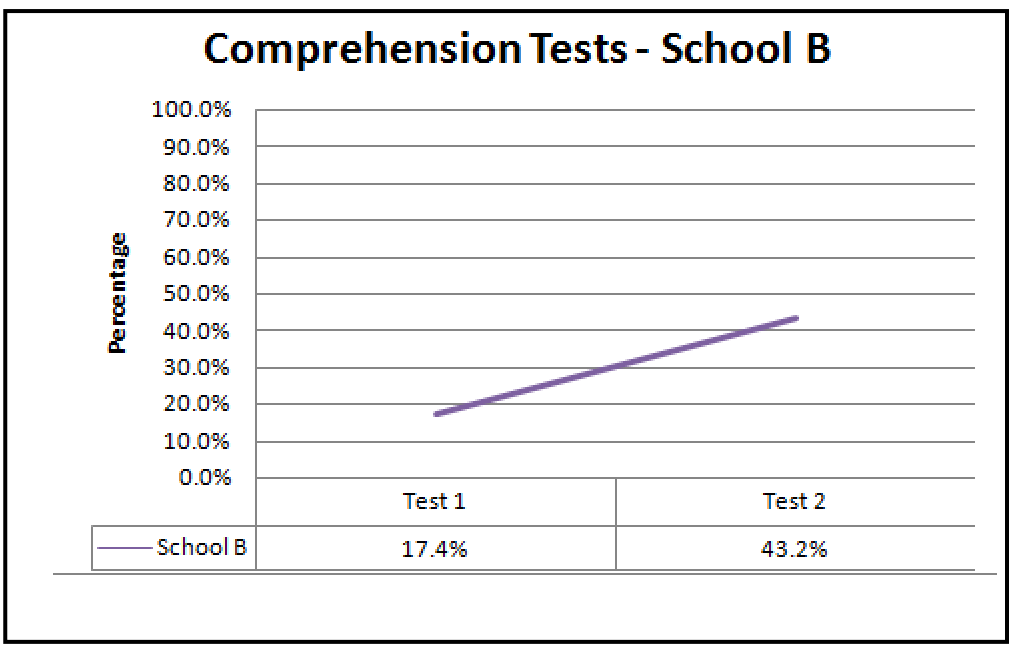


Figure 5.10: Results for comprehension tests – School B

5.4.2.4 Semi-structured interviews

The teacher responsible for the Grade 4s at School B (from the less affluent/poor community) suggested I only interview two groups. She felt that the interview format will not be helpful in the case of those learners that really struggle academically. After the first interview with the stronger academic group, I understood her concern. The learners found it really difficult to put into words how they learn from text. They seemed uneasy during the interview process, even after the intervention. No overt metacognitive knowledge was recorded during the initial interviews. They simply stated that they read and reread, and try to remember as much as possible.

During the follow-up interview, I was surprised by the average performing group of learners that, with a bit of prompting, started to enthusiastically talk about what they learned from “Abel”, the main character in the story-based intervention. They could successfully recite a summary of the metacognitive strategies covered in the stories, with hand gestures, as done by Abe and friends (see Figure 5.11).

Figure 5.11: Screenshot from focus group interview – School B (average-performing group – after intervention)

5.5 COMPARATIVE FINDINGS

In terms of the learners' awareness of metacognitive strategy use in content learning, the questionnaire (*RLQ*) revealed that the young learners in the present study have a very limited knowledge of metacognitive strategies. After the intervention, there was a significant improvement observed with both groups. Interestingly, the improvement for School A was 41,9% (17,6% / 42%), while School B had an improvement of 94% (see Figure 5.12). The learners from School B, however, started from a very low base and after the improvement still only achieved an unsatisfactory average score of 34,6%. Research suggests that poor performers will show greater improvement with metacognitive interventions compared to stronger learners (McCormick et al, 2013). The above findings substantiate most literature.

For School A, the most improved awareness concerned the "prior knowledge" strategy. The learners from School B, however, indicated "previewing, predicting and verifying" as the strategy most remembered (understood?) after the intervention. Both the groups focused most on the "summarising" strategy *before* the intervention (see Addendum L). It was encouraging to see that all the learners' knowledge about meta-comprehension strategies broadened – they gained knowledge of a variety of strategies.

The other quantitative instrument, the comprehension test, also indicated a marked improvement in terms of comprehension and recall ability after the intervention. It is difficult to compare the two class groups on this instrument, because the conditions under which the tests were administered were somewhat dissimilar (see previous comments in this chapter). School A (Quintile 5) and B (Quintile 1) had a parallel percentage improvement (around 150%) after the intervention. The average score (28,1%) on the first comprehension test for the learners from School A was surprisingly low compared to what the teacher recorded before. I am of the opinion that the reason for this very low score can be attributed to the manner in which the test was administered. Usually the learners would have the reading piece to refer to while writing a comprehension test, but I specifically wanted to also test their ability to recall information that they read and therefore I instructed the teacher not to hand the reading piece back to them. The learners were made aware of this beforehand. I hypothesised that they would then be 'forced' to apply more strategic learning techniques. The other reason for this group (School A) to underperform in the test might be the fact that they had to read with comprehension and learn for recall without the help of a parent or caregiver. They were given ample time to prepare for the test, but only during school hours (they could not take the reading piece home to study). Their dependency on a parent to help them study was highlighted during the focus group interviews (see Section 5.3.1.4). When they were given a similar comprehension test activity after the intervention, they had a much better average performance (71,3%), under the same conditions. I would speculate that they learned from the first experience and that the intervention made an impact.

The learners from School B, compared to the other class group, did not improve to a satisfactory level in terms of comprehension and recall after the intervention (43,2%) (see Table 5.5). One cannot realistically expect a dramatic improvement over such a short period of time (one intervention), especially in light of learners from poor communities having inadequate literacy levels (see Section 4.4.2).

Table 5.8: Comprehension test results – schools A and B

	School A	School B
Test 1 – average %	28,1	17,4
Test 2 – average %	71,3	43,2
% improvement (difference / original score)	153,74	148,3

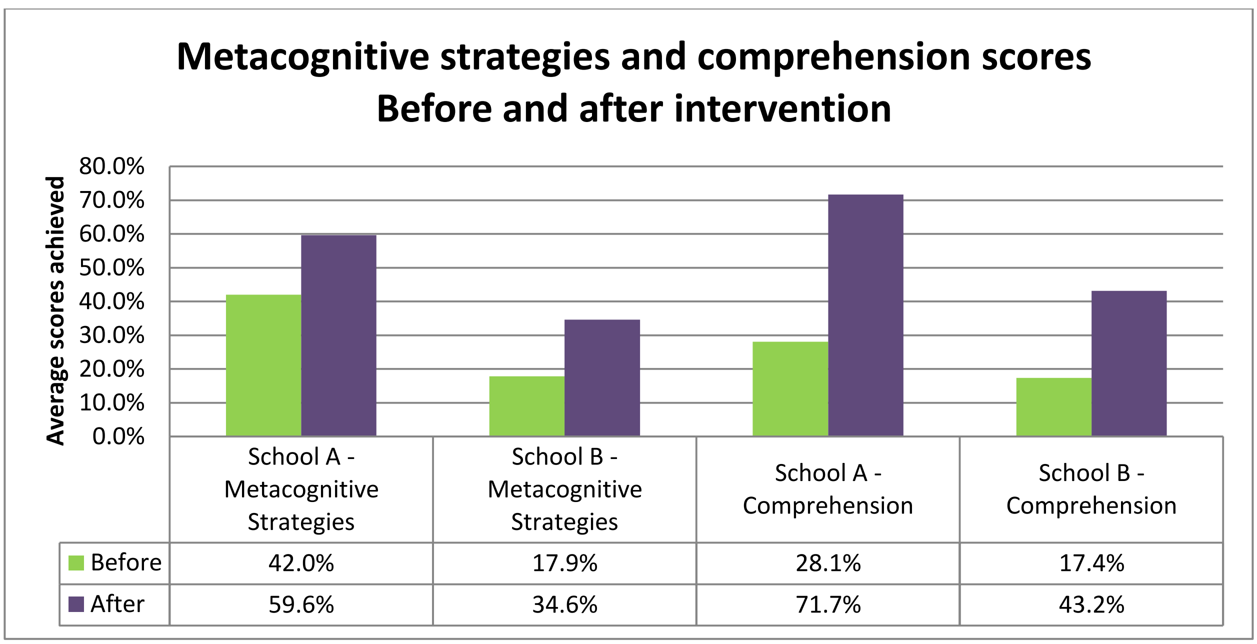


Figure 5.12: Quantitative results – schools A and B, before and after intervention

5.5.1 THE IMPACT OF SOCIO-ECONOMIC AND OTHER CONTEXTUAL FACTORS

Comparing the qualitative data gathered by means of written self-reflection tasks and focus group interviews is slightly more challenging. Because of the nature of the instruments, the learners from School B (the underperforming school) were less forthcoming to share their thoughts. These learners struggled to a greater extent to articulate what they were doing and thinking during a learning activity – far more than was the case with School A's learners (more affluent community). Even after the intervention the learners from School B were unable to put into writing (self-reflection task) or articulate (interviews) *how* they learn and think, while the learners from School A at least had a slight increase in thinking language (language of thought).

These findings concur with the research of Pappas et al. (2003), who found that the ability to describe thinking and explain ideas is stronger in the upper-SES groups than middle- or lower-SES groups. Learners from less affluent communities have limited vocabulary (Hart & Risley, 1995). The focus group interview format used in the present study, required from learners to articulate their thoughts and explain their behaviour, and that might be an explanation for the limited relevant data gathered from the learners from the very poor community.

Care was taken to standardise, as far as possible, the process of data collection (before and after evaluation) and the implementation of the story-based intervention at the two different schools. The modus operandi for each measuring instrument was pre-planned and discussed with the teachers involved, including the way I presented the stories to the learner groups. However, because the research should specifically aim to give an account of how a design functions in authentic settings (DBRC, 2003), I had to be flexible at times and the teachers involved also reported on some deviations to the initial plans. I have come to believe that the contextually sensitive nature of DBR can elicit valuable data for the practitioner (teacher/researcher).

On one occasion, for instance, I was busy reading a story to the learners at School B and just as we were getting to the essential features of the text and I got them to engage and comment on what they were reading, the administrative officer of the school abruptly came into the classroom. She announced that the 'dentist bus' (a public service to those without access to basic medical aid) had arrived and about half of the class had to leave the session immediately. The rest of that interrupted session, however, I spent informally interacting with the learners left in class and we had some very informative conversations about schoolwork and life in general. Taking time to simply connect to and understand the target group better (in this case Grade 4 learners), should contribute to a more effective intervention. It is often in those unplanned, informal moments that you discover nuggets of gold.

Earlier I also mentioned (see Section 5.4.2.3) that the teacher from School B had to help her learners with reading most of the material, while the other group (School A) had no problem with self-reading. The low literacy level of one of the groups (School B) had a direct impact, not only on the research results but also on the process and procedure. This is another contextual issue that cannot be ignored (see Chapter 6 for further discussion).

Another matter worth mentioning is that of discipline and the immediate learning environment (classroom). School B has limited resources and the teacher shared with me her frustration with the limited physical space in her classroom. She also remarked that the specific group of learners (Grade 4 of 2012, School B) involved in the second iteration was a "difficult bunch". Apart from the socioeconomic challenges, quite a significant number in the class had concentration issues and the teacher suspected that some of them had undiagnosed Attention Deficit Hyperactive Disorder (ADHD). She, and particularly the other teacher responsible for the Grade 4 group, had to constantly reprimand them on their disruptive behaviour. This 'unpleasantness' seems to affect the learners because many made comments about the conflict in class on their self-reflection task sheets.

One learner (V5) wrote the following: "It must be quiet when we read … Teacher is very cross with us… we are naughty…." (see Figure 5.13 below). I asked the teachers to write down any observations during the research sessions and, to corroborate this issue of a disruptive class environment further, the teacher made the following comment: "… some are looking around … it is as if they are waiting for someone to read to them … some kids are very disruptive … class is not quiet" (see Figure 5.14).

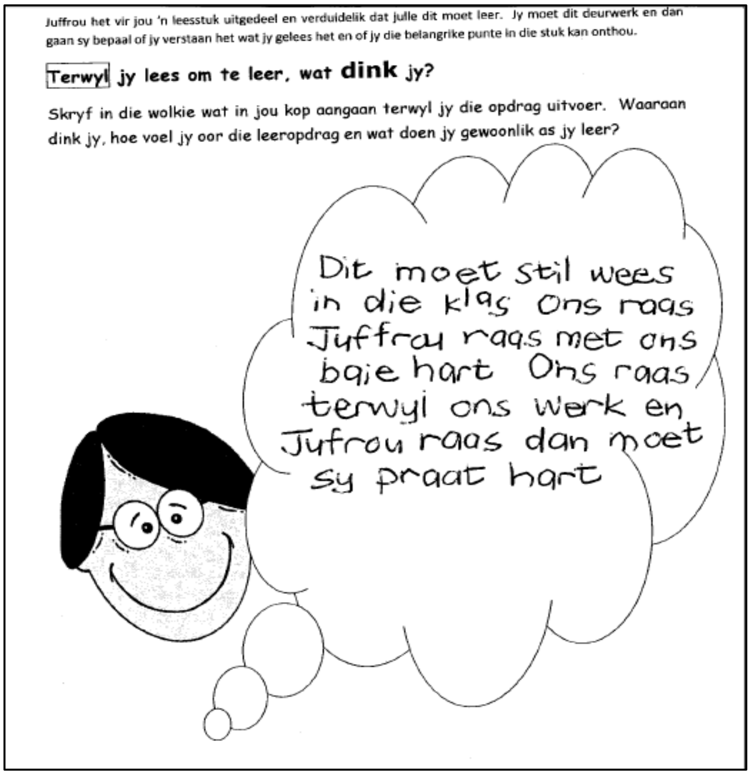


Figure 5.13: Self-reflection task – Learner V5

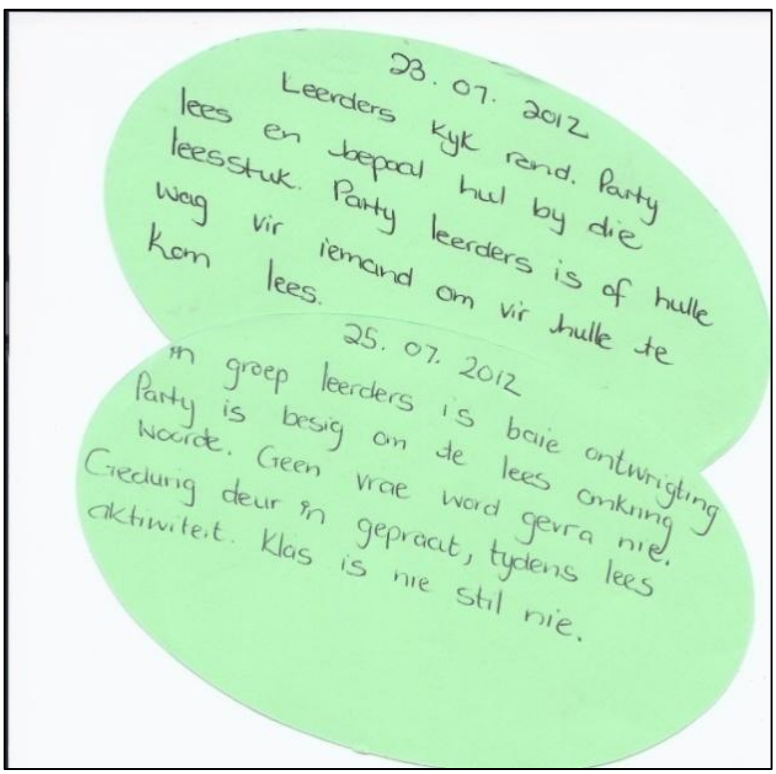


Figure 5.14: Teacher's notes (School B)

On closer analysis of the observation notes and self-reflection writings such as those presented above (see figures 5.13 and 5.14), one might infer that the lack of initiative taken in class and reluctance to express themselves verbally are more than just a discipline or ADHD issue. Evans and Rosenbaum (2008) conducted research on how poverty might have an impact on the development of self-regulation skills. They concluded that children in high-risk environments often have less opportunity to practise self-regulation because they are bombarded with a plethora of uncontrollable, negative physical and social environmental conditions. Chronic exposure to poverty has been associated with diminished self-efficacy (Bandura, Barbaranelli, Caprara & Pastorelli, 2001) and lower personal control beliefs (Evans & Rosenbaum, 2008). Landry et al. (2002) also mention that "research has documented that high degrees of directiveness interferes with children's ability to take initiative, particularly in social interactions" (p. 193). During my time with the learners from the poor community (School B), I observed very little conversation and debate between learners, and learners and teachers on intellectual topics that would stimulate thinking language (also see Section 3.3). Environment plays a major role, but to put it solely on social conditions would be improbable. The teacher's instructional methods and teaching style, and the individual temperaments of the learners, inter alia, should also be considered as contributing factors.

5.6 CONCLUSION

Research findings from both quantitative and qualitative data-collection methods were outlined in this chapter. Overall, the analysis of the data indicates that the story-based intervention seemed to have had a positive effect on the development of metacognitive awareness in these contexts. In Chapter 6 the implications based on the findings and design principles are presented, and suggestions are made for future research.

CHAPTER 6
REVIEW, REFLECT AND RECOMMEND

"Learning without thought is a labour lost,
thought without learning is perilous" – Confucius[7]

6.1 INTRODUCTION

Our ability to think about not just what we learn, but also how, why and when we learn best, and then using this awareness, is what sets the expert learner apart. Confucius might not have used the term 'metacognition', but he understood the critical importance of higher-order thinking in relation to actual, deep learning (see quote).

The idea that metacognition is "one of the bare essentials to successful learning" is unchallenged in the large body of research undertaken on the subject over many years (Mahdavi, 2014, p. 529). Veenman et al. (2006), however, draw attention to various "unresolved issues" that still need further investigation, and the "conditions for the acquisition and instruction of metacognition" is one of those areas of investigation (pp. 3–4). The present study set out to explore an innovative intervention to develop metacognition among Grade 4 learners learning from expository text, and in the preceding chapters I have documented this cyclic DBR process (see Figure 1.1 for an overview of the research process).

Chapter 1 introduced the study and provided a rationale and direction for the rest of the investigation. Chapter 2 framed the study in terms of theory and together with the first chapter, represented Phase 1 of the DBR process of analysing a practical problem, informed by both theory and practice. The development of the design solution (Phase 2) was addressed in Chapter 3, conceptually framing an effective intervention. Chapters 4 and 5 coincided with Phase 3 of the DBR process, namely the implementation and testing of the intervention. The research design, characterised by two iterations of development, enactment

[7] http://www.goodreads.com/author/quotes/15321.Confucius

and analysis, was delineated in detail and the data was analysed in these chapters. Herrington et al. (2007) explain that Phase 4 of the DBR approach includes the presentation of guiding principles and the dissemination of the findings for both theoretical and practical gain. In this final chapter, I therefore review and reflect on the findings and offer a set of design principles for a metacognitive intervention as proposed in the study (see Figure 6.1). I conclude with a description of the limitations of the study and then recommend research possibilities for the future.

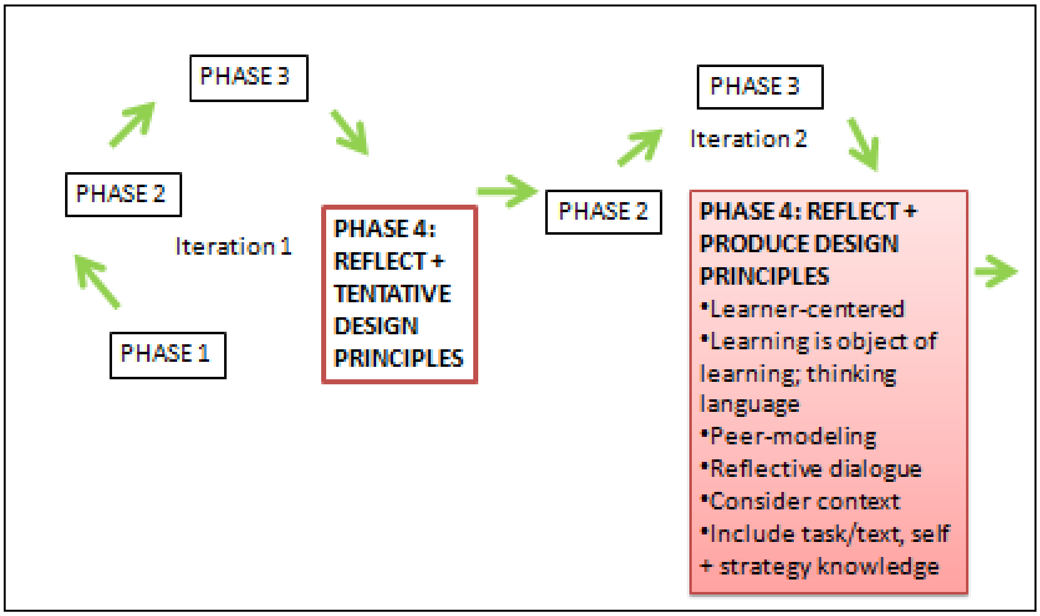


Figure 6.1: Research design – positioning Phase 4

6.2 AN OVERVIEW – THE RATIONALE AND RESEARCH OUTCOMES IN CONTEXT

I would argue that young learners do not know *how* to learn. The habit of rote learning and memorising without deep processing is commonplace (Moonsamy, 2014). The central argument in this thesis was that learners, already at early intermediate level, should be purposefully helped to become metacognitively aware when engaged in the act of learning from expository text. How can this best be done given the challenging school scenario? One way would be to explicitly incorporate metacognitive knowledge and thinking language in an entertaining story text. In Figure 6.2 I review the research presented in this thesis and I now briefly recap on the study.

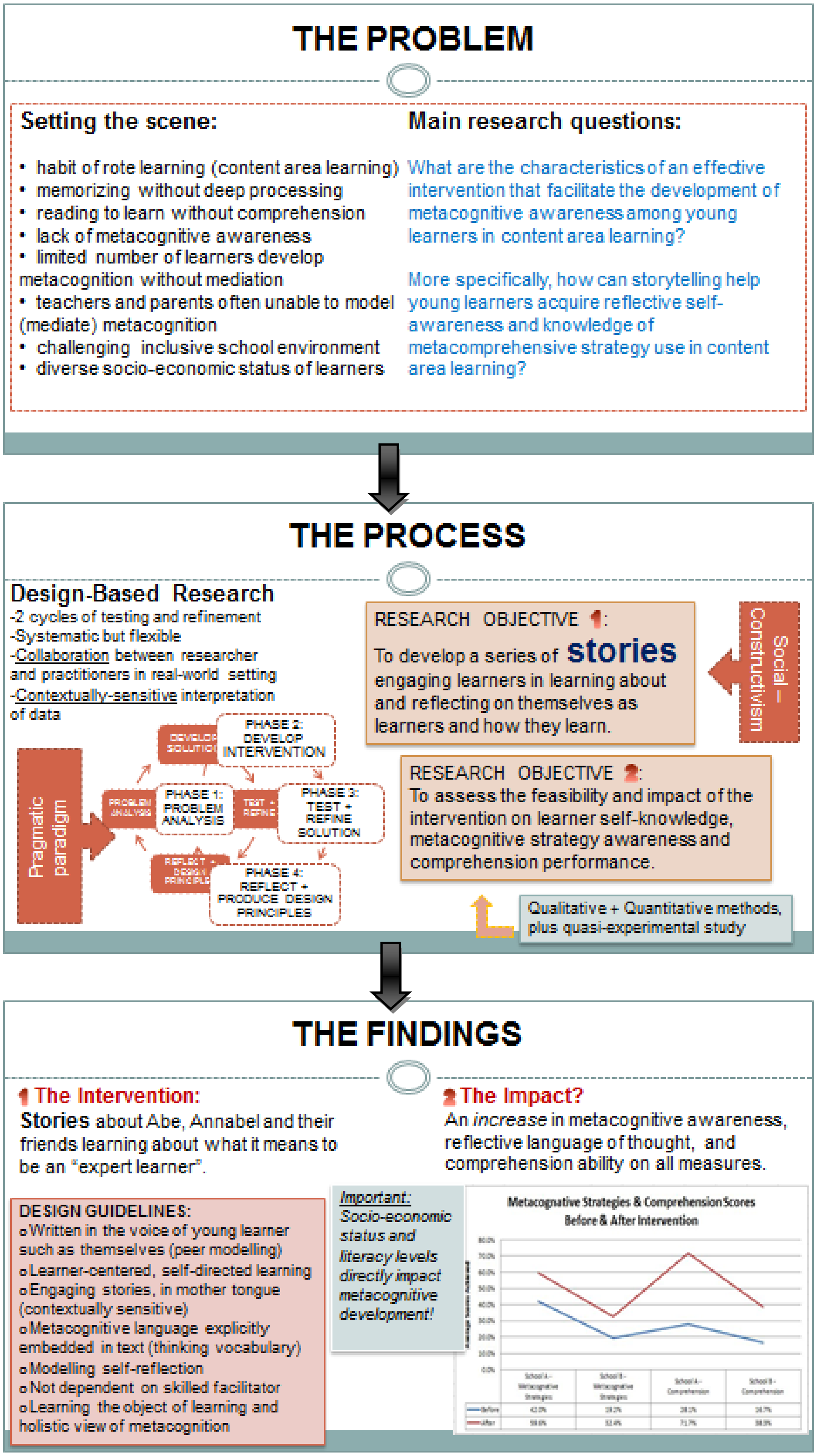


Figure 6.2: Research review

Metacognitive awareness is an essential thinking activity that all individuals need to apply for optimal learning outcomes and to become self-regulated lifelong learners (Wittwer & Renkl, 2008). The *problem*, however, is that "only a limited number of learners spontaneously apply metacognitive strategies"; hence, the importance of making metacognition "explicit to all learners so that they can develop a conscious awareness" (Wittwer & Renkl, 2008, p. 55). In the first phase of the present research study, I made a case for explicit early intervention, before rote learning and memorising without deep processing become habitual in content area learning or underperformance lead to a diminished academic self-concept. The main research question (see Section 1.5) read as follows: How can storytelling be used to foster the development of metacognitive awareness among learners in the intermediate phase?

In terms of the *process*, the DBR study, situated within a pragmatic paradigm, was guided by two definite objectives in an attempt to find an answer to the research questions posed. In the first instance, an intervention in the form of a series of stories engaging learners in learning about and reflecting on themselves as learners and how they learn, was developed. This story-based intervention was in reaction to the problem identified (see Section 1.4) in the first phase of the design-based approach. Collaboration with practitioners and a comprehensive literature review (see chapters 2 and 3) guided the conceptualisation process, representing Phase 2 (DBR). The intervention went through various micro evaluative cycles (Phase 3) within two main iterations of development, enactment and analysis, and a discussion of the consequential design principles (Phase 4) follows in the next section. Social constructivist theory framed the development of the intervention. The second objective was to assess the feasibility and impact of the intervention on a learner's reflective self-knowledge, metacognitive strategy awareness and comprehension performance. This objective was realised through the use of various qualitative and quantitative measurements (see Chapter 4). The very nature of DBR is to question the relationship between the design of the intervention and its impact on learning from many different angles (Gravemeijer & Cobb, 2006).

The *findings* from the present study were very encouraging, as outlined in the previous chapter. I developed a read-to-learn questionnaire (see Section 4.4.3.2), assessing the learners' knowledge of metacognitive strategies before, during and after reading text, and specifically they were tested on the following strategy clusters: previewing, predicting and verifying; self-questioning; drawing on prior knowledge; purpose setting; summarising and drawing on mental images; and applying fix-up strategies. During the second iteration, the questionnaire was administered to the learners, both before the intervention and after the stories about Abe and his friends have been read, to determine the intervention's impact on metacomprehension strategy knowledge. Both school groups showed a marked improvement, and particularly promising was the fact that all the learners gained knowledge of a variety of strategies (see Section 5.5). I also used a typical comprehension-type test to measure the learners' ability to read an expository text with recall and comprehension (see Section 4.4.3.3). This quantitative instrument also indicated a significant improvement, although the learners from School B, compared to the other group, did not improve to a satisfactory level of comprehension performance after the intervention (see Section 5.5). In terms of qualitative measurements, I used a written self-reflection task (see Section 4.4.3.4) and semi-structured focus group interviews (see Section 4.4.3.5) to assess the participants' ability to reflect on their level of self-awareness, verbalise their thoughts in terms of the learning activity (task and text) and understand metacomprehension strategy use. The data gathered indicated that learners struggled to verbalise their thoughts. Even after the intervention, only a slight improvement in terms of frequency was noticed, but the variety of metacognitive elements mentioned increased. These instruments, however, added valuable data to the study because it elicited slightly different information about the learners' perspectives on learning than did the questionnaire and comprehension tests (see Section 5.5.1).

The research objectives were therefore achieved. I developed a story-based intervention and its feasibility and impact were evaluated. Directing the development of the 12 stories about Abe, Annabel and their friends learning about what it means to be an 'expert learner' were design principles from theory and practice. The intervention and the guiding principles were implemented at Grade 4 level and within a diverse socio-economic school environment. An increase in metacognitive awareness, reflective language of thought and comprehension ability on all measures was observed. The story-based intervention thus seems to be a feasible and effective learning tool to develop metacognition, within the context described in the present study.

6.3 REFLECTING ON SECONDARY RESEARCH QUESTIONS

To shed further light on the main research question posed and in order to reflect on some of the more prominent issues addressed in the study, I now elaborate on each of the secondary questions listed in Chapter 1 (see Section 1.3) that guided the study's two main objectives.

6.3.1 How aware are early Intermediate Phase learners (Grade 4) of how they learn, and what they believe about learning and themselves as learners, and can they verbalise this awareness?

For the purpose of this study, I defined metacognition as including knowledge (awareness) about one's knowledge, processes, and cognitive and affective states, and the ability to consciously and deliberately monitor and regulate one's knowledge, processes, and cognitive and affective states (see Section 2.5). Furthermore, metacognitive awareness was realised through the verbalisation of thinking language (Section 3.5.2).

What is the state of young learners' metacognitive knowledge? Given the findings on both the qualitative and quantitative measures in the present study (see Chapter 5 for research findings), I would conclude that young learners at early intermediate level lack metacognitive knowledge within the context of content area learning. Their scores on the different instruments measuring metacognition were varied in relation to variables such as the socio-economic environment (see sections 6.3.2 and 6.3.3), but in general they were very low and limited to only a few learning and cognitive strategies (e.g. summarisation). This was not unexpected and predicted by literature (see Section 3.6). Scores on the questionnaire administered to assess metacomprehension strategy awareness were very low and remained relatively low even after the intervention, in both school environments. The young learners particularly struggled to verbalise their thoughts and explain how they learn, substantiating again what is stated in literature about young learners' lack of "language of thought" (Tishman, & Perkins, 1997, p. 369). The lack of thinking vocabulary came to the fore when the self-reflective tasks and focus group interviews were conducted. As was reported in the previous chapter, even with prompting the learners demonstrated a limited ability to take part in any discussion about the learning process and themselves as learners (see Section

5.3.1.4) These findings again underscore the importance of providing learners with the necessary vocabulary and metacognitive knowledge to explain themselves in terms of how they go about comprehending expository text. Vygotsky (1987) believed that "thinking depends on speech" (p. 120). Story text as a learning tool provides the perfect opportunity to explicitly expose learners (readers) to thinking lexicon and metacognitive concepts.

6.3.2 What is the difference between low-achieving and high-achieving learners in terms of their metacognitive awareness and the effect of the intervention on their metacognitive development?

I only used one data-collection method, namely semi-structured focus group interviews (see Section 4.4.3.5), to shed light on the difference between low-, average- and high-achieving learners in terms of their metacognitive awareness. Given that most of the learner groups struggled to express themselves verbally (see Section 6.3.1) during the interviews, the findings are therefore limited and inconclusive. What was evident, however, was that the high achievers had more to say (more talkative), they portrayed far more self-confidence (academic self-efficacy) and were more forthcoming in giving answers. The low-achieving group of learners had tremendous trouble to verbalise any answer and I struggled to get information from them, using this method. The most interesting, however, was that the average-performing learners provided the highest frequency (although only marginally) and quality of cognitive and metacognitive utterances during the interviews, after the intervention. One could therefore conclude that, in the present study context, the average achiever benefitted most from the intervention. This was the case in both schools.

6.3.3 Does the socio-economic context of the learners have an impact on the development of metacognitive knowledge, and specifically, does it influence the effect of the intervention?

During the first phase of the DBR process, I decided to include the socio-economic context in the study, because the practitioners I collaborated with alluded to the possible effect of home environment on the development of metacognition among learners. The literature review revealed a significant correlation between literacy development and socio-economic factors (see Section 3.6). The critical importance of language for cognitive development, as was noted by Vygotsky (1987), comes to the fore when comparing different socio-economic groups in terms of metacognitive awareness. The two learner groups from the different schools were broadly categorised as from a more affluent community (School A, Quintile 5) and from a very poor community (School B, Quintile 1), based on the general learner profile of the school as a whole (see Section 4.4.2) – individual outliers were not taken into account.

In the present study, learners from School A showed a slight increase in thinking language (qualitative measures), while an insignificant increase was noted with the struggling learners from School B. One example would be the learner (K25) from School A who initially noted on the self-reflection task that she "feels nervous" about the reading exercise (see Table 5.1), but after the intervention she demonstrated some metacognitive awareness by commenting: "I look for the main points and repeat them to myself" (see Table 5.6). In terms of the quantitative measures, the learners from the poor community (School B) achieved an average score of 34,6% on the questionnaire assessing their knowledge of metacognitive strategies *after* the intervention, while the learners from School A achieved an average of 59,6% on the same measure. Ultimately, the learners from the more affluent community (School A) performed notably better on *all* the measuring instruments assessing metacognitive knowledge (see Section 5.5.1). The comprehension test measure showed the biggest difference between the two groups with School A scoring an average of 72,7% compared to the School B's 43,2% after the intervention.

Table 6.1: Percentage improvement on the RLQ measuring metacomprehension strategy knowledge

	School A (Q5; less poor community)	School B (Q1; very poor community)
Average score <u>before</u> the story-based intervention	42%	17,9%
Average score <u>after</u> the story-based intervention	59,6%	34,6%
% improvement (difference / original x 100)	**17,6 / 42 X 100 = 41,9%**	**16,7 / 17,9 X 100 = 93,3%**

The conclusion can thus be made that the socio-economic context of a learner *has* an impact on the development of metacognition. More importantly, though, is the issue of whether the effectiveness of the type of intervention (story-based) used in the present study was influenced by the socio-economic context of the learner group. The percentage improvement between the two school groups on the questionnaire measure is depicted in Table 6.1 above. In a previous comparative discussion (see Section 5.4) I mentioned that there was a significant improvement observed with both groups. If improvement is calculated as indicated (see Table 6.1), then the learner group from the poor community had a far greater average percentage improvement after the intervention (93,3%) than the more affluent group (41,9%), because they started from a very low base. Even with the dramatic improvement, however, School B did not achieve a satisfactory level of awareness with only 34,6% average score (see Section 5.5 for a more detailed discussion).

'Context' is, however, a broad and fuzzy concept. A multitude of factors impact learning and thus define the 'learning context'. In the present study, I raised the issue of the varied socio-economic environmental factors learners are exposed to (e.g. poverty) and the possible impact it would have on the proposed intervention. As I journeyed on this research venture, I realised that another critical feature that might have a direct impact on the effectiveness of a metacognitive intervention worth mentioning at this stage, would be the teachers and specifically the quality input of the earlier grade teachers (Grade R – 3). The biggest stumbling block for effective metacognitive development, and learning in general, that came to the fore also in this study, is literacy and the learners' ability to read with comprehension or lack thereof. The role of the foundation phase teacher and the importance of quality teacher training can not be overemphasized.

6.3.4 How practical (feasible) is this type of learning intervention within the current school system and at the early Intermediate Phase – what are the experiences of learners and teachers?

In her recent study on reading strategy instruction at the Intermediate Phase and conducted in South Africa, Klapwijk (2011) refers to the "current education reality" that needs to be considered (p. 256). She states that "it would be unrealistic to propose or implement future change without acknowledging current realities (existing teaching circumstances)" (Klapwijk, 2011, p. 256). The full extent of the challenges that the South African education system is faced with are complex and vast (see Section 1.4).

I would, however, like to again highlight two of these challenges that have direct bearing on the findings of this study. The first issue has to do with the availability of highly qualified teachers that are able to model metacognitive behaviour. In this regard, Woolfolk (2013) upholds the anecdotal evidence I have gathered by stating that although "years of research" indicates the benefits of teaching learners how to learn, actual metacognitive instruction in the classroom rarely happens. "Powerful and sophisticated learning strategies are seldom taught directly until high school or even college, so most students have little practice with them" (p. 321). Woolfolk (2013) further maintains that some teachers think memorizing is learning.

To make matters worse, often parents or caregivers, as significant and supposedly 'more knowledgeable others', also lack the ability to provide sustainable learning support to learners. This is particularly evident in the group of learners from School B (poor community). The theory on socio-economic context and academic performance, as well as its relationship with metacognitive awareness, was supported by the findings in the present study (see Section 6.3.3). It was also particularly the teacher from School B that confessed to how much she has learned from this research experience. She said: "I remember studying about metacognition during my second year (at university), but now I have seen how it is done in practice".

I know of many excellent teachers and parents that model metacognitive behaviour to their children and learners, but for the vast majority I suspect this is not the case. This lack of metacognitive support by an adult was the drive behind the flexible, learner-centred story-based intervention that would not be dependent on a highly trained facilitator. I strongly feel that explicit metacognitive teaching/instruction and modelling by a teacher is still the first prize. But learners should not be held back in terms of their metacognitive development if they are not exposed to such a person. It can thus be argued that I conceptualised a practical solution in response to a real problem.

The second 'current education reality' that had a direct impact on the feasibility of the study was the low literacy rates of South African learners. The statistics are particularly disheartening (see Section 1.3). Based on the findings of the present study, it is my belief that reading ability had a direct impact on the effectiveness of the story-based intervention employed. The learners from School B presented with extremely poor reading ability, scoring only 43% for language literacy on the Annual National Assessment (2012 class group), and this restricted the initially envisaged flexible use of the story-based intervention, as well as its possible impact. The teacher from School B, for instance, had to read the stories out loud to the learners again and only a few were able to self-read. How can we teach learners to be metacognitively strategic when engaged in academic learning if they have not even mastered the basic skills of reading with comprehension?

Based on the findings of the present study, which indicated a noticeable improvement of metacognitive awareness after the intervention (see Chapter 5 for results), I would suggest that reading skills and metacognitive awareness in relation to academic learning should be taught simultaneously. Even though many of the participating learners could not read at the appropriate level, a growth in strategic thinking and self-awareness was noticed in general on all measures. I would therefore argue that the low literacy rate and poor reading ability of the majority of South African learners place a limitation on the feasibility of the conceptualised intervention, *but* that it can still reap considerable benefits for both skilled and non-skilled readers, if creatively adapted to the context.

“Design research by its character aims to be practically relevant” (Plomp, 2007, p. 22). As a design researcher I aimed at developing an intervention that can be used in practice and that is empirically underpinned, in response to real problems identified in practice. When I started this research journey, I conceptualised an intervention in response to the perceived lack of available metacognitive role models in the current learning environment. Initially I envisioned that the stories will be an independent learning tool that could be used by the learners themselves (self-read), without direct mediation by the teacher (or more knowledgeable other). This idea presumed that the learners would be able to self-read the story text with comprehension at an acceptable level. Unfortunately, already during the first iteration, I had to adapt my research plan to stay ‘practically relevant’. Learners from School B read with great difficulty. I therefore decided to read the stories out loud to both schools (to treat both case studies equally), after which the learners had an opportunity to reread the stories on their own. The set of stories now became a more flexible learning tool to be used as prescribed by the unique context. The mediating role of the teacher would therefore come into play in certain instances, although the stories could still be used independently by able learners themselves as they self-read and reflect on the metacognitive behaviour modelled (indirectly mediated) by Abe and his friends.

6.4 LESSONS LEARNT – PRESENTING THE DESIGN PRINCIPLES

The main contribution of design research is the set of well-articulated design principles accompanying the conceptualised intervention (Wozniak, Pizzica, & Mahony, 2012) and, according to Nieveen (2007), these guidelines provide insight into the following:

- Purpose/function of the intervention
- Key characteristics of the intervention (substantive emphasis)
- Guidelines for designing the intervention (procedural emphasis)
- Its implementation conditions
- Theoretical and empirical arguments (evidence) for the characteristics and procedural guidelines (p. 89).

The purpose of the intervention was the development of metacognitive awareness among intermediate learners (grades 4–6) engaged in content area learning in the form of a series of stories.

The design principles proposed below represent a combination of conclusions drawn from this study and certain theoretical principles and research-based recommendations discussed in the literature review and highlighted during the analysis and interpretation of data. Substantive, procedural and conditional guidelines attempt to answer the research question of what are the characteristics of the story-based intervention, and how does this type of intervention develop metacognition?

6.4.1 Design principle 1: A learner-centred intervention supporting self-regulated learning – storytelling

The benefits of using stories in teaching are plentiful and well documented in literature (see Section 3.8). As I have stated before (see Section 3.2), Woolfolk (2013) reminds us that neuroscience strongly support the use of stories in teaching. Not only are stories organised, having a sequence, so they are easier to remember than unrelated information, but stories also engage many areas of the brain (memories, experiences, feelings, beliefs). But most importantly, children love an entertaining story. After I mentioned to one of the classes that I will be reading them stories and they will be given their own storybook to read, one of the girls spontaneously exclaimed: "Jippee! … A story!"

The storytelling concept is learner-centred. The stories are told by children like themselves, talking about issues of relevance to the learners and the stories are written at their level of competence. Self-regulated learning is ultimately the goal of education (Bandura, 2007) and to provide learners with an example of someone (in the form of a virtual fellow learner, a story character) taking ownership of their own learning is persuasive.

However, not only is self-regulated learning modelled (see also Section 6.3.3), the fact that the learners can read the stories themselves, without being dependent on a teacher or highly educated parent to equip them with metacognitive knowledge, is fostering self-regulated conduct in more than one way. Bandura (as cited in Woolfolk, 2013) noted that "one goal of teaching should be to free students from the need for teachers, so the students can continue to learn independently throughout their lives" (p. 409). For this to happen, learners must practice being a 'self-starter', but also be equipped to self-regulate their own learning.

The learning tool proposed in the present study is conceptualised as independent from the teacher or caregiver's ability to model metacognitive awareness and skills. As I have stated earlier, from my extensive investigation of existing learning tools and training programmes it is evident that the success of an intervention is highly dependent on the capability and availability of a more proficient facilitator, usually a teacher and/or a parent (see Section 3.7). Study and thinking skills programmes are plentiful and I mention the well-known programmes of Lipton and Feuerstein in an earlier chapter (see Section 3.8). I have, however, yet to come across a tool that can be utilised directly by a younger learner, not dependent on a well-trained facilitator (and a thick facilitators' guide to boot!) to ensure effectiveness. Cockcroft (2014) substantiates my concern: "Therefore, it would seem that metacognitive instruction would benefit many South African learners but the success of such an endeavour would depend on intensive and extensive teacher training" (p. 171).

6.4.2 Design principle 2: Making learning the object of learning and giving learners the vocabulary to talk about how they learn

Stories have been used as a teaching tool in various ways (see Section 3.8). But what sets these stories in the present study apart is the fact that the storyline is about learning itself – learning about how to learn. Abe is reflecting, in his own words, on his (metacognitive) experiences as a learner and is sharing his metacognitive knowledge with the reader. Explicitly embedded in the text of the story is 'thinking language' (Tishman & Perkins, 1997). We know from literature that many learners often struggle to express themselves (their mental state) verbally (Lai, 2011; Pintrich et al, 2000; Schraw & Dennison, 1994) and this has been confirmed by the present research findings (see Chapter 5). The low-achieving learners in the study and particularly those from the poor school community demonstrated an inability to verbalise how they learn and think, upholding research on the impact of socio-economic context (Hart & Risley, 1995). These young learners lacked the means, the vocabulary, to express themselves (see also discussion under Section 2.6).

To infuse the language of learning and explicitly embed thinking vocabulary into the text of an entertaining story is therefore a further characteristic of the intervention proposed by the present study. Tishman and Perkins (1997) purport that the thinking language not only provides the words and concepts to help us communicate, but it also regulates and shapes our thinking. To develop metacognition, thinking needs to be made explicit, and this bringing of the mental process of thinking to conscious reflection is similar to the 'think-aloud' technique used with success in research (Dimmitt & McCormick, 2012). According to Vygotsky, "language is critical for cognitive development because it provides a way to express ideas and ask questions, the categories and concepts for thinking, and the links between the past and the future” (as cited in Woolfolk, 2013, p. 58)

6.4.3 Design principle 3: Using peer modelling and self-reflective talk to make metacognitive knowledge explicit to the learner

The stories are written in the voice of a young learner, such as themselves, self-reflecting on his metacognitive experiences and what he learns about being metacognitive. Abe and his friends (characters in the stories) therefore peer modelled metacognitive awareness, as well as self-reflection, through the means of reflective written text.

Modelling is especially a key element in the social cognitive theory of learning and various factors contribute to the effectiveness of modelled behaviour being transferred (Woolfolk, 2013). Schunk, Pintrich and Meece (2008) contend that we learn about what behaviours are appropriate from people like ourselves, so models who are seen as similar are more readily imitated. Woolfolk (2013) reiterates by stating the following: “All students need to see successful, capable models who look and sound like them, no matter what their ethnicity, socio-economic status, or gender” (p. 400). In this study, however, I do not refer to direct modelling (adult-mediated) as is the case in Feuerstein’s work, but modelling through the use of a story-based tool.

Vygotsky’s theory also supports learning through imitation and advocates the assistance or mediation by a more knowledgeable other, in this situation peer modelling. Woolfolk (2013) comments that sometimes “the best teacher is another student who just figured out how to solve the problem, because this student is probably operating in the learner’s zone of proximal development” (p. 63). The idea is thus to model (by telling a story) what and how expert learners think and act, and in this way hopefully bring the reader into the ZPD (see Section 2.2).

Reflection is central to being metacognitive (Bormotova, 2011) and within the constructivist perspective of learning, reflective thinking is encouraged (Windschitl, 2002). In Figure 2.5, the importance of conscious reflection in the conceptual framework of the present study is clear. Expert learners actively reflect on their learning (Ertmer & Newby, 1996) and in the story text

Abe models how to reflect on one's own learning. Abe relates (tells) first-hand how he thinks and what he learns about himself and the learning process, providing the reader with the vocabulary and phrases to imitate. One of the learners from School A commented (after the intervention): "I read and then I stop and ask myself: What does this part mean? I think out loud … like Abe …"

6.4.4 Design principle 4: A flexible, relevant and contextually sensitive intervention, collaboratively designed

Based on the social constructivist view that learning is a product of activity, culture and context, Dobrovolny (2006) draws attention to the importance of creating authentic experiences for learning. According to Vygotsky, learning is mediated by cultural tools and is the result of social and intellectual interaction with others, and the tools available in the culture and context (Daniels & Edwards, 2004; Snowman & McCown, 2015; Woolfolk, 2013). Telling a story in the language of the audience is a cultural tool and can thus be used to provide authentic contexts for learning about learning.

Early on in my research journey I realised that the intervention had to be flexible in terms of time and space, and highly adaptable to the context. The typical classroom today is inclusive and the diverse needs and abilities among the learners are challenging. A storybook is portable and can be used in the classroom or taken home. The teacher can read the stories out loud to a group of learners or an individual learner can self-read the stories. The reading activity can be done at a time most convenient for the parties involved. Stories can be written in a language and at a level most appropriate to the target audience, and one can tailor the content of the stories to suite the interests and needs of the specific learners.

Finally, the design process is one of collaboration. In the present study, the stories were written in consultation with the participating teachers. I also received feedback from experts (published writers) on the writing technique itself, but the topics and characters in the stories were very much inspired by feedback from the learners themselves (focus group interviews, Iteration 1). Woolfolk (2013) maintains that "students are the best sources of information about their own thinking" (p. 61) and it is therefore important to involve the learners themselves in the development of the story-based intervention.

6.4.5 Design principle 5: Various metacognitive aspects should be covered in the intervention

"Metacognition is higher order knowledge about your own thinking as well as your ability to use this knowledge to manage your own cognitive processes" such as comprehending expository text (Woolfolk, 2013, p. 318). In the present study I subscribed to a comprehensive definition of metacognition (see Section 2.5) and the taxonomy of Pintrich (2002) guided my conceptualisation of metacognitive knowledge (see Figure 2.5). To develop metacognitive awareness is not just to have knowledge of learning strategies, but it also encompasses knowledge of the tasks and self-knowledge, including motivational beliefs.

Woolfolk (2013) points to the issue that learners and teachers tend to only focus on memorising techniques and strategies, and even make the comment that "they don't know what else to do" (p. 321). It was evident from the findings, for instance, that emotion plays a major role in learning. During the self-reflection task, the majority of the remarks concerned either the learners' emotional state or social and learning environments (see sections 5.3.1.2 and 5.4.2.2). Literature confirms that self-awareness – making learners aware of how they learn and how to best apply their own cognitive (and affective) resources when engaged in a learning task – facilitates self-regulated learning. During the focus group interviews, one of the learners (School B, Iteration 1) commented: "I know I am good with pictures … When I think I see a picture …" I included an explanation of the different learning styles (part of self-knowledge) in one of the first stories and this learner might have referred to her learning style, although she did not directly use the term.

Ultimately, the idea is to model expert learner behaviour through stories told by learners themselves. Expert learners not only have knowledge about strategies for learning, they also "know themselves, the subject, the task, and the contexts in which they will apply their learning" (Woolfolk 2013, p. 410). The metacognitive aspects explicitly embedded in the stories are outlined in Table 5.3. The conceptualisation of the story-based intervention was based on the notion of conscious reflection (peer-modelled by a story character) mediating the application of metacognitive awareness (regulation) (see Figure 2.5).

6.5 CHALLENGES, STRENGTHS AND LIMITATIONS OF THE STUDY

Poor reading skills on the part of the participating learners posed a serious challenge for me as researcher, particularly in the case of School B. I tried to compensate for this by being flexible in my choice of the DBR approach, which is contextually sensitive by nature. I read the stories to the learners as a group first and then they were given time to self-read. In terms of the assessment instruments, reading ability had a bearing on the learners' engagement with the reading piece they had to read and study for comprehension assessment purposes. The comprehension test results were particularly low (see sections 5.3.1.3 and 5.4.2.3) and this could partly be the consequence of poor reading skills. The 20-item multiple-choice questionnaire (metacomprehension strategies) also expected from the learners to read with comprehension.

The learning tool was developed in such a way that learners could self-read the stories, without any direct mediation from a teacher or more knowledgeable other. As I have mentioned previously (see Section 6.3.4), I realised during the first iteration that particularly the learners from the one school would have great difficulty reading the text. I decided to read the set of 12 stories out loud to all the learner groups to standardise the intervention to an extent, after which they were given time to self-read. Limited direct mediation therefore took place, and this had an impact on the research findings. The issue of mediation is an important one. Because most currently available metacognitive development interventions (see sections 3.5 and 3.7) centre around time-consuming and effortful human mediator input, mainly by highly skilled teachers (e.g. Feuerstein's Instrumental Enrichment Programme), I purposefully tried to circumvent the total dependency on traditional adult mediation. Within the Vygotskian learning theory, I still made use of tools of mediation, but in the form of the story text, including language and the characters in the stories.

Furthermore, the scope of the present study was restricted to young learners at the early Intermediate Phase (average age 10 years) and I specifically focused on reading comprehension of expository text (content area learning). In literature, motivation to learn, and specifically self-efficacy, is regarded as a significant mediating factor in learning performance (Coutinho, 2006). This influential factor was not specifically taken into account in this investigation regarding the development of metacognition. Although the duration of the study could be considered as sufficient for the study's aims, a longitudinal study with the same sample groups exposed to repeated and expanded/elaborated intervention and tracing their progress to higher grades could add to the output value.

Another issue that can be a limitation or strength is the fact that I acted as both developer and researcher, directly partaking in the research process. My presence coupled with my unique characteristics, and way of reading the stories and interacting with the learners, could have led to the Hawthorn effect. The participatory nature of DBR, however, is valued by literature as a benefit (see Section 4.3.1). The research design of the present study played a prominent role in this research and proved to be a very effective approach to bridging the gap between classroom practice and theory.

A challenge worth mentioning was the actual writing of the stories (intervention). Writing an entertaining story for children requires very specific knowledge and creative skill. What made the activity even more demanding was the fact that the theme was about learning and I had to explicitly include in the text metacognitive terminology, but still keeping the stories within a narrative genre. This might be regarded as a limitation to the replication of such a type of intervention by other researchers in the future.

Ultimately, in response to the second objective of the research study (see Section 1.4), one could conclude that the story-based intervention conceptualised in this study is both feasible (see also Section 6.2) and succeeded in improving the learners' metacognitive awareness.

6.6 CONTRIBUTIONS OF THE STUDY AND FUTURE PROSPECTS

As a DBR study, "outputs in the form of both knowledge and products" are implied (Herrington et al., 2007, p. 4096) (see Section 4.3). The knowledge claim of the present design study, and the one that sets it apart from other research approaches, takes the form of design principles outlined in Section 6.4. These design principles contain substantive and procedural knowledge to inform future development and implementation decisions (Linn et al., 2004).

Furthermore, as was stated earlier (see Section 4.3.2.4), Herrington et al. (2007) argue that the dominant "goal in educational research should be the solving of teaching, learning and performance problems" (p. 4096). In DBR, the product of design is thus viewed as a major output. I acted as both the developer and the researcher in the design of the story-based intervention. A set of 12 narrative short stories were developed on the topic of learning with explicit metacognitive vocabulary embedded in the mother tongue text and written in the voice of a learner reflecting on expert learning behaviour (see Section 3.9). The intervention design was mostly based on Vygotsky's social constructivist views on cognitive development. This is an original practice-oriented contribution to the terrain of study. In this research, I argue for an 'out of the box', creative way to approach metacognitive development, given the challenging contextual issues in the current school environment.

The collaborative nature of the research approach also brings about the professional development of participants, and what Herrington et al. (2007) call 'societal outputs'. Both teachers involved in the study commented on how much they learned through their participation in the research project. One of the teachers also expressed her desire to share her newly acquired knowledge of metacognition and developing higher-order thinking among her learners with her fellow teachers. Unfortunately, she resigned shortly after the research was concluded at School B, to take up a new position at another school. Hopefully she will spread 'the message' of metacognitive awareness among her new colleagues. I have also already presented the provisional results of this research at a local as well as international conference (see Section 4.7), to test and share with the greater educational community my thoughts and insights on fostering learning-how-to-learn competence.

DBR is a relatively unexplored research approach in the South African academic environment, although it has experienced growing support over the past decade internationally (see Anderson & Shattuck, 2012). It can therefore be argued that the present study contributes to the field of educational research, not only in the form of actual outputs, but also in the way the research was conducted. On a personal note, I found the DBR approach having the potential to successfully address the 'divide' between practice and theory.

In terms of future prospects, the strength of design research lies in the repeated iterative testing of the interventions or artefacts designed, producing even more refined and improved design principles. Design considerations highlighted in the present study have not yet been fully explored and it might be of particular benefit to repeat the type of research with a different grade level (Grade 5 or 6) or within a different context (e.g. home schooling environment) to assess how the design would be affected. Longitudinal studies are further advised to determine whether early intervention has long-term transfer potential. Will those learners that gain metacognitive awareness through intervention eventually portray self-directed learning? The mediating role of the teacher using the proposed type of learning tool, where language ability is a challenge, needs to be further investigated and the stories could be translated into other languages as prescribed by the teaching context. In addition, one could also explore the audiotaping of the stories alongside the story text. In this way, the problem of learners struggling to read is addressed and the original notion of an independent tool is attained.

During the first phase of the present study, I conceptualised the development of metacognition within the context of content learning at intermediate level. I presented the conceptual framework that guided the development of the story-based intervention in Figure 2.6. The importance of making metacognition explicit to learners so that they can develop a conscious awareness is highlighted. I proposed that reflection is not only the result of metacognitive awareness but also play a mediating role in the development thereof. This perspective on the mediating role of (conscious, verbalised) reflective thought in fostering metacognitive development is novel and should be further investigated.

Assessment of metacognition has always been a challenging issue (Georghiades, 2004; Veenman, 2015). Without accurate assessment, however, it is difficult and ineffective to attempt to develop (metacognitive) knowledge and skills. I used a combination of measuring instruments in this design research study, but would like to highlight the read-to-learn questionnaire, loosely based on the *MSI* of Schmitt (1990) and others (see Section 4.4.3.2). As far as I could establish, this is the only Afrikaans questionnaire to test metacomprehension strategy awareness in content area learning, specifically developed for early intermediate level learners. The validity and reliability of this assessment instrument should be formally tested with a larger sample group in future research. The refinement of this measuring tool could also include translation into other South African mother tongue languages, with the added benefit of being used not only to assess but also as development tool.

6.7 FINAL THOUGHTS

In the first chapter I highlighted the importance of self-regulated learning in today's rushed knowledge society and Bandura (2007) reiterates this:

> A major goal of formal education is to equip learners with the intellectual tools, self-beliefs, and self-regulatory capabilities to educate themselves throughout their lifetime. The rapid pace of technological change and accelerated growth of knowledge are placing a premium on capabilities for self-directed learning (p. 10).

Empowering learners with the knowledge and skills to address the challenges they face in school and beyond is essential for global competitiveness (Moonsamy, 2014), and the development of metacognitive competence is central to meeting this need. This research attempted to make a contribution to the critical area of cognitive education and offers an innovative approach to presenting metacognitive concepts to learners, at their level of development and interest. It is promising to see that the new South African education policy document for the Curriculum and Assessment Policy Statements (Department of Basic Education, 2011) states that "thinking and reasoning" must be infused into all subject areas. Important, however, is that we also provide support in the form of practical learning tools, such as the story-based intervention explored in the present study, to learners, teachers and parents to facilitate the development of metacognition.

Professor Jonathan Jansen, Rector of the University of the Free State, makes the following statement:[8]

> . . . in matters social as well as educational, the best tool at our disposal as human beings is to think our way out of problems; far too much emphasis in South African education is on coverage of content and too little on the underlying thinking skills crucial for understanding complex scholarly and social problems.

In conclusion, Victor Frankel[9] commented that between stimulus and response there is a space, and in that space lies our freedom and our power to choose our response. He maintained that in our response (the choices we make) lie our growth and our happiness. Adding to this profound statement, I believe that being self-aware and capable of thinking about the way we think and act, and the effects our actions have on the world around us, guide our choices. The fundamental importance of developing as metacognitive beings cannot be underestimated.

[8] Retrieved from http://www.thinkingschoolssa.co.za/fund-us.html
[9] Retrieved from BrainyQuote.com/quotes/quotes/v/viktorfr160380.html

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ADDENDUM A – Approval notice, Western Cape Education Department

Western Cape Government
Education

Directorate: Research

Audrey.wyngaard2@pgwc.gov.za
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Fax: 0865902282
Private Bag x9114, Cape Town, 8000
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REFERENCE: 20120208-0005
ENQUIRIES: Dr A T Wyngaard

Mrs Suzanne Van Aswegen
14 Heather Lane
Kenridge
Durbanville
7550

Dear Mrs Suzanne Van Aswegen

RESEARCH PROPOSAL: LEARNING HOW TO LEARN THROUGH STORIES – DESIGN-BASED METACOGNITIVE INTERVENTION AT THE INTERMEDIATE PHASE

Your application to conduct the above-mentioned research in schools in the Western Cape has been approved subject to the following conditions:

1. Principals, educators and learners are under no obligation to assist you in your investigation.
2. Principals, educators, learners and schools should not be identifiable in any way from the results of the investigation.
3. You make all the arrangements concerning your investigation.
4. Approval for projects should be confirmed by the District Director of the schools where the project will be conducted.
5. Educators' programmes are not to be interrupted.
6. The Study is to be conducted from **16 July 2012 till 28 September 2012**
7. No research can be conducted during the fourth term as schools are preparing and finalizing syllabi for examinations (October to December).
8. Should you wish to extend the period of your survey, please contact Dr A.T Wyngaard at the contact numbers above quoting the reference number.
9. A photocopy of this letter is submitted to the principal where the intended research is to be conducted.
10. Your research will be limited to the list of schools as forwarded to the Western Cape Education Department.
11. A brief summary of the content, findings and recommendations is provided to the Director: Research Services.
12. The Department receives a copy of the completed report/dissertation/thesis addressed to:

    The Director: Research Services
    Western Cape Education Department
    Private Bag X9114
    CAPE TOWN
    8000

We wish you success in your research.

Kind regards.
Signed: Audrey T Wyngaard
for: **HEAD: EDUCATION**
DATE: 09 February 2012

ADDENDUM B – Ethical clearance approval from Stellenbosch University

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Approval Notice
New Application

31-May-2012
VAN ASWEGEN, Suzanne

Protocol #: DESC3/2012
Title: **Learning how to learn through stories: A design-based metacognitive awareness Intervention for the Intermediate phase (S.N.3.06.11)**

Dear Mrs Suzanne VAN ASWEGEN,

The **New Application** received on **13-Feb-2012**, was reviewed by staff members of the REC office on **23-Feb-2012** and was approved. Please note the following information about your approved research protocol:

Protocol Approval Period: **26-Apr-2012 -26-Apr-2013**

Standard provisions
1. The researcher will remain within the procedures and protocols indicated in the proposal, particularly in terms of any undertakings made in terms of the confidentiality of the information gathered.
2. The research will again be submitted for ethical clearance if there is any substantial departure from the existing proposal.
3. The researcher will remain within the parameters of any applicable national legislation, institutional guidelines and scientific standards relevant to the specific field of research.
4. The researcher will consider and implement the foregoing suggestions to lower the ethical risk associated with the research.

You may commence with your research with strict adherence to the abovementioned provisions and stipulations.

Please remember to use your **protocol number** (**DESC3/2012**) on any documents or correspondence with the REC concerning your research protocol.

Please note that the REC has the prerogative and authority to ask further questions, seek additional information, require further modifications, or monitor the conduct of your research and the consent process.

After Ethical Review:
Please note that a progress report should be submitted to the Committee before the approval period has expired if a continuation is required. The Committee will then consider the continuation of the project for a further year (if necessary). Annually a number of projects may be selected randomly for an external audit.

National Health Research Ethics Committee (NHREC) number REC-050411-032.

This committee abides by the ethical norms and principles for research, established by the Declaration of Helsinki, the South African Medical Research Council Guidelines as well as the Guidelines for Ethical Research: Principles Structures and Processes 2004 (Department of Health).

Provincial and City of Cape Town Approval

Please note that for research at a primary or secondary healthcare facility permission must be obtained from the relevant authorities (Western Cape Department of Health and/or City Health) to conduct the research as stated in the protocol. Contact persons are Ms Claudette Abrahams at Western Cape Department of Health (healthres@pgwc.gov.za Tel: +27 21 483 9907) and Dr Helene Visser at City Health (Helene.Visser@capetown.gov.za Tel: +27 21 400 3981). Research that will be conducted at any tertiary academic institution requires approval from the relevant parties. For approvals from the Western Cape Education Department, contact Dr AT Wyngaard (awyngaar@pgwc.gov.za, Tel: 0214769272, Fax: 0865902282, http://wced.wcape.gov.za).

Institutional permission from academic institutions for students, staff & alumni. This institutional permission should be obtained before submitting an application for ethics clearance to the REC.
Please note that informed consent from participants can only be obtained after ethics approval has been granted. It is your responsibility as researcher to keep signed informed consent forms for inspection for the duration of the research.

We wish you the best as you conduct your research.
If you have any questions or need further help, please contact the REC office at 0218089183.

Included Documents:
DESC Application form/checklist

Sincerely,
Sidney Engelbrecht
REC Coordinator
Research Ethics Committee: Human Research (Humanities)

ADDENDUM C – Teacher consent form

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UNIVERSITEIT STELLENBOSCH

TOESTEMMING OM DEEL TE NEEM AAN NAVORSING

RESEARCH TITLE: "Learning to learn through stories – Design-based metacognitive awareness intervention at the intermediate phase."

NAVORSINGSONDERWERP: "LEER MET STORIELEES HOE OM TE LEER"

Geagte Klasonderwyseres

U toestemming word gevra vir deelname aan 'n navorsingstudie, onder leiding van Suzanne van Aswegen (B.Sc. (Ed), M.A. (Industrial Psychology)), van die Departement Opvoedkundige Sielkunde aan die Universiteit van Stellenbosch. Die studie sal bydra tot doktorale navorsing (PhD).

1. DOEL VAN DIE STUDIE

Die studie ondersoek die aard en ontwikkeling van metakognisie by jong leerders. Om 'n taak uit te voer benodig jy kognisie (verstandelike vermoëns), maar *om te verstaan hoe* jy daardie taak uitvoer, is metakognitiewe kennis en vaardighede nodig. Metakognisie, in eenvoudige terme, is bloot 'om te dink oor hoe jy dink en leer'. Om bewus te wees van *hoe* jy dink soos jy 'n leeropdrag uitvoer en dan om hierdie kennis van jou denk/leerproses te gebruik om wat jy doen (jou gedrag) aktief te reguleer, staan bekend as metakognisie. Navorsing het bewys dat metakognisie noodsaaklik is vir sukses op akademiese gebied en ook op alle fasette van die lewe. 'n Metakognies bewuste leerder gaan strategies te werk om 'n taak te verrig en 'n probleem op te los.

Hierdie studie fokus spesifiek op inhoudsvakleer en die doel van die navorsing is tweeledig: (1) die ontwikkeling van 'n storieleesmetode of leer-intervensie, ("a learning tool in the form of stories") wat metakognisie bevorder, en (2) om die effektiwiteit van die intervensie te bepaal. Met hierdie navorsing gaan ons poog om te kyk of ons leerders in Graad 4 kan help om makliker en beter te kan leer. Ons vra vrae soos 'watter leermetodes (strategieë) gebruik jy as jy 'n stuk lees vir leer' en 'weet jy hoe en wanneer jy sekere leermetodes moet gebruik sodat jy die stuk werk beter kan verstaan en onthou?' Ons het stories geskryf wat gaan oor kinders wat leer hoe om te leer en ons gaan hierdie stories in die klas lees. Daarna gaan ons kyk of die lees van die stories vir hulle gehelp het om beter te weet hoe om met begrip en vir langtermynretensie te leer. Ons fokus is dus om jong leerders te bemagtig om self verantwoordelikheid te neem vir hul studiemetodes en leerprestasies.

2. PROSEDURE

Van die leerders wat deelneem aan die studie sal verwag word om die volgende te doen:

1. 'n Vraelys (Lees vir Leer-Vraelys) te voltooi wat kennis van metakognitiewe strategie-gebruik toets,
2. 'n Leesstuk deur te werk,

3. Dan vrae te beantwoord oor wat hy/sy gedink en gedoen het voor, tydens en nadat hy/sy die leesstuk deurgewerk het (Geskrewe self-refleksieblad).
4. ‘n Kort begripstoets te skryf oor die leesstuk wat hy/sy deurgewerk het.
5. ‘n Individuele onderhoud met die navorser te voer, waartydens vrae gevra sal word oor metakognitiewe strategiekennis.

Bogenoemde prosedure sal na afloop van die intervensie herhaal word. Die intervensie behels die voorlees / selflees van kort stories oor Abel, sy suster Annabel en hul vriende wat leer hoe om te leer. In die stories word die leerproses in eenvoudige terme bespreek en Abel vertel watter strategieë werk en waarom. Hierdie stories gaan vir 6 weke elke oggend vir sowat 15 minute gelees word, met reflektiewe groepsbespreking en inoefening van tegnieke. Op die bestaande rooster is daar vroegoggend ‘n periode vir informele lees en u het aangedui dat hierdie periode benut kan word vir navorsing. Alle klasse het elke oggend normaalweg tyd vir informele leesen dus sal geen ekstra tyd benodig word vir die intervensie nie. Die navorsing word beplan vir die derde kwartaal van 2012.

Die onderwyseres sal direk betrokke wees by die navorsing, alhoewel die lees van die stories en die data insameling deur die navorser self gedoen sal word. Die bestaande rooster sal bepaal wanneer die voor- en na intervensie evaluering gedoen word. U insae is reeds gevra rondom die tipe vraagstelling in die vraelys en die begripstoetse, ten opsigte van die geskikte taalgebruik en moeilikheidsgraad. As klasonderwyseres sal van u gevra word om te help met die inoefening en vaslegging van konsepte gedurende die intervensie periode, wat behels leerbegrippe in die klas herhaal (bv. die woorde ‘voorspel’ en ‘opsom’ op bord skryf) en kort groepbesprekings oor wat die vorige dag geleer is. U insae en raad sal bydra tot die sukses van die studie en die navorsingsontwerp vereis dan ook spesifiek deurlopende samewerking met die leerkrag. Verslag sal ook gedoen word van hoe die onderwyseres die proses ervaar het.

3. MOONTLIKE RISIKO’S EN / OF VOORDELE

Niks nadeligs kan met die leerders gebeur as hul deelneem aan die navorsing nie. Hul klaspunte sal geensins beïnvloed word deur hoe die vrae tydens die ondersoek beantwoord word nie en dan gaan ons ook so ver moontlik dit tydens normale klasperiodes doen, wat geen ekstra werk vir hulle inhou nie.

Die stories is spesiaal vir kinders tussen 9- en 12-jarige ouderdom geskryf en ons weet uit vorige navorsing dat die strategieë waarvan hul gaan leer vir leerders kan help om beter te leer en skoolwerk makliker te verstaan. As hulle die dinge waarvan hul in die stories gaan lees in die toekoms inoefen, sal hul heel moontlik ook al hoe beter presteer. Om deel te neem aan die navorsing is dus potensieel voordelig. Na afloop van die studie word beplan om die stories te vertaal en wyer beskikbaar te stel. Daar is nie ‘n kontrole groep nie en daarom kan die ander klasse wat nie direk betrokke is by die studie nie, ook toegang tot die stories hê. Geen leerders word dus benadeel nie. Die navorsingsideaal is om ‘n praktiese, bewysgebaseerde ‘leermiddel’ daar te stel wat leerders op ‘n vroeë ouderdom, ongeag hul opvoedingsomstandighede, sal aanmoedig om van onafhanklike leerbeginsels en effektiewe strategieë kennis te neem en in te oefen, ten einde langtermynsukses te smaak.

4. BETALING VIR DEELNAME

Geen betaling vir deelname sal deur enigiemand betrokke by die studie ontvang word nie.

5. VERTROULIKHEID, STAKING VAN DEELNAME EN REGTE VAN DEELNEMERS

Enige informasie wat deur die studie bekom word en wat betrekking het op individuele deelnemers sal konfidensieël hanteer word. Deur van kodering gebruik te maak sal daar ook geen direkte verwysing na enige spesifieke persoon of institusie in die verslaggewing van die navorsing wees nie. As klasonderwyseres sal u direk by die navorsingstudie betrokke wees en derhalwe ook toegang hê tot die navorsingsdata. Verdere data vanuit rekords, naamlik leesvaardigheid en gemiddelde prestasie punte, sal benodig word vir interpretasie doeleindes en hiermee word formeel toestemming gevra om toegang tot hierdie rekords te verkry. Ouers kan versoek om na afloop van die studie hul eie kinders se resultate op die meetinstrumente met die navorser of juffrou te kom bespreek. Data sal gestoor word op 'n veilige plek en geen ongemagtige persone sal toegang tot die data verkry nie. Die studieleiers het wel ook toegang tot die navorsingresultate.

Die volle Graad 4 IB klas van 2011 (27 leerders), van [redacted], saam met u as hul klasonderwyseres, sal betrokke wees by die studie. Dit staan egter elke leerder vry om nie deel te neem aan die studie nie. Deelname is vrywillig van aard en onttrekking aan die studie sal geen nadelige gevolge hê nie. Indien die leerder sekere vrae nie wil beantwoord nie, kan hy/sy so doen en steeds in die studiegroep bly. Die navorser het ook die reg om die leerder aan die studie te onttrek indien die omstandighede dit vereis, byvoorbeeld a.g.v. onvoorsiene afwesigheid. Die behoefte by leerders aan kennis oor selfstandige leerstrategieë is deur u bevestig en as klasonderwyseres neem u vrywillig deel aan die studie.

U het egter steeds die volle reg om te onttrek en om deelname sonder enige benadeling te staak. Geen wetlike regte, eise of voordele sal a.g.v. deelname opgesê word nie. Indien u enige navrae oor die regte van 'n navorsingsdeelnemer het, kontak gerus Me. Maléne Fouché by die Afdeling vir Navorsingsontwikkeling [mfouche@sun.ac.za; 021 808 4622].

6. IDENTIFIKASIE VAN NAVORSER

Indien u enige navrae oor die navorsing het, word u versoek om die volgende persone te kontak:

Suzanne van Aswegen (navorser) [redacted]
[redacted] *(klasonderwyseres)* [redacted]
Studieleiers – departement Opvoedkundige Sielkunde:
Prof E Swart
Dr M Oswald

HANDTEKENING VAN KLASONDERWYSERES

Ek, ________________________________, as Graad 4 Klasonderwyseres van __________________________ (naam van skool) het bogaande informasie deurgelees en verstaan wat ek gelees het. Ek is ook die geleentheid gegee om enige vrae te vra waaroor ek nog onseker mag wees en hierdie vrae is bevredigend beantwoord.

Ek gee hiermee vrywillig toestemming dat my leerders aan die betrokke studie mag deelneem. Daar is 'n kopie van hierdie vorm aan my verskaf.

____ ______________________

Handtekening van Onderwyseres **Datum**

ADDENDUM D – School principal consent form

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jou kennisvennoot • your knowledge partner

UNIVERSITEIT STELLENBOSCH

TOESTEMMING OM DEEL TE NEEM AAN NAVORSING

RESEARCH TITLE: "Learning to learn through stories – Design-based metacognitive awareness intervention at the intermediate phase."

NAVORSINGSONDERWERP: "LEER MET STORIELEES HOE OM TE LEER"

Geagte Skoolhoof

U toestemming word gevra vir deelname aan 'n navorsingstudie, onder leiding van Suzanne van Aswegen (B.Sc. (Ed), M.A. (Industrial Psychology)), van die Departement Opvoedkundige Sielkunde aan die Universiteit van Stellenbosch. Die studie sal bydra tot doktorale navorsing (PhD).

1. DOEL VAN DIE STUDIE

Die studie ondersoek die aard en ontwikkeling van metakognisie by jong leerders. Om 'n taak uit te voer benodig jy kognisie (verstandelike vermoëns), maar *om te verstaan hoe* jy daardie taak uitvoer, is metakognitiewe kennis en vaardighede nodig. Metakognisie, in eenvoudige terme, is bloot 'om te dink oor hoe jy dink en leer'. Om bewus te wees van *hoe* jy dink soos jy 'n leeropdrag uitvoer en dan om hierdie kennis van jou denk/leerproses te gebruik om wat jy doen (jou gedrag) aktief te reguleer, staan bekend as metakognisie. Navorsing het bewys dat metakognisie noodsaaklik is vir sukses op akademiese gebied en ook op alle fasette van die lewe. 'n Metakognies bewuste leerder gaan strategies te werk om 'n taak te verrig en 'n probleem op te los.

Hierdie studie fokus spesifiek op inhoudsvakleer en die doel van die navorsing is tweeledig: (1) die ontwikkeling van 'n storieleesmetode of leer-intervensie, ("a learning tool in the form of stories") wat metakognisie bevorder, en (2) om die effektiwiteit van die intervensie te bepaal. Met hierdie navorsing gaan ons poog om te kyk of ons leerders in Graad 4 kan help om makliker en beter te kan leer. Ons vra vrae soos 'watter leermetodes (strategieë) gebruik jy as jy 'n stuk lees vir leer' en 'weet jy hoe en wanneer jy sekere leermetodes moet gebruik sodat jy die stuk werk beter kan verstaan en onthou?' Ons het stories geskryf wat gaan oor kinders wat leer hoe om te leer en ons gaan hierdie stories in die klas lees. Daarna gaan ons kyk of die lees van die stories vir hulle gehelp het om beter te weet hoe om met begrip en vir langtermynretensie te leer. Ons fokus is dus om jong leerders te bemagtig om self verantwoordelikheid te neem vir hul studiemetodes en leerprestasies.

2. PROSEDURE

Van die leerders wat deelneem aan die studie sal verwag word om die volgende te doen:

1. 'n Vraelys (Lees vir Leer-Vraelys) te voltooi wat kennis van metakognitiewe strategie-gebruik toets,
2. 'n Leesstuk deur te werk,

3. Dan vrae te beantwoord oor wat hy/sy gedink en gedoen het voor, tydens en nadat hy/sy die leesstuk deurgewerk het (Geskrewe self-refleksieblad).
4. ‘n Kort begripstoets te skryf oor die leesstuk wat hy/sy deurgewerk het.
5. ‘n Individuele onderhoud met die navorser te voer, waartydens vrae gevra sal word oor metakognitiewe strategiekennis.

Bogenoemde prosedure sal na afloop van die intervensie herhaal word. Die intervensie behels die voorlees / selflees van kort stories oor Abel, sy suster Annabel en hul vriende wat leer hoe om te leer. In die stories word die leerproses in eenvoudige terme bespreek en Abel vertel watter strategieë werk en waarom. Hierdie stories gaan vir 6 weke elke oggend vir sowat 15 minute gelees word, met reflektiewe groepsbespreking en inoefening van tegnieke. Op die bestaande rooster is daar vroegoggend ‘n periode vir informele lees en die juffrou het aangedui dat hierdie periode benut kan word vir navorsing. Alle klasse het elke oggend normaalweg tyd vir informele leesen dus sal geen ekstra tyd benodig word vir die intervensie nie. Die navorsing word beplan vir die derde kwartaal van 2012.

Die onderwyseres sal direk betrokke wees by die navorsing, alhoewel die lees van die stories en die data insameling deur die navorser self gedoen sal word. Die onderwyseres se rooster sal bepaal wanneer die voor- en na intervensie evaluering gedoen sal word. Haar insae is reeds gevra rondom die tipe vraagstelling in die vraelys en die begripstoetse, ten opsigte van die geskikte taalgebruik en moeilikheidsgraad. Die onderwyseres sal help met die inoefening en vaslegging van konsepte gedurende die intervensie periode, wat behels leerbegrippe in die klas herhaal (bv. die woorde ‘voorspel’ en ‘opsom’ op bord skryf) en kort klas besprekings oor wat die vorige dag geleer is.Die onderwyseres se insae en raad sal bydra tot die sukses van die studie en die navorsingsontwerp vereis dan ook spesifiek deurlopende samewerking met die leerkrag. Verslag sal ook gedoen word van hoe die onderwyseres die proses ervaar het.

3. MOONTLIKE RISIKO’S EN / OF VOORDELE

Niks nadeligs kan met die leerders gebeur as hul deelneem aan die navorsing nie. Hul klaspunte sal geensins beïnvloed word deur hoe die vrae tydens die ondersoek beantwoord word nie en dan gaan ons ook so ver moontlik dit tydens normale klasperiodes doen, wat geen ekstra werk vir hulle inhou nie.

Die stories is spesiaal vir kinders tussen 9- en 12-jarige ouderdom geskryf en ons weet uit vorige navorsing dat die strategieë waarvan hul gaan leer vir leerders kan help om beter te leer en skoolwerk makliker te verstaan. As hulle die dinge waarvan hul in die stories gaan lees in die toekoms inoefen, sal hul heel moontlik ook al hoe beter presteer. Om deel te neem aan die navorsing is dus potensieel uiters voordelig. Na afloop van die studie word beplan om die stories te vertaal en wyer beskikbaar te stel. Daar is nie ‘n kontrole groep nie en daarom kan die ander klasse wat nie direk betrokke is by die studie nie, ook toegang tot die stories hê. Geen leerders word dus benadeel nie. Die navorsingsideaal is om ‘n praktiese, bewysgebaseerde ‘leermiddel’ daar te stel wat leerders op ‘n vroeë ouderdom, ongeag hul opvoedingsomstandighede, sal aanmoedig om van onafhanklike leerbeginsels en effektiewe strategieë kennis te neem en in te oefen, ten einde langtermynsukses te smaak. Elke mens het die reg om hul volle potential te verwesenlik en metakogniese bewusmaking is onontbeerlik deel van hierdie proses.

4. BETALING VIR DEELNAME

Geen betaling vir deelname sal deur enigiemand betrokke by die studie ontvang word nie.

5. VERTROULIKHEID, STAKING VAN DEELNAME EN REGTE VAN DEELNEMERS

Enige informasie wat deur die studie bekom word en wat betrekking het op individuele deelnemers sal konfidensieël hanteer word. Deur van kodering gebruik te maak sal daar ook geen direkte verwysing na enige spesifieke persoon of institusie in die verslaggewing van die navorsing wees nie. Die klasjuffrou sal direk by die navorsingstudie betrokke wees en derhalwe ook toegang hê tot die navorsingsdata. Verdere data vanuit rekords, leesvaardigheid en gemiddelde prestasie punte, sal ook benodig word vir interpretasie doeleindes en hiermee word formeel toestemming gevra om toegang te verkry tot hierdie rekords. Ouers kan versoek om na afloop van die studie hul eie kinders se resultate op die meetinstrumente met die navorser of juffrou te kom bespreek. Data sal gestoor word op ‘n veilige plek en geen ongemagtige persone sal toegang tot die data verkry nie.

Die volle Graad 4 IB ([redacted]) klas van 2011, van [redacted], saam met hul klasjuffrou, sal betrokke wees by die studie. Daar is ‘n totaal van 28 leerders betrokke. Dit staan egter elke leerder vry om nie deel te neem aan die studie nie. Deelname is vrywillig van aard en onttrekking aan die studie sal geen nadelige gevolge hê nie. Indien die leerder sekere vrae nie wil beantwoord nie, kan hy/sy so doen en steeds in die studiegroep bly. Die navorser het ook die reg om die leerder aan die studie te onttrek indien die omstandighede dit vereis, byvoorbeeld a.g.v. onvoorsiene afwesigheid. Die betrokke juffrou het die behoefte aan kennis oor selfstandige leerstrategieë bevestig en neem vrywillig deel aan die studie. Sy het egter steeds die volle reg om te onttrek.

U mag te enige tyd u toestemming terugtrek en ‘n leerder mag deelname sonder enige benadeling staak. Geen wetlike regte, eise of voordele sal a.g.v. deelname opgesê word nie. Indien u enige navrae oor die regte van ‘n navorsingsdeelnemer het, kontak gerus Me. Maléne Fouché by die Afdeling vir Navorsingsontwikkeling [mfouche@sun.ac.za; 021 808 4622].

6. IDENTIFIKASIE VAN NAVORSER (IDENTIFICATION OF INVESTIGATOR)

Indien u enige navrae oor die navorsing het, word u versoek om die volgende persone te kontak:

Suzanne van Aswegen (navorser) [redacted]
[redacted] *(klasonderwyseres)* [redacted]
Studieleiers – departement Opvoedkundige Sielkunde:
Prof E Swart *021 808 2306* *estelle@sun.ac.za*
Dr M Oswald *021 808 2037* *mmoswald@sun.ac.za*

HANDTEKENING VAN SKOOLHOOF

Ek, ______________________________, as Skoolhoof van ________________________ (naam van skool) het bogaande informasie deurgelees en verstaan wat ek gelees het. Ek is ook die geleentheid gegee om enige vrae te vra waaroor ek nog onseker mag wees en hierdie vrae is bevredigend beantwoord.

Ek gee hiermee vrywillig toestemming dat my leerders aan die betrokke studie mag deelneem. Daar is ‘n kopie van hierdie vorm aan my verskaf.

____ ____________________
Handtekening van Skoolhoof **Datum**

ADDENDUM E – Participant assent form

STELLENBOSCH UNIVERSITEIT

DEELNEMER INFORMASIEBLAD EN TOESTEMMINGSBRIEF


Liewe Leerder,
Hierdie brief is om jou in te lig oor my navorsing en om jou te vra om daaraan deel te neem.

TITEL VAN NAVORSINGSPROJEK: *Leer hoe om te leer deur stories.*
(Learning how to learn – Design-based metacognitive awareness intervention at the Intermediate Phase.)

NAVORSER SE NAAM: *Suzanne van Aswegen*

ADRES: [redacted]

KONTAKNOMMER: [redacted]

Wat is NAVORSING?

Navorsing is iets wat ons doen om nuwe kennis te verkry oor hoe dinge werk en waarom mense op sekere maniere optree. Ons gebruik navorsing om beter maniere uit te vind om byvoorbeeld leerlinge te help om makliker te leer, soos in hierdie spesifieke navorsing waarvan julle deel is. Deur navorsingstudies leer ons meer van onsself en ander en hoe om in ons omgewing beter te funksioneer.

Waaroor gaan hierdie navorsingsprojek?

Die doel van hierdie navorsing is om te kyk of ons leerders in Graad 4 kan help om makliker en beter te kan leer. As jy 'n stuk werk moet lees en verstaan, watter metodes of strategieë gebruik jy? Weet jy hoe en wanneer jy sekere strategieë moet gebruik sodat jy die stuk werk beter kan verstaan en onthou? Dit is sulke vrae wat ons deur die navorsing probeer beantwoord Dan het ons verder stories geskryf wat gaan oor kinders soos julle wat leer hoe om te leer en ons gaan hierdie stories in die klas lees. Daarna gaan ons kyk of die lees van die stories vir julle gehelp het om beter te weet hoe om te leer sodat jy dinge beter kan verstaan en onthou.

Waarom is jy gevra om deel te neem aan hierdie navorsing?

Saam met jul klasjuffrou is al die kinders in jul klas (Graad 4IB) gekies om deel te neem aan die navorsing. Graad 4 is 'n belangrike jaar, want julle begin hierdie jaar toetse en eksamens skryf en julle het allerlei nuwe leervakke, soos Wetenskap en Aardrykskunde. Omdat jy in Graad 4 is, is jy perfek om my met my navorsing te help!

Wie doen die navorsing?

My naam is (juffrou) Suzanne van Aswegen en ek is van die Universiteit van Stellenbosch. My werk is om kinders te wys hoe om te studeer en hoe om skoolwerk te geniet. Ek is ook 'n navorser en julle gaan my help om te verstaan hoe kinders dink terwyl hulle leer en of die lees van spesifieke stories vir julle help om beter te leer.

Wat gaan met jou gebeur as jy deelneem aan die navorsing?

Tydens die eerste deel van die navorsing gaan van julle verwag word om 'n vraelys te voltooi wat vrae vra oor wat julle doen en dink, voor, terwyl en nadat julle 'n leesstuk deurwerk. Julle ken reeds begripstoetse. Juffrou gaan vir julle 'n begripstoets gee ('n leesstuk om te leer), net soos gewoonlik, maar daarna gaan julle vrae gevra word oor wat *julle gedoen het. Ek gaan ook vir julle in 'n onderhoud 'n paar vrae vra, maar daar is nie regte of verkeerde antwoorde nie en dit is nie 'n toets nie. Julle hoef geensins bang of bekommerd te wees oor die vragies wat gevra gaan word nie. Jy gaan ook verder in 'n paar sinne vir my neerskryf wat jy gedink het, soos jy die leesstuk probeer leer het.*

In die tweede deel van die navorsing, gaan ons vir 'n paar weke 'n storieboek lees oor Abel, Annabel en hul maats wat leer hoe om te leer. Ons gaan gesels oor die dinge waarvan jul in die stories lees en julle gaan probeer doen wat Abel en sy vriende julle wys om te doen. Dit gaan alles in die derde Kwartaal gebeur, en meestal vroegoggend in leestyd. Nadat ons al die stories deurgewerk het, gaan julle weer gevra word om die vraelyste en toetse af te lê wat jul gedoen het voordat ons met die stories begin het.

Kan enigiets sleg met jou gebeur?

Niks sleg kan met jou gebeur as jy deelneem aan die navorsing nie. Jou klaspunte sal geensins beïnvloed word deur hoe jy die vrae tydens die ondersoek beantwoord nie en verder gaan ons ook so ver moontlik dit tydens normale klasperiodes doen, wat geen ekstra werk vir julle beteken nie.

Kan enigiets goeds met jou gebeur?

Die stories is spesiaal vir leerders net soos julle geskryf en ons weet uit vorige navorsing dat die strategeië waarvan jy gaan leer definitief vir leerders help om beter te leer en skoolwerk makliker te verstaan. As jy die dinge waarvan jy in die stories gaan lees in die toekoms inoefen, sal jy heel moontlik ook al hoe beter presteer. Om deel te neem aan die navorsing is dus goed en voordelig vir jou.

Sal enigiemand weet jy neem deel aan die studie?

Jou ouers moet toestemming gee dat jy kan deelneem aan die studie en net jul onderwyser en ek (die navorser) sal direk betrokke wees by die studie. Jul antwoorde op die verskillende vraelyste is egter vertroulik en ons sal dit nie met ander mense deel sodat hul uitvind dit wat jy gesê en gedoen het nie.

Met wie kan jy gesels oor die studie?

Suzanne van Aswegen (navorser)	*Tel.* [redacted]
[redacted] *(klasonderwyser)*	*Tel.* [redacted]
Prof Estelle Swart (studieleier)	*Tel.* [redacted]
Dr Marietjie Oswald (studieleier)	*Tel.* [redacted]

Wat as jy nie wil deelneem nie?

As jy nie wil deelneem aan die studie nie, kan jy so sê en niks sal gebeur met jou as jy nie wil deelneem nie. Selfs al het die navorsing reeds begin, kan jy steeds besluit om nie meer voort te gaan nie. Deelname is vrywillig.

Verstaan jy hierdie navorsingstudie en is jy bereid om deel te neem?

JA NEE

Het die navorser al jou vrae beantwoord?

JA NEE

Verstaan jy dat jy nie verplig is om deel te neem nie?

JA NEE

___________________________ ______________________

Handtekening van LEERDER Datum

ADDENDUM F – Parent consent form

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jou kennisvennoot • your knowledge partner

STELLENBOSCH UNIVERSITY / UNIVERSITEIT

TOESTEMMING OM DEEL TE NEEM AAN NAVORSING

RESEARCH TITLE: "Learning to learn through stories – Design-based metacognitive awareness intervention at the intermediate phase."

NAVORSINGSONDERWERP: "LEER MET STORIELEES HOE OM TE LEER"
Geagte Ouer / Voog van leerder

U toestemming word gevra vir u kind se deelname aan 'n navorsingstudie, onder leiding van Suzanne van Aswegen (B.Sc. (Ed), M.A. (Industrial Psychology)), van die Departement Opvoedkundige Sielkunde aan die Universiteit van Stellenbosch. Die studie sal bydra tot doktorale navorsing (PhD).

1. DOEL VAN DIE STUDIE

Die studie ondersoek die aard en ontwikkeling van metakognisie by jong leerders. Om 'n taak uit te voer benodig jy kognisie (verstandelike vermoëns), maar *om te verstaan hoe* jy daardie taak uitvoer, is metakognitiewe kennis en vaardighede nodig. Metakognisie, in eenvoudige terme, is bloot 'om te dink oor hoe jy dink en leer'. Om bewus te wees van *hoe* jy dink soos jy 'n leeropdrag uitvoer en dan om hierdie kennis van jou denk/leerproses te gebruik om wat jy doen (jou gedrag) aktief te reguleer, staan bekend as metakognisie. Navorsing het bewys dat metakognisie noodsaaklik is vir sukses op akademiese gebied en ook op alle fasette van die lewe. 'n Metakognies bewuste leerder gaan strategies te werk om 'n taak te verrig en 'n probleem op te los.

Hierdie studie fokus spesifiek op inhoudsvakleer en die doel van die navorsing is tweeledig: (1) die ontwikkeling van 'n storieleesmetode of leer-intervensie, ("a learning tool in the form of stories") wat metakognisie bevorder, en (2) om die effektiwiteit van die intervensie te bepaal. Met hierdie navorsing gaan ons poog om te kyk of ons leerders in Graad 4 kan help om makliker en beter te kan leer. Ons vra vrae soos 'watter leermetodes (strategieë) gebruik jy as jy 'n stuk lees vir leer' en 'weet jy hoe en wanneer jy sekere leermetodes moet gebruik sodat jy die stuk werk beter kan verstaan en onthou?' Ons het stories geskryf wat gaan oor kinders wat leer hoe om te leer en ons gaan hierdie stories in die klas lees. Daarna gaan ons kyk of die lees van die stories vir hulle gehelp het om beter te weet hoe om met begrip en vir langtermynretensie te leer. Ons fokus is dus om jong leerders te bemagtig om self verantwoordelikheid te neem vir hul studiemetodes en leerprestasies.

2. PROSEDURE

As u kind aan die studie deelneem, sal van hom/haar gevra word om die volgende te doen:

1. 'n Vraelys (Lees vir Leer-Vraelys) te voltooi wat kennis van metakognitiewe strategie-gebruik toets,
2. 'n Leesstuk deur te werk,
3. Dan vrae te beantwoord oor wat hy/sy gedink en gedoen het voor, tydens en nadat hy/sy die leesstuk deurgewerk het (Geskrewe self-refleksieblad).
4. 'n Kort begripstoets te beantwoord oor die leesstuk wat deurgewerk is.

5. ‘n Individuele onderhoud met die navorser te voer, waartydens vrae gevra sal word oor sy/haar eie metakognitiewe strategiekennis.

Bogenoemde prosedure sal na afloop van die intervensie herhaal word. Die intervensie behels die voorlees van kort stories oor Abel, sy suster Annabel en hul vriende wat leer hoe om te leer. In die stories word die leerproses in eenvoudige terme bespreek en Abel vertel watter strategieë werk en waarom. Hierdie stories gaan vir 6 weke elke oggend vir sowat 15 minute gelees word, met reflektiewe groepsbespreking en inoefening van tegnieke. Alle klasse het elke oggend normaalweg tyd vir informele lees en dus sal geen ekstra tyd benodig word vir die intervensie nie. Die navorsing word beplan vir die derde kwartaal van 2012.

3. MOONTLIKE RISIKO’S EN ONGEMAK

Niks nadeligs kan met u kind gebeur as hy/sy deelneem aan die navorsing nie. Sy/haar klaspunte sal geensins beïnvloed word deur hoe die vrae tydens die ondersoek beantwoord word nie en dan gaan ons ook so ver moontlik dit tydens normale klasperiodes doen, wat geen ekstra werk vir hulle inhou nie.

4. MOONTLIKE VOORDELE VIR DEELNAME

Die stories is spesiaal vir kinders tussen 9- en 12-jarige ouderdom geskryf en ons weet uit vorige navorsing dat die strategieë waarvan hul gaan leer vir leerders kan help om beter te leer en skoolwerk makliker te verstaan. As hulle die dinge waarvan hul in die stories gaan lees in die toekoms inoefen, sal hul heel moontlik ook al hoe beter presteer. Om deel te neem aan die navorsing is dus potensieel voordelig. Na afloop van die studie word beplan om die stories te vertaal en wyer beskikbaar te stel. Die navorsingsideaal is om ‘n praktiese, bewysgebaseerde ‘leer-hulpmiddel” daar te stel wat leerders op ‘n vroeë ouderdom, ongeag hul opvoedingsomstandighede, sal aanmoedig om van onafhanklike leerbeginsels en effektiewe strategieë kennis te neem en in te oefen, ten einde langtermynsukses te smaak.

5. BETALING VIR DEELNAME

Geen betaling vir deelname sal deur enigiemand betrokke by die studie ontvang word nie.

6. VERTROULIKHEID

Enige informasie wat deur die studie bekom word en wat betrekking het op individuele deelnemers sal konfidensieël hanteer word. Deur van kodering gebruik te maak sal daar ook geen direkte verwysing na enige spesifieke persoon of institusie in die verslaggewing van die navorsing wees nie. Die klasjuffrou sal direk by die navorsingstudie betrokke wees en derhalwe ook toegang hê tot die data. Die data word ook met die studieleiers bespreek. Ouers kan versoek om na afloop van die studie hul eie kinders se resultate op die meetinstrumente met die navorser of juffrou te kom bespreek. Data sal gestoor word op ‘n veilige plek en geen ongemagtige persone sal toegang tot die data verkry nie. Verdere data vanuit rekords, naamlik leesvaardigheid en gemiddelde prestasie punte, sal benodig word vir interpretasie doeleindes en hiermee word formeel toestemming van u as ouer /voog gevra om hierdie data te bekom. Ook hierdie data sal met konfidensialiteit hanteer word, soos al die ander data.

7. STAKING VAN DEELNAME

Die volle Graad 4 IB klas van 2012, van [redacted], saam met hul klasjuffrou, sal betrokke wees by die studie. Daar is ‘n totaal van 28 leerders betrokke. Dit staan egter u kind vry om nie deel te neem aan die studie nie. Deelname is vrywillig van aard en onttrekking aan die studie sal geen nadelige gevolge hê nie. Indien u kind sekere vrae nie wil beantwoord nie, kan u kind so doen en steeds in die studiegroep bly. Die navorser het ook die reg om u kind aan die studie te onttrek indien die omstandighede dit vereis, byvoorbeeld a.g.v. onvoorsiene afwesigheid. Die navorser behou ook die reg voor om die studie in geheel te onttrek.

8. IDENTIFIKASIE VAN NAVORSERS

Indien u enige navrae oor die navorsing het, word u versoek om die volgende persone te kontak:

Suzanne van Aswegen (navorser) [redacted]
[redacted] *(klasonderwyseres)* [redacted]

Studieleiers – departement Opvoedkundige Sielkunde:
Prof E Swart
Dr M Oswald

9. WETLIKE REGTE VAN NAVORSINGSDEELNEMERS

U mag te enige tyd u toestemming terugtrek en u kind mag deelname sonder enige benadeling staak. Geen wetlike regte, eise of voordele sal a.g.v. u deelname opgesê word nie. Indien u enige navrae oor u of u kind se regte as navorsingsdeelnemer het, kontak gerus Me. Maléne Fouché by die Afdeling vir Navorsingsontwikkeling [mfouche@sun.ac.za; 021 808 4622].

HANDTEKENING VAN OUER/VOOG OF REGSVERTEENWOORDIGER

Ek, ________________________________, as ouer/voog van __________________________ (naam van deelnemer) het bogaande informasie deurgelees en verstaan wat ek gelees het. Ek is ook die geleentheid gegee om enige vrae te vra waaroor ek nog onseker mag wees en hierdie vrae is bevredigend beantwoord.

Ek gee hiermee vrywillig toestemming dat my kind aan die betrokke studie mag deelneem. Daar is 'n kopie van hierdie vorm aan my verskaf.

____ ______________________
Handtekening van Ouer / Voog **Datum**

____ ______________________
Handtekening van Navorser **Datum**

ADDENDUM G – Read-to-Learn Questionnaire (RLQ)

Naam: ______________________ Datum: ______________________

LEES VIR LEER VRAELYS (LLV):

Instruksies: Dink aan dinge wat jy kan doen om 'n leesstuk beter te verstaan as jy dit leer. Besluit dan watter een van die drie keuses vir jou persoonlik die meeste sal help. Daar is geen reg of verkeerde antwoord nie. Merk asseblief die blok wat jy kies met 'n X.

1. **VOORDAT** ek begin lees, is dit 'n goeie idee om:

A. Te besluit hoe lank dit my sal neem om die inhoud te lees.	B. Vlugtig na die inhoud te kyk vir moeilike woorde wat ek nie ken nie.	C. Te voorspel waaroor die inhoud gaan en wat ek verwag om te leer.

2. VOORDAT ek begin lees, is dit 'n goeie idee om:

A. Vrae uit te dink oor die onderwerp, sodat ek kan kyk of ek dit later kan beantwoord.	B. 'n Lys van moeilike en onbekende woorde te maak.	C. Te dink vir wie ek sal vra vir hulp as ek sou vashaak of iets nie verstaan nie.

3. VOORDAT ek begin lees, is dit 'n goeie idee om:

A. Nie tyd te mors nie en dadelik te begin lees, want dan weet ek waaroor die leesstuk gaan.	B. Te dink aan wat ek reeds weet van die onderwerp waaroor ek gaan lees.	C. Seker te maak dat ek al die woorde reg kan uitspreek voordat ek begin lees.

4. VOORDAT ek begin lees, is dit 'n goeie idee om:

A. Vir iemand anders te vra waaroor die teks gaan.	B. Seker te maak dat ek die inhoud verstaan.	C. Te dink waarom ek die stuk lees. Wat is my doel?

5. VOORDAT ek begin lees, is dit 'n goeie idee om:

A. Die opskrifte en prentjies te gebruik om te dink waaroor ek gaan lees.	B. Die woorde wat ek nie ken nie, te klank totdat dit sin maak..	C. Te oefen om die teks hardop te lees .

6. **TERWYL** ek lees, is dit 'n goeie idee om:

A. Die inhoud baie stadig te lees, sodat ek nie iets belangriks mis nie.	B. Die heeltyd te dink waarom ek die stuk lees en wat ek moet doen om my doel te bereik.	C. Te dink hoe ver ek alreeds gelees het en hoeveel werk daar nog oor is om deur te lees.

7. TERWYL ek lees, is dit 'n goeie idee om:

A. Te stop as ek iets nie verstaan nie en liewers 'n ander leesstuk oor dieselfde onderwerp, wat makliker is, te soek.	B. Terug te gaan na die hoofopskrifte toe en te kyk of dit by die inhoud pas.	C. Gereeld te stop en 'n gedeelte in my eie woorde oor te vertel, sodat ek kan sien of ek dit verstaan.

8. TERWYL ek lees, is dit 'n goeie idee om:

A. Te dink aan wat ek voorspel het waaroor die leesstuk sal gaan en of ek reg was. Ek moet dan verder raai watter inligting nog deel van die inhoud sal wees.	B. Die teks hardop aan iemand anders voor te lees, sodat ek kan seker maak van my uitspraak.	C. Nie deurmekaar te raak met die kennis wat ek alreeds het oor die onderwerp nie en dit waaroor ek nou lees nie.

9. TERWYL ek lees, is dit 'n goeie idee om:

A. Voordurend te dink aan wat ek alreeds oor die onderwerp weet, sodat ek die nuwe kennis met die vorige kennis kan verbind.	B. Altyd teen dieselfde spoed te lees.	C. Nie na die prente en opskrifte te kyk nie, want dit mag my dalk deurmekaar maak en my aandag aftrek.

10. TERWYL ek lees, is dit 'n goeie idee om:

A. Die interessante dele te herhaal en te onthou.	B. Te kyk of ek my vrae oor die onderwerp kan beantwoord en of ek nuwe vrae kan uitdink.	C. Alles wat ek lees oor te skryf op 'n aparte bladsy, sodat ek die inhoud beter sal kan onthou.

11. TERWYL ek lees, is dit 'n goeie idee om:

A. Die moeilike woorde stadig uit te klank.	B. So vinnig as moontlik te probeer lees, sodat ek genoeg tyd sal hê om die stuk weer oor te lees as ek iets nie verstaan nie.	C. Sekere dele weer oor te lees of vooruit te lees, as iets vir my onduidelik is en ek nie verstaan nie.

12. TERWYL ek lees, is dit 'n goeie idee om:

A. Alles te probeer onthou wat ek lees. Alles is ewe belangrik anders sou dit mos nie daar wees nie.	B. Die hoofgedagtes en belangrike feite uit te soek en dit aan te teken op 'n breinkaart of 'n diagram.	C. Daardie dele wat ek nie verstaan nie net te los en te konsentreer op die dele in die leesstuk wat ek verstaan.

13. TERWYL ek lees, is dit 'n goeie idee om:

A. 'n Mooi raam te trek om die leesstuk en die prente in te kleur.	B. Die inligting oor en oor te herhaal en hardop vir myself te sê, want ek onthou dan beter.	C. Prentjies in my kop te maak of my te verbeel ek kyk na 'n fliek van wat ek gelees het, sodat ek beter sal verstaan en onthou.

14. TERWYL ek lees, is dit 'n goeie idee om:

A. As ek op 'n woord af kom wat ek nie ken nie, weer die sin of paragraaf oor te lees, en die woorde	B. Nie vir hulp te vra nie, want dan sal ek nooit leer hoe om op my eie te lees en te leer nie.	C. Iemand anders te vra om vir my die stuk voor te lees..

rondom die onbekende woord te gebruik om sy betekenis uit te werk.		

15. **NADAT** ek gelees het, is dit 'n goeie idee om:

A. Die dele wat ek die meeste van gehou het, te onderstreep.	B. Te dink oor hoe interessant of vervelig die leesstuk was.	C. Te dink aan die rede waarom ek die stuk gelees het en of ek verstaan wat ek gelees het.

16. NADAT ek gelees het, is dit 'n goeie idee om:

A. Die hoofgedagtes en punte oor te vertel en neer te skryf in my eie woorde, om te kyk of ek verstaan.	B. Die leesstuk weer saggies te lees en veral klem te lê op die interessante dele.	C. Te kyk watter dele van die leesstuk is die langste en bevat die meeste feite.

17. NADAT ek gelees het, is dit 'n goeie idee om:

A. Te dink oor ander onderwerpe wat ek ook meer van wil leer.	B. Te dink aan wat ek verwag het om van te lees voor ek begin lees het en of ek al die inligting gekry het wat ek voorspel het ek sou.	C. Die moeilike woorde en dié wat ek nie kon uitspreek nie, te omkring.

18. NADAT ek gelees het, is dit 'n goeie idee om:

A. Te dink oor wat ek reeds geweet het toe ek begin lees het en watter nuwe kennis ek nou bygeleer het.	B. 'n Vriend te vra watter dele in die teks vir hom/haar.te lekkerste was om van te lees.	C. Die stuk weer oor en oor en oor te lees, selfs die dele wat ek nie goed verstaan nie.

19. NADAT ek gelees het, is dit 'n goeie idee om:

A. Iemand te vra om my te help dink aan 'n beter opskrif vir die leesstuk.	B. My gedagtes te orden deur 'n breinkaart te teken of 'n lys te maak van die hoofpunte, en dan te kyk hoeveel feite ek van elke punt onthou.	C. Die stuk oor te lees om seker te maak ek het nie 'n deel uitgelos nie.

20. NADAT ek gelees het, is dit 'n goeie idee om:

A. Verskillende kleure penne te gebruik om die verskillende dele in die teks te onderstreep.	B. Seker te maak dat ek die vrae wat ek in my kop gehad het terwyl ek die stuk deur gelees het, kan beantwoord en te dink aan nog vrae, noudat ek klaar gelees het.	C. Slegs die eerste en laaste sinne van elke paragraaf oor te lees, want dit gaan my help om die inhoud te onthou.

Name: ______________________ Date: ______________________

READ TO LEARN QUESTIONNAIRE (RLQ):

Directions: Think about what kinds of things you can do that will help you to understand something that you read better. Then decide which one of the three suggestions would help you personally the most. There is no right or wrong answers. Please make an X in the block you choose.

1. **BEFORE** I begin reading, it's a good idea to:

A. Decide how long it will take me to read the content.	B. Scan the text for big words I do not know.	C. Make some guesses about what I think the text will be about.

2. BEFORE I begin reading, it's a good idea to:

A. Ask myself questions that I would like to have answered on the topic I'm going to read on.	B. Make a list of the words I'm not sure about in the text.	C. Think about who I can ask for help if I get stuck.

3. BEFORE I begin reading, it's a good idea to:

A. Not waste time and just start reading from the beginning, because then I will know what the work is about.	B. Think of what I already know about the topic I'm going to read on.	C. Make sure I can pronounce all of the words before I start.

4. BEFORE I begin reading, it's a good idea to:

A. Ask someone else to tell you what the text is about.	B. Check to see if the content is making sense.	C. Make sure I know why I'm going to read the text. What is the purpose?

5. BEFORE I begin reading, it's a good idea to:

A. Use the headings and pictures to think about what I will be reading on.	B. Sound out the words I don't know.	C. Practice reading the text aloud.

6. **WHILE** I'm reading, it's a good idea to:

A. Read the content very slowly so that I will not miss any important parts.	B. Keep thinking about why I am reading the content and what I need to do to achieve my purpose/goal.	C. Keep track of how much I still need to read before I'm done.

7. WHILE I'm reading, it's a good idea to:

A. Stop reading if something does not make	B. Go back to the headings to see if the	C. Stop often to retell the main points to see if I understanding the

sense and rather look for another text that is easier to understand.	content matches (is the same as) the headings.	text so far.

8. WHILE I'm reading, it's a good idea to:

A. Check to see if my guesses/ predictions are right and make new ones as I read along.	B. Read the text aloud to someone to check if I read the words correctly.	C. Try not to confuse what I already know with what I'm reading about.

9. WHILE I'm reading, it's a good idea to:

A. Keep thinking about what I already know about the topic, to connect/link the new information with the old.	B. Always read at a constant, steady pace	C. Not look at the pictures or the headings, because they might confuse me.

10. WHILE I'm reading, it's a good idea to:

A. Remember and reread the interesting parts and skip the others.	B. Try to answer the questions I asked myself earlier and formulate new ones as I read.	C. Rewrite everything I read on a separate page, so I will better remember the detail.

11. WHILE I'm reading, it's a good idea to:

A. Sound out all the difficult words to try to pronouns it correctly.	B. Try to read as fast as I can, so I have enough time to reread the text if something is not making sense.	C. Reread some parts or read ahead, if something does not make sense, to see if I can figure out the meaning.

12. WHILE I'm reading, it's a good idea to:

A. Remember all the detail in the text, because everything is important to remember.	B. Identify and understand the main ideas (key concepts) and write them down in a map or diagram.	C. Skip the parts of the text I don't understand and concentrate on what I do.

13. WHILE I'm reading, it's a good idea to:

A. Colour in the pictures and draw a frame around the text	B. Say the detail I read over and over again so I will remember.	C. Imagine a movie or make pictures in my mind of what I read so I will better understand and remember.

14. WHILE I'm reading, it's a good idea to:

A. Reread the sentence and use the words around it to figure out the meaning, when I come	B. Not ask help if I get stuck, because then I will never learn to figure it out on my own.	C. Have someone else read the content aloud to me.

across a word I don't know the meaning of.		

15. **AFTER** I've read the text it's a good idea to:

A. Underline the parts I liked the most.	B. Think about how interesting or boring the text was to read.	C. Think about why I read the text and check to see if I have any more questions on the topic I read about.

16. AFTER I've read the text it's a good idea to:

A. Retell or write down the main points in my own words to check if I understand.	B. Practice reading the text aloud putting emphasis on the good parts.	C. Check which parts of the text is the longest and has the most facts.

17. AFTER I've read the text it's a good idea to:

A. Think about other topics I want to also read about.	B. Think about what I expected to read in the text as I began reading and if it was what I predicted.	C. Circle the big words and the words that I struggled to pronounce.

18. AFTER I've read the text it's a good idea to:

A. Think about what information I already knew in the text and what I learned that I did not know before.	B. Ask a friend what parts of the text he/she enjoyed the most.	C. Read the story again to be sure I said all of the words right.

19. AFTER I've read the text it's a good idea to:

A. Ask someone to help me think about a better heading for the text.	B. Organize my thoughts by drawing a mind map or make a list of the main facts and ideas, and see how much I remember about each heading.	C. Reread the text to check if I have not skipped any important parts.

20. AFTER I've read the text it's a good idea to:

A. Use different coloured pens to underline the different parts.	B. Check if I can answer the questions I thought of as I read through the text and I think of more questions I have now that I've worked through the content.	C. Reread only the first and last sentences of each section, because that will give me a good idea about the content

ADDENDUM H – Comprehension test

<u>LEESSTUK 1 EN BEGRIPSTOETS: HENRY FORD</u> <u>(Bron: Kennis 32; Boekdeel 3; p.552)</u>

Naam en Graad: ______________________________

Beantwoord die volgende vrae op die bladsy. Onthou om jou naam te skryf en lees die vrae sorgvuldig deur voordat jy dit beantwoord. Die toets tel uit 20.

Skryf slegs die ontbrekende woorde / sinne neer:

1. Na sy pa se dood het almal verwag Henry Ford sou ______________________, maar hy het 'n talent gehad vir ___________________ dinge. Op 27 jaar is hy na Detroit om te gaan werk vir _______________________ Company.

   Sy eerste motor kon met 'n snelheid van ___________km/h ry en hy neem aanvanklik (aan die begin) veral in __________________ belang.

   As 'n motor aanmekaargesit word op 'n monteerband, waarop dit van een groep werktuigkundiges na die volgende beweeg, terwyl nuwe onderdele in elke stadium aangebring word, noem ons dit ________________________.

   In sy leeftyd het hy meer as ________ miljoen motors in sy fabrieke geproduseer (gemaak) en alhoewel hy baie ryk was, het hy 'n ____________ lewe gelei. (8)

Verskaf 'n kort antwoord vir die volgende vrae:

2. Henry Ford is in watter land gebore? (1)

   ____

3. Hoe oud het Henry Ford geword? (1)

   ____

4. Wat was die beste eienskap van sy motor? (1)

   ____

5. Watter kleur was die Model T? (1)

   ____

Sê of die volgende sinne waar of onwaar is. As die antwoord onwaar is moet jy die sin verander sodat dit waar is. (2)

6. Die Ford Motor Company is in 1930 gestig en ses jaar later produseer (ontwerp en maak) hy die beroemde Model T.

   ____

   ____

7. Toe die eerste motor baie jare gelede op straat verskyn, het die meeste mense hierdie gedoente met entoesiasme dadelik aanvaar.

   ____

   ____

Die antwoorde vir die volgende vrae moet in vol sinne gegee word. Onthou om ten minste twee feite onder elke vraag te verskaf, want die vrae tel twee punte.

8. Waar en hoe het Henry sy eerste werksondervinding opgedoen? (2)

____

____

____

9. Lys twee karakter eienskappe (geaardheid) van Henry Ford wat van hom so ‘n unieke mens gemaak het en verduidelik hoekom jy so sê. (2)

____

____

____

10. Hoe was Henry se verhouding met sy werkers? Het hulle van hom gehou en wat het hy van hulle verwag? (2)

____

____

____

11. Hoe het die uitbreek van die Eerste Wêreld Oorlog sy werksaamhede beïnvloed? (2)

____

____

____

ANTWOORDSTEL (HENRY FORD LEESSTUK):

1. Na sy pa se dood het almal verwag Henry Ford sou _**gaan boer**______, maar hy het 'n talent gehad vir ___**meganiese**___ dinge. Op 27 jaar is hy na Detroit om te gaan werk vir _**Edison Illuminating**_____ Company.

   Sy eerste motor kon met 'n snelheid van ___**40**__km/h ry en hy neem aanvanklik (aan die begin) veral in __**wedrenne (renmotors)**___ belang.

   As 'n motor aanmekaargesit word op 'n monteerband, waarop dit van een groep werktuigkundiges na die volgende beweeg, terwyl nuwe onderdele in elke stadium aangebring word, noem ons dit __**massaproduksie**___.

   In sy leeftyd het hy meer as ___**35**_____ miljoen motors in sy fabrieke geproduseer (gemaak) en alhoewel hy baie ryk was, het hy 'n _**eenvoudige**_ lewe gelei. (8)

2. Henry Ford is in watter land gebore? (1) **Amerika** (Michigan)____

3. Hoe oud het Henry Ford geword? (1) ______**84**__________

4. Wat was die beste eienskap van sy motor? (1) _**goedkoop genoeg vir almal**_________

5. In watter kleure het die Model T uitgekom? (1) _**net swart**___________________

6. Die Ford Motor Company is in 1930 gestig en ses jaar later produseer (ontwerp, maak) hy die beroemde Model T. **OW, 1903** ______________________________________

7. Toe die eerste motor baie jare gelede op straat verskyn, het die meeste mense hierdie gedoente met entoesiasme dadelik aanvaar.

   OW, met wantroue bejeen; gevaarlik; speeding van rykes?______________

8. Waar en hoe het Henry sy eerste werksondervinding opgedoen? (2)

   Hy het op sy pa se plaas 'n werkswinkel geopen en Hy het by 'n plaaslike ingenieursbedryf gaan werk.

9. Lys twee karakter eienskappe (geaardheid) van Henry Ford wat van hom so 'n unieke mens gemaak het en verduidelik hoekom jy so sê. (2)

   Deursettingsvermoe – aangehou tot hy 'n goedkoper motor gemaak het; Eienaardig – nie van Jode gehou, maar teen die oorlog; eiesinnig – wou altyd sy sin hê; mense moes doen wat hy sê; Vrygewig met werkers gewees; **Intelligent en talentvol;** ______________

10. Hoe was Henry se verhouding met sy werkers? Het hulle van hom gehou en wat het hy van hulle verwag? (2)

    Hy was vrygewig en het hul goed betaal. Hy het belanggestel in sy werkers se lewens. Maar hy het ook verwag dat hy hard sal werk en hy was teen vakbonde.

11. Hoe het die uitbreek van die Eerste Wêreld Oorlog sy werksaamhede beïnvloed? (2)

    Hy het aanvanklik geweier dat hulle sy fabrieke gebruik om oorlogsmateriaal maak, maar later het hy gehelp met vervaardiging van o.m. wapens.

LEESSTUK 2 EN BEGRIPSTOETS: PIKKEWYNE (Bron: Kennis 32; Boekdeel 3; p.532)

Naam en Graad: ___________________________

Beantwoord die volgende vrae op die bladsy. Onthou om jou naam te skryf en lees die vrae sorgvuldig deur voordat jy dit beantwoord. Die toets tel uit 20.

Skryf slegs die ontbrekende woorde neer:

1. Daar is sowat _______________ verskillende pikkewynspesies en nie een van die spesies kan _______________ nie. Hul vlerke word gebruik vir _______________ . Op land lyk pikkewyne maar taamlik _______________, maar in die water beweeg hul baie vinnig en stuur hulself met hul _______________. Hul kan baie hoog uit die water spring en eet __________ en __________. Tydens broeityd kom groot getalle pikkewyne op land byeen en hul broei altyd op _______________ plek. (8)

Verskaf 'n kort antwoord vir die volgende vrae:

2. Hoe lank vat dit vir die eiers om uit tebroei? (1)

    ____

3. Hoeveel eiers lê die wyfie? (1)

    ____

4. Wie sorg vir die eiers en kleintjies? (1)

    ____

5. Buiten Suid-Afrika, noem 'n land waar pikkewyne volop voorkom. (1)

    ____

Sê of die volgende sinne waar of onwaar is. As die antwoord onwaar is moet jy die sin verander sodat dit waar is. (2)

6. Pikkewyne jag hul kos op land en in die see.

    ____

    ____

7. Pikkewyne maak nooit 'n nes, voordat hul hul eiers daarin lê nie.

    ____

    ____

Die antwoorde vir die volgende vrae moet in vol sinne gegee word. Onthou om ten minste twee feite onder elke vraag te verskaf, want die vrae tel twee punte.

8. Pikkewyne kom net in die Suidelike Halfrond (Antarktiese streek) voor. Waarom kom hulle nie in die Arktiese streke (Noordelike gebiede) voor nie? (2)

____

____

____

____

9. Lys twee karakter eienskappe (geaardheid) van pikkewyne wat van hulle sulke unieke voëls maak. (2)

____

____

____

____

10. Noem twee natuurlike vyande van pikkewyne. (2)

____

____

____

____

11. Hoe reageer pikkewyne teenoor mense en waarom? (2)

____

____

____

____

ANTWOORDSTEL (PIKKEWYNE LEESSTUK):__

1. Daar is sowat _**17**____________ verskillende pikkewynspesies en nie een van die spesies kan _______**vlieg**___ nie. Hul vlerke word gebruik vir __**swem**_________ .

   Op land lyk pikkewyne maar taamlik _**lomp / hulpeloos**_, maar in die water beweeg hul baie vinnig en stuur hulself met hul _ _______**pote**___.

   Hul kan baie hoog uit die water spring en eet ____**vis**___ en __**tjokka / skaaldiere**_____. Tydens broeityd kom groot getalle pikkewyne op land byeen en hul broei altyd op ____**dieselfde**___ plek. (8)

2. Hoe lank vat dit vir die eiers om uit tebroei? (1)

   __Tussen 33 en 63 dae / tussen 1 of 2 maande_____

3. Hoeveel eiers lê die wyfie? (1) __**Een of twee eiers**______________

4. Wie sorg vir die eiers en kleintjies? (1) __**Albei ouers / die wyfie en mannetjie**________

5. Buiten Suid-Afrika, noem een ander land waar pikkewyne volop voorkom. (1)

   _Mosambiek / Australië / Ooskus van Suid-Amerika / Nieu-Seeland / Galapagos-eilande / enige verder land wat nie in stuk na verwys word nie, maar wat wel korrek is ____

6. Pikkewyne jag hul kos op land en in die see.

   Onwaar; Pikkewyne jag slegs in die see. (1)

7. Pikkewyne maak nooit ‘n nes, voordat hul hul eiers daarin lê nie. (1)

   Onwaar; Sommige pikkewyne maak ‘n nes, terwyl ander sommer net in ‘n holte in die grond hul eiers lê.

8. Pikkewyne kom net in die Suidelike Halfrond (Antarktiese streek) voor. Waarom kom hulle nie in die in die Arktiese streke (Noordelike gebiede) voor nie? (2)

   In die Arktiese gebiede is daar groot landdiere soos jakkalse en ysbere (roofdiere),

   wat broei op land onmoontlik maak.

9. Lys twee karakter eienskappe (geaardheid) van pikkewyne wat hulle sulke unieke voels maak. (2)

   Nuuskierig; sosiaal

10. Noem twee natuurlike vyande van pikkewyne. (2)

    Haaie; moordenaarwalvisse / luipertrobbe

11. Hoe reageer pikkewyne teenoor mense en waarom? (2)

    Hul sien nie mense as gevaarlik nie (nie bang vir mense nie),

    Want hul het geen aangebore vrees vir enige landdier nie.

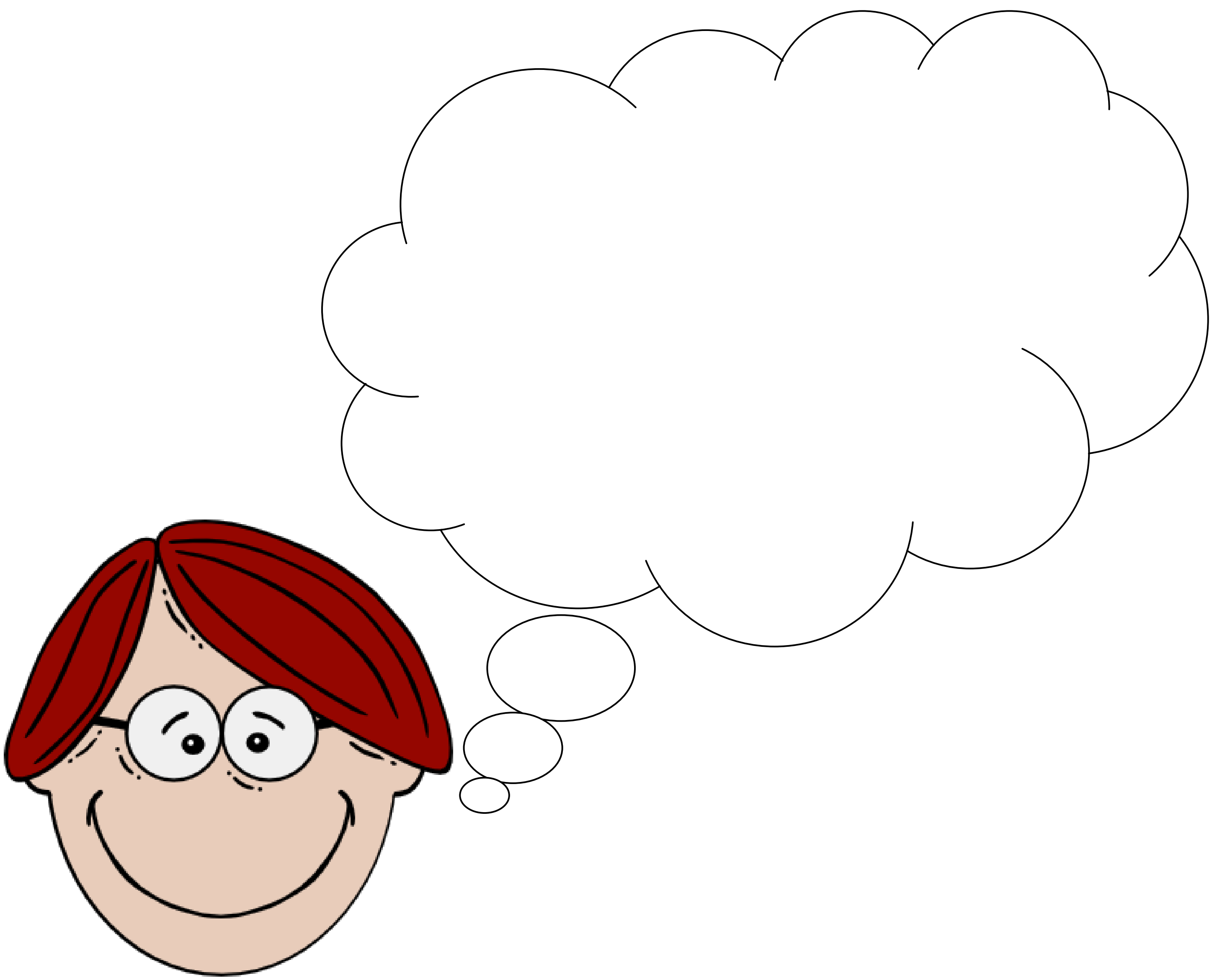
ADDENDUM I – Written self-reflection tasks

WRITTEN SELF-REFLECTION TASK / GESKREWE SELF-REFLEKSIE TAAK:

Juffrou het vir jou 'n leesstuk uitgedeel en verduidelik dat julle dit moet **leer**. Jy moet dit deurwerk en dan gaan sy jou begrip toets. Sy gaan toets of jy verstaan wat jy gelees het en of jy die belangrike punte in die stuk kan onthou.

Voordat jy begin lees om te leer, wat **dink** jy?

Skryf in die wolkie wat in jou kop aangaan. Sê hoe jy voel en wat jy doen en waaraan jy dink, as jy gereedmaak om die opdrag uit te voer.

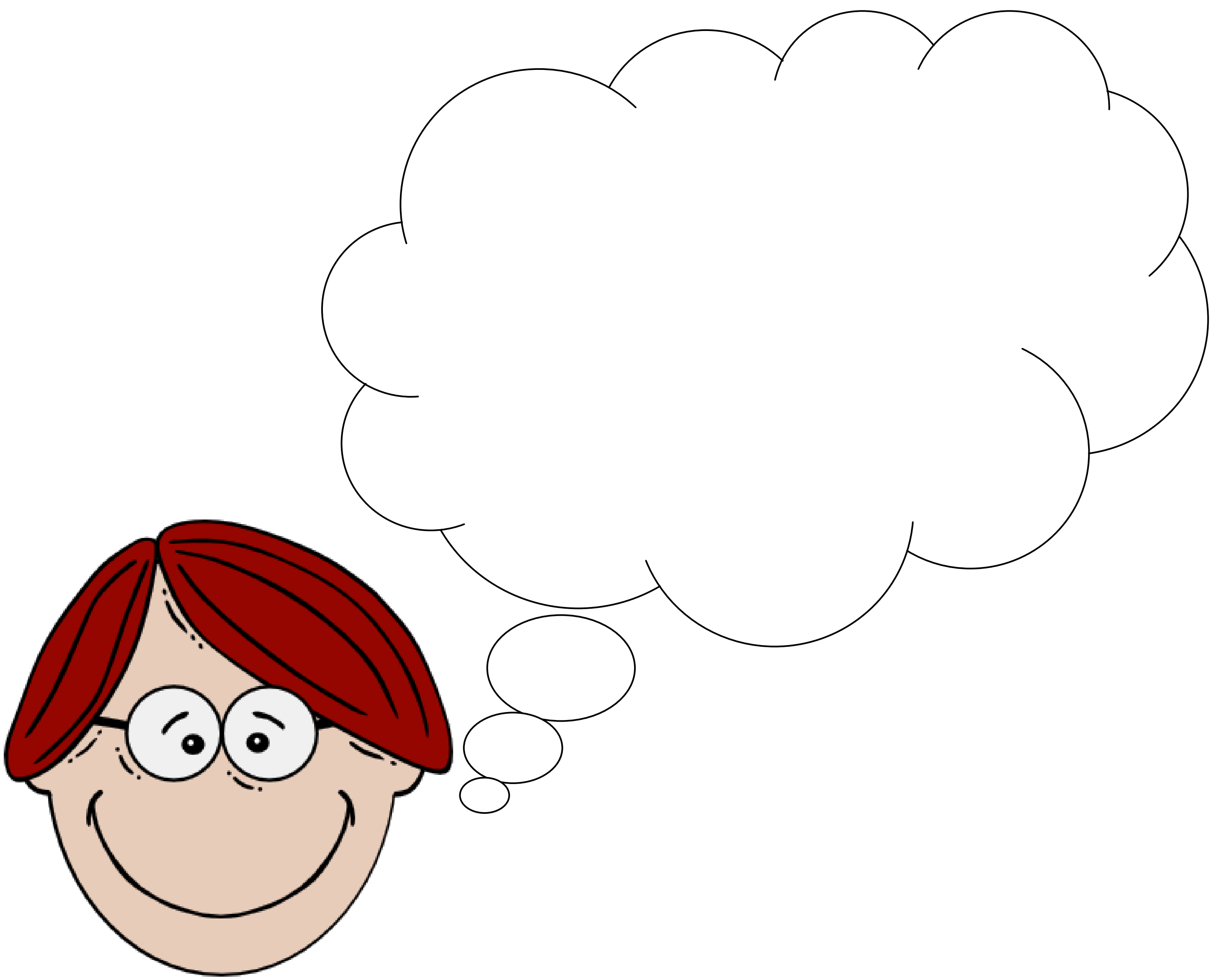


WRITTEN SELF-REFLECTION TASK / GESKREWE SELF-REFLEKSIE TAAK:

Juffrou het vir jou 'n leesstuk uitgedeel en verduidelik dat julle dit moet **leer**. Jy moet dit deurwerk en dan gaan sy jou begrip toets. Sy gaan toets of jy verstaan wat jy gelees het en of jy die belangrike punte in die stuk kan onthou.

Terwyl jy lees om te leer, wat **dink** jy?

Skryf in die wolkie wat in jou kop aangaan. Sê hoe jy voel en wat jy doen en waaraan jy dink, terwyl jy die opdrag uitvoer. Verduidelik **hoe** jy leer.

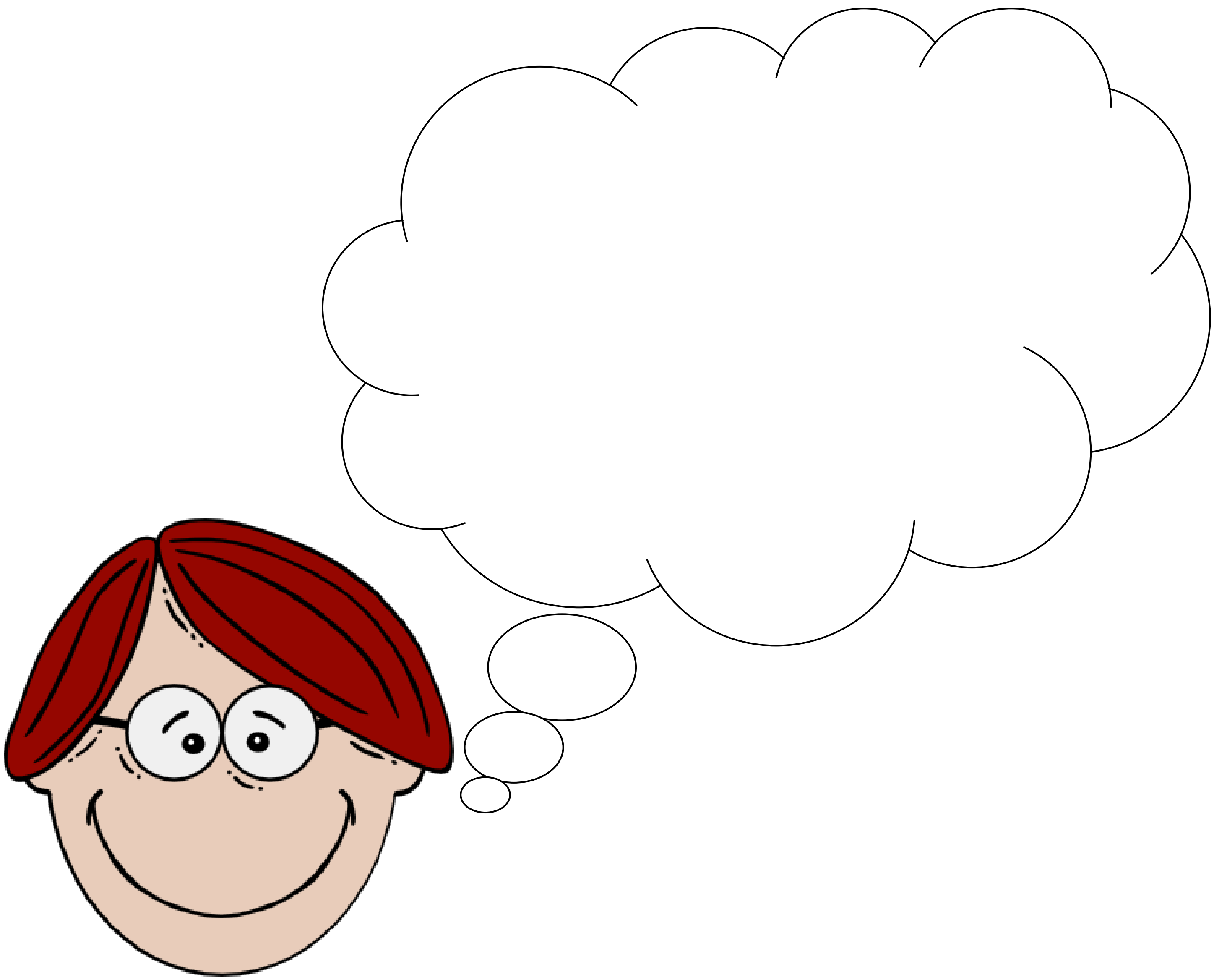


WRITTEN SELF-REFLECTION TASK / GESKREWE SELF-REFLEKSIE TAAK:

Juffrou het vir jou 'n leesstuk uitgedeel en verduidelik dat julle dit moet **leer**. Jy moet dit deurwerk en dan gaan sy jou begrip toets. Sy gaan toets of jy verstaan wat jy gelees het en of jy die belangrike punte in die stuk kan onthou.

Nadat jy gelees het om te leer, wat **dink** jy?

Skryf in die wolkie wat in jou kop aangaan. Sê hoe jy voel en wat jy doen en waaraan jy dink, as jy die opdrag uitvoer. Verduidelik **hoe** jy leer.



ADDENDUM J – Learner interview schedule

ONDERHOUDSVRAE – LEERDERS (INTERVIEW SCHEDULE – LEARNERS)

1) Het jy onlangs goed gedoen in 'n toets of weet jy van iemand wat baie goeie punte kry in toetse? Waarom het jy goed gedoen of waarom dink jy doen daardie maatjie altyd goed?

2) Vertel vir my van jouself as leerder: Hou jy van leerwerk (studeer) en hoekom?

3) Wat was die moeilikste vir jou van die leesstuk wat jy moes leer?

4) Toe juffrou vir jou die opdrag gee, wat het jy heel eerste gedoen of gedink toe die leesstuk uitgedeel is (voordat jy begin lees het)?

5) Terwyl jy gelees het en besig was om te leer, wat het jy gedoen (watter metodes / strategiee) om die werk beter te verstaan en te onthou vir die toets?

6) Was daar woorde of dele in die leesstuk wat jy nie verstaan het nie? Wat het jy toegedoen / wat kan jy in die toekoms doen as jy weer vashaak?

7) Nadat jy die stuk deurgelees het, wat het jy toe gedoen of gedink?

8) Hoe weet 'n mens of jy die werk goed genoeg ken vir 'n toets?

ADDENDUM K – Focus group interview (transcript)

FOCUS GROUP INTERVIEWS (*before* intervention) – School A (high-achieving group)
1) Het jy onlangs goed gedoen in 'n toets of weet jy van iemand wat baie goeie punte kry in toetse? Waarom het jy goed gedoen of waarom dink jy doen daardie maatjie altyd goed?
Ek het goed geleer [Wat beten dit?] *… gelees. Ek onthou in my brein. Ek het goed geleer…* [Wanneer doen 'n mens goed?] *ja, as ek baie hard leer… Hy het sy boeke huistoe gevat en geleer en dan onthou hy in sy kop. Hy maak 'n brein kaart* [Dink jy dit het gehelp?] *Ja…*
2) Vertel vir my van jouself as leerder: Hou jy van leerwerk (studeer) en hoekom?
Ja, dis lekker.. jy leer nuwe goeters wat jy in die lewe kan gebruik.. en soos nuwe woorde. [So, dis vir jou lekker?] *Ja… partykeer.. jy leer nuwe goed. Daars sekere goed waarvan ek hou soos woordsomme… dis lekker…* [So dis vir jou altyd lekker?] *Nee… wanneer daar vyf bladsye van woorde is om te leer* [Wanneer dit te veel is?] *Ja…*
3) Wat was die moeilikste vir jou van die leesstuk wat jy moes leer?
Nee… maar van die woorde was moeilik… Hy't na Detroit gegaan [sommige woorde is moeilik?...]
4) Toe juffrou vir jou die opdrag gee, wat het jy heel eerste gedoen of gedink toe die leesstuk uitgedeel is (voordat jy begin lees het)?
Weet nie… Ek was opgewonde om dit te lees… ek dink ek het al gehoor van Henry Ford.. Toe ek die woorde Henry Ford sien toe weet ek dit gaan oor Ford [en wat het jy eerste aan gedink?] *.. die kar.. ja, die Ford kar* [Het jul al van Ford geleer?] *Nee… Ja geweet…*
5) Terwyl jy gelees het en besig was om te leer, wat het jy gedoen (watter metodes / strategiee) om die werk beter te verstaan en te onthou vir die toets?
Eers gelees – eers deurgelees en dan soek ek vir die moeilike woorde en dan probeer ek dit verstaan en dan lees ek dit weer met die woorde wat ek nou beter verstaan [ok.. so almal van julle het dit gelees?] *Ja…* [en terwyl jul aan gelees het, wat het jul gedink… kop aangegaan] *My verstand gaan toe as ek lees.* [So net gelees?] *Al daai informasie gaan net na my kop toe…*
6) Was daar woorde of dele in die leesstuk wat jy nie verstaan het nie? Wat het jy toe gedoen / wat kan jy in die toekoms doen as jy weer vashaak?
Ons onderstreep dit.. die moeilike woorde..Hoekom? Want dis belangrik? [Wat doen jul dan?] *Ons gaan vra vir 'n ouer…* [het jul rerig toe gevra?] *nee…*
7) Nadat jy die stuk deurgelees het, wat het jy toe gedoen of gedink?

Toe lees ons dit weer… om te verstaan.. het vir myself soos hoofpunte gekry [wat is dit?]Dis soos hier staan 'n stukkie waar hy in die oorlog was en daar waar hy sy eerste kar gebou het… opsommings gemaak [hoeveel keer het jul dit deurgelees?] Baie keer.
8) Hoe weet 'n mens of jy die werk goed genoeg ken vir 'n toets?
Jy kan vir jouself dit opsê… in jou kop. Jy kan jou ma vra om jou te vra… jy glo in jouself… Iemand vra vir jou vrae en dan moet jy dit onthou. [wie vra vrae?] Mamma… of ek self. [vra Mamma altyd vir jou?] Nie Wiskunde nie.. [en hierdie keer se toets?] Niemand het ons gevra nie… [Was jul voorbereid?] (kyk onseker na mekaar.) Ja… [So sê vir my, as jou Ma nie daar is om vrae te vra nie, hoe weet jy jy's reg om toets te skryf?] As jy goed geleer het en jy vra jouself vrae… en jy skryf dit neer op 'n bladsy… Jy maak 'n breinkaart…

ADDENDUM L – Data sets

QUANTITATIVE DATA FOR SCHOOL A

COMPREHENSION TEST

Total	20	20	
School A	**Test 1**	**Test 2**	**Diff**
K 01	7	9.5	2.5
K 02	3.5	14.5	11
K 03	4	17	13
K 04	4.5	13.5	9
K 05	1.5	9	7.5
K 06	7	18	11
K 07	2.5	17	14.5
K 08	4.5	16	11.5
K 09	11	15	4
K 10	4	17	13
K 11	5	11	6
K 12	5	12	7
K 13	12.5	18	5.5
K 14	3	18	15
K 15	5	16	11
K 16	5	14	9
K 17	6.5	11.5	5
K 18	1.5	10	8.5
K 19	10.5	14.5	4
K 20	8	16.5	8.5
K 21	1.5	11	9.5
K 22		16.5	16.5
K 23	5.5	18	12.5
K 24	10.5	14	3.5
K 25	7.5	14.5	7
K 26	6.5	13	6.5
K 27	3	12	9
Sum	**146**	**387**	
Average	5.6	14.3	
Ave %	28.1%	71.7%	
Adjusted Total	**146**	**370.5**	
Adj Average	**5.6**	**14.3**	
Adj Ave %	**28.1%**	**71.3%**	
Adj. n	26	26	

QUESTIONAIRE

	RLQ 1							**RLQ 2**							**RLQ 2 - RLQ1**	
Total	4	3	3	3	5	2	**20**	4	3	3	3	5	2	**20**		
School A	**P/V**	**Que**	**PK**	**Pur**	**S/MI**	**FU**	**Total**	**P/V**	**Que**	**PK**	**Pur**	**S/MI**	**FU**	**Total**	**Diff**	**Diff %**
K 01	2	2	2	2	2	2	**12**	3	0	3	2	2	1	**11**	-1	-8.3%
K 02	1	2	0	2	2	1	**8**	1	0	2	1	4	1	**9**	1	12.5%
K 03	1	3	0	0	3	1	**8**	4	3	3	1	4	1	**16**	8	100.0%
K 04	1	1	1	0	4	1	**8**	1	2	3	3	4	1	**14**	6	75.0%
K 05	1	2	1	1	4	1	**10**	2	1	1	1	5	1	**11**	1	10.0%
K 06	1	0	0	1	3	1	**6**	2	3	3	3	4	1	**16**	10	166.7%
K 07	1	1	0	0	1	1	**4**	3	2	2	0	2	1	**10**	6	150.0%
K 08	0	2	1	1	3	1	**8**	2	1	2	2	2	1	**10**	2	25.0%
K 09	1	1	1	2	4	0	**9**	2	1	2	3	3	1	**12**	3	33.3%
K 10	2	0	0	0	2	1	**5**	1	1	1	1	2	1	**7**	2	40.0%
K 11	2	1	2	1	3	1	**10**	2	1	3	1	2	1	**10**	0	0.0%
K 12	2	0	0	0	5	1	**8**	3	2	2	2	2	0	**11**	3	37.5%
K 13	0	2	1	0	1	2	**6**	3	3	2	1	4	2	**15**	9	150.0%
K 14	1	2	1	1	4	1	**10**	4	3	3	1	3	2	**16**	6	60.0%
K 15	1	0	2	1	4	2	**10**	2	2	1	1	4	1	**11**	1	10.0%
K 16	1	2	1	1	3	1	**9**	0	1	2	2	3	1	**9**	0	0.0%
K 17	1	1	2	1	2	1	**8**	2	1	2	1	2	2	**10**	2	25.0%
K 18	1	1	2	0	2	2	**8**	0	1	1	0	2	0	**4**	-4	-50.0%
K 19	1	1	1	2	4	0	**9**	2	1	3	2	4	2	**14**	5	55.6%
K 20	2	1	2	0	2	0	**7**	2	3	3	2	3	2	**15**	8	114.3%
K 21	1	0	0	0	1	0	**2**	1	1	1	2	2	1	**8**	6	300.0%
K 22	3	2	2	0	2	1	**10**	4	3	1	1	3	2	**14**	4	40.0%
K 23	2	0	1	2	5	0	**10**	3	2	3	3	5	1	**17**	7	70.0%
K 24	3	1	0	2	5	0	**11**	2	3	3	3	5	1	**17**	6	54.5%
K 25	1	2	1	1	3	2	**10**	3	3	3	3	5	1	**18**	8	80.0%
K 26	3	1	1	3	2	2	**12**	1	1	2	1	5	0	**10**	-2	-16.7%
K 27	3	1	1	1	2	1	**9**	1	0	1	0	5	0	**7**	-2	-22.2%
Sum	**39**	**32**	**26**	**25**	**78**	**27**	**227**	**56**	**45**	**58**	**43**	**91**	**29**	**322**		
Average	**1.4**	**1.2**	**1.0**	**0.9**	**2.9**	**1.0**	**8.4**	**2.1**	**1.7**	**2.1**	**1.6**	**3.4**	**1.1**	**11.9**		
n	27	27	27	27	27	27	27	27	27	27	27	27	27	27		

RLQ 1	**36.1%**	**39.5%**	**32.1%**	**30.9%**	**57.8%**	**50.0%**	**42.0%**	**51.9%**	**55.6%**	**71.6%**	**53.1%**	**67.4%**	**53.7%**	**59.6%**
RLQ 2	**51.9%**	**55.6%**	**71.6%**	**53.1%**	**67.4%**	**53.7%**	**59.6%**							
Diff	15.7%	16.0%	39.5%	22.2%	9.6%	3.7%	17.6%							

QUANTITATIVE DATA FOR SCHOOL B

Total	20	20	
School B	**Test 1**	**Test 2**	**Diff**
V 01	0	2	2
V 02			0
V 03		15.5	15.5
V 04	4.5	16	11.5
V 05	3	6	3
V 06	6	12	6
V 07	0	0	0
V 08	0	2.5	2.5
V 09		1.5	1.5
V 10	1.5	7.5	6
V 11	4	14	10
V 12	0		0
V 13		0	0
V 14	7.5	18	10.5
V 15		10	10
V 16	3	5.5	2.5
V 17	4.5	6.5	2
V 18	0	4.5	4.5
V 19	9	6	-3
V 20	7.5	17	9.5
V 21	2.5	5	2.5
V 22	3	6.5	3.5
V 23		2.5	2.5
V 24	2.5	4.5	2
V 25	4.5	13	8.5
V 26	1	6.5	5.5
V 27		8	8
V 28		1.5	1.5
V 29	6.5	12.5	6
V 30	4.5	13	8.5
V 31	1.5	10.5	9
V 32		0	0
V 33	3.5	9.5	6
Sum	**80**	**237.5**	**157.5**
Average	3.3	7.7	
Ave %	16.7%	38.3%	
Adjusted Total	**80**	**198.5**	
Adj Average	**3.5**	**8.6**	
Adj Ave %	**17.4%**	**43.2%**	
Adj. n	**23**	**23**	

	RLQ 1							**RLQ 2**							**RLQ 2 - RLQ1**	
Total	4	3	3	3	5	2	**20**	4	3	3	3	5	2	**20**		
School B	**P/V**	**Que**	**PK**	**Pur**	**S/MI**	**FU**	**Total**	**P/V**	**Que**	**PK**	**Pur**	**S/MI**	**FU**	**Total**	**Diff**	**Diff %**
V 01								2	0	1	0	0	0	**3**	3	
V 02														**0**	0	
V 03								4	1	1	1	4	1	**12**	12	
V 04	1	2	1	1	2	0	**7**	1	2	1	1	3	1	**9**	2	28.6%
V 05	1	0	0	1	1	0	**3**	1	0	1	1	0	1	**4**	1	33.3%
V 06	0	0	0	1	1	0	**2**	2	1	2	1	3	1	**10**	8	400.0%
V 07	2	1	1	0	0	0	**4**	4	3	3	0	0	0	**10**	6	150.0%
V 08							**0**	2	1	1	1	0	0	**5**	5	
V 09	1	1	1	0	3	1	**7**	3	2	0	0	0	2	**7**	0	0.0%
V 10	0	1	0	0	3	1	**5**	1	1	0	2	1	1	**6**	1	20.0%
V 11	0	0	0	0	0	0	**0**	2	1	2	2	3	1	**11**	11	
V 12	0	1	0	0	0	0	**1**	1	0	1	1	3	0	**6**	5	500.0%
V 13	0	0	0	0	0	0	**0**	1	0	0	2	2	0	**5**	5	
V 14	0	1	0	0	2	0	**3**	1	1	2	0	3	0	**7**	4	133.3%
V 15	0	0	0	1	2	0	**3**	1	1	0	0	0	1	**3**	0	0.0%
V 16	1	2	1	1	1	1	**7**	1	0	1	1	0	1	**4**	-3	-42.9%
V 17	1	0	0	1	0	1	**3**	2	2	1	0	1	1	**7**	4	133.3%
V 18	1	2	1	2	2	0	**8**	0	2	0	2	1	0	**5**	-3	-37.5%
V 19	0	0	0	1	2	0	**3**	2	1	1	1	3	1	**9**	6	200.0%
V 20	0	0	0	1	2	0	**3**	2	1	1	1	2	1	**8**	5	166.7%
V 21	0	1	0	1	2	0	**4**	3	3	2	0	0	0	**8**	4	100.0%
V 22	0	1	1	0	2	0	**4**	3	2	1	1	1	1	**9**	5	125.0%
V 23	1	0	0	2	0	0	**3**	1	1	1	1	2	0	**6**	3	100.0%
V 24	0	0	0	2	2	0	**4**	0	0	1	2	1	0	**4**	0	0.0%
V 25	0	1	0	1	0	0	**2**	1	2	2	2	1	0	**8**	6	300.0%
V 26	0	0	0	0	0	0	**0**	3	0	0	1	1	0	**5**	5	
V 27	2	3	2	0	1	0	**8**	3	1	1	2	3	1	**11**	3	37.5%
V 28	1	1	1	0	1	1	**5**	3	1	0	1	0	1	**6**	1	20.0%
V 29	0	1	0	0	2	2	**5**	1	1	2	0	3	0	**7**	2	40.0%
V 30								0	0	0	0	0	0	**0**	0	
V 31	0	1	3	0	1	1	**6**	0	0	1	0	3	0	**4**	-2	-33.3%
V 32	0	0	0	0	0	0	**0**	3	1	1	0	3	1	**9**	9	
V 33	0	0	0	0	0	0	**0**	1	1	0	1	1	2	**6**	6	
Sum	**12**	**20**	**12**	**16**	**32**	**8**	**100**	**55**	**33**	**31**	**28**	**48**	**19**	**214**		
Average	0.4	0.7	0.4	0.6	1.1	0.3	3.4	1.7	1.0	1.0	0.9	1.5	0.6	6.5		
Ave %	10.7%	23.8%	14.3%	19.0%	22.9%	14.3%	17.2%	43.0%	34.4%	32.3%	29.2%	30.0%	29.7%	32.4%		
Adjusted Total	12	20	12	16	32	8	100	47	31	28	26	44	18	194		
Adj Average	0.429	0.714	0.429	0.571	1.143	0.286	3.571	1.679	1.107	1.000	0.929	1.571	0.643	6.929		
Adj Ave %	10.7%	23.8%	14.3%	19.0%	22.9%	14.3%	**17.9%**	42.0%	36.9%	33.3%	31.0%	31.4%	32.1%	**34.6%**		
Adj. n	28	28	28	28	28	28	28	28	28	28	28	28	28	28		

RLQ 1	**10.7%**	**23.8%**	**14.3%**	**19.0%**	**22.9%**	**14.3%**	**17.9%**	**42.0%**	**36.9%**	**33.3%**	**31.0%**	**31.4%**	**32.1%**	**34.6%**
RLQ 2	**42.0%**	**36.9%**	**33.3%**	**31.0%**	**31.4%**	**32.1%**	**34.6%**							
Diff	31.3%	13.1%	19.0%	11.9%	8.6%	17.9%	16.8%							

ADDENDUM M – Newspaper article

■ Grade 4 pupil [redacted] from the [redacted] walks along a colourfully decorated wall at the school.

■ **Above:** Grade R pupils [redacted] deliver their plates to the school kitchen.
■ **Right:** Grade 4 pupils [redacted] wash their hands after lunch.

Going to class hungry

[redacted]s farm school pupils don't have it easy, but teaching staff and community initiatives are helping to keep them in class – their best shot at a brighter future.

ADRI-ANN PETERS

Nestled between wealthy [redacted] neighbourhoods and vineyard-ringed office blocks, at the end of a long, red gravel road, is [redacted] Primary. The Afrikaans-medium school was established by the All Saints Anglican Church in 1933 for the children of farm labourers.

A softly-spoken, 11-year-old girl from [redacted] is one of the pupils here and, like her classmates, she faces challenges very different to her peers at more affluent institutions.

While more fortunate children are driven to school by at least one parent, this young girl, with minimal help from the sister with whom she lives, wakes up, bathes and puts on her navy-blue uniform. Each day, she makes the 15-minute walk to the spot where she and three other neighbourhood children, meet a man in a bakkie whom they pay to drive them to school.

The young girl is one of the lucky ones. The parents of other children at her school cannot afford to pay for transport. Some farm school children must walk or take specially commissioned buses arranged by the Western Cape Department of Education (WCED) to get to class.

Continued on page 4

■ Principal Priscilla August is passionate about setting pupils on the path to success.

Brighter future for farm schools

From page 1

The journey to school can be long. Transportation is one of the key reasons why children at farm schools drop out.

The girl who shared her story with Tygertalk loves her school, which now falls under the banner of the WCED and educates 186 pupils from Grade R to Grade 6 with a staff of seven teachers.

She stays with her older sister and her children in a three-bedroom house. Her father died when she was young, and her mother lives with her younger sister in Wesbank, a poor community off the R300 near Delft.

The girl shares a classroom with other children who face similar circumstances to her own – some probably face far worse. Their road to achieving success is a hard one to travel.

Several hands shoot up to answer a question in a buzzing Grade-4 classroom. The question: "How many of you don't bring a packed lunch to school?"

The children, about 10 out of a class of approximately 30 pupils, say their parents can't prepare food because they leave the house for work too early in the morning. Others say their parents know a meal will be provided by the Peninsular Schools Feeding Scheme.

With an affinity for languages, the young girl is the proud owner of a new dictionary. She won it along with a trophy, a medal and a restaurant food voucher, in a competition run by Rotary and the Durbanville Schools Foundation (DSF). It rewards pupils who do well in literacy.

These are some of the ways in which outside organisations are helping farm children to escape the hand life has dealt them. The girl is one of the top achievers in her grade. She has dreams of going to [redacted] High School next year.

"I know I won't be neglected there," she says.

Continued on facing page

Source:

Bellville/Durbanville

Tygertalk;

Thursday September 20, 2012

ADDENDUM N – Story 2 (translated)

2. A library in Abe's head

Today was a great day at school. It was Charl's birthday and he brought bags full of sweets and chips to school. He is 10 years old. I am so looking forward to my party in a few weeks' time. My mom promised to bake me a huge chocolate cake this year with a Spiderman on top made of Smarties and my friends and I are going to slide on the extra high waterslides. The owner built the waterslide from plastic and now rents it out for parties. Oh, I can hardly wait! I hope the weather is still warm then, otherwise we will be shivering and freezing ...

Talking of shivering, I had such a fright today when our teacher showed us how thick her study books are. She is studying at a university to become an even better teacher. The books are very thick and it is a lot of reading. Teacher says our brain can save countless information and knowledge. She explained that we can reuse this knowledge as we wish, as long as we *save it in the correct way* in our brain. She then asked who has been to a LIBRARY recently and whether we can remember how all the books were sorted according to type and topic. I am sure you have been in a library before?

All the books on the same topic are sorted in groups. When you walk into a library and you are looking for a book on animals, for example, there is a special section specifically for books on nature and animals. Imagine what would happen if all the books on all the different topics were mixed up! There are books on the sea, stories in Afrikaans, English books, dictionaries, books on food, fashion magazines, and much, much more in a library. If all the books were mixed up, we would take ages to find a specific book and sometimes we won't even be able to find it again.

What a mouth full! On our way home, I tried to explain to Martin, who drives home with us, how his brain works. He said he has never thought about how we think and how we learn. "I thought I can simply read a piece that I have to study over and over again, and then I'll remember what I have read?" he said. Dad added from behind the steering wheel that we should not simply read work that we have to study over and over again until we think we will remember it. The idea is that we should do something with what we learn to help us to remember and understand it better.

What do you think? Do you also simply read your work over and over again and hope you understand it?

Dad said he only understood Geography well when his teacher took their class outside on a cloudy day, and they stood looking at the clouds for two periods. They had to draw them and then discussed the different types of clouds in groups. Back in class, his teacher went through the work on cloud formation again and Dad said he started understanding everything better then. Dad added: "It helps especially if you tell someone else about what you have to learn in your own words, even if it is only to your dog. Then you realise what you understand and what you can remember." That following week, when he had to study for a test, he thought back to how the different clouds looked and what their properties are, and all the facts he had to remember were 'stuck' in his brain. Dad said he used to tell his little sister about his study work at the breakfast table, and that helped a lot.

Teacher explained that our brain is also a bit like a library. We must save new knowledge in a specific place and give it a name, so that we can remember next time where to get it from. If, for example, we learn something new about healthy food, we have to save it with other knowledge that we have already saved in our brains on healthy food or something that reminds us of healthy food. It could be anything, from a picture of a nurse or your mother's name or a book's title or the word broccoli – anything that reminds you of 'healthy food'. We call this making an association. For example, you may associate 'healthy food' with the word 'broccoli'. You then think of what you already know on the topic of 'healthy food', and then you **connect** that to prior knowledge that you have already saved in your brain. The more **associations** or connections you can think of, the easier for you to remember the information or new knowledge.

Teacher always says it is all about making associations and connections. Our brain consists of thousands upon thousands of small stuff called nerve cells or **neurons**, which look a bit like thin trees, with a head on one side and roots on the other side. They are all connected to one another – the head of one to the roots of the other, and vice versa. There are thousands of connections in our brain and the denser these connections, the better our brain works and the better we can remember new knowledge that we read, hear or see. Wow! My head is spinning from thinking how my brain works!