

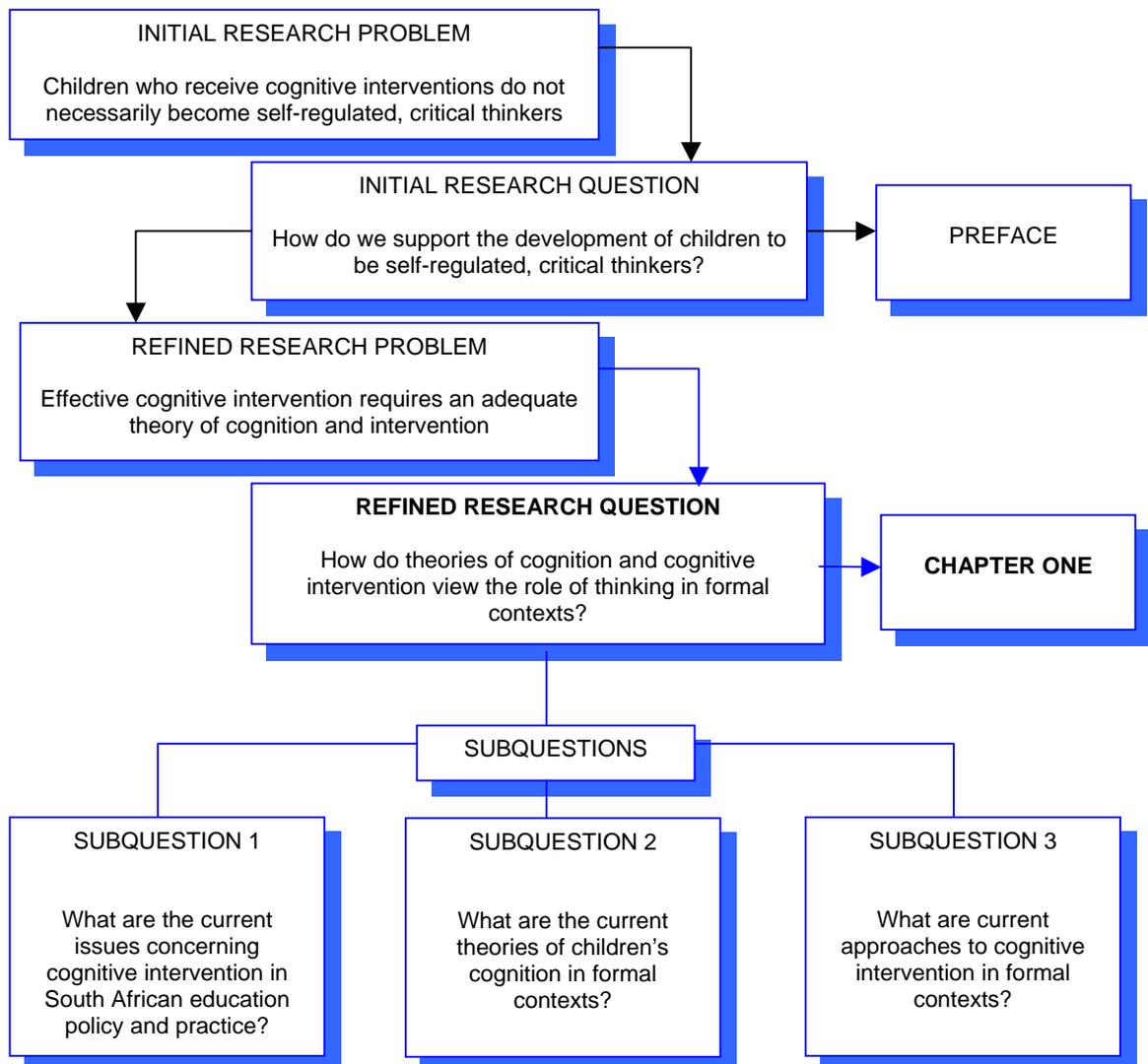
# CHAPTER ONE

## Current issues concerning children's learning in formal contexts

Weighing the pig doesn't fatten it.

Black and William (1998 in Long, 2000)

### META-NARRATIVE 1.1



## 1.1 THE SOCIOPOLITICAL CONTEXT OF COGNITIVE INTERVENTION

In the first decade since the introduction of outcomes based education (OBE) and Curriculum 2005 in South Africa, there have been continuous large scale and small scale attempts, both formal and informal, to assess the effectiveness of the new educational system. Long (2000) notes that assessment is a major part of the educational process because teaching could become unfocused without it. However, Long (2000) also notes that not all assessment activities are necessarily justified, especially if assessments are unable to contribute to the improvement of educational practice.

The implementation of a new education system in South Africa has led to widespread concern that particular standards in education are not being achieved and that South Africa's position in relation to other countries' should be carefully monitored as part of a global concern about standards in education. Hence our participation in studies such as the Third International Mathematics and Science Study (TIMSS) and the UNESCO-sponsored Monitoring Learning Achievement (MLA) project. However, educational issues in South Africa still extend far beyond merely setting and achieving minimum educational standards. Prof. Kader Asmal, Minister of Education (Asmal, 1999) acknowledged in an address to the Cape Town Press Club:

We have not succeeded in ameliorating the devastating impact of *apartheid* in the education and training of the majority of our people. Many weaknesses and shortcomings have survived – indeed thrived – in the first five years of democratic government. Large parts of the system are dysfunctional (p.2).”

Minister Asmal (1999) reiterated that (in terms of education and training) “we have a national emergency on our hands (p. 3).” The emergency in South African education can be felt on institutional level, as well as in the classroom. In that sense, the greater African educational experience which Samoff (2001) describes reflects another dimension of some of South Africa's most pressing educational problems:

The sense of excitement, hope, and anticipation in African education has been replaced by widespread dismay, disappointment, and discouragement...After a period of rapid growth and dramatic progress, education in Africa, at all levels and in all forms, is in dire straits, we are told. With few exceptions, both schools and learning have deteriorated, and the situation is continuing to worsen. Roofs leak and wind blows through paneless windows. There are too few teachers to sustain expanded access, too many teachers have had little preparation, and very few teachers have opportunities to improve their skills (p. 6).

Samoff (2001) notes that the “absence of a visible, energetic, and purposive leadership” (p. 25) may well have contributed towards the despondency, but that the limited success with which the responsibility for education was decentralised, coupled with the inclination to seek external funds, also played a role. The reliance on international donor funds may well have led to a situation where African countries’ educational reform was being determined by external roleplayers with their own interests. Samoff (2001) concludes by saying that:

*Africa [must] run faster as it tries to catch up with those who are ahead....Scrambling to catch up always leaves those presumed to be in front to determine where they, and thus everyone else, are going (p. 27).*

The educational crisis is by no means an African phenomenon only, so it is not always clear who is “in front”, or even if anyone is really in front. If TIMSS, the largest international comparative study of educational achievement to date, is anything to go by, then countries such as Singapore, the Czech Republic and Japan find themselves in front, and countries such as South Africa, Colombia and Cyprus find themselves at the back of the race (Plomp, 1999). It would admittedly be very simplistic to make such judgements on the basis of one study alone. A study that ranks the science and mathematics achievement of countries’ learners in certain grades can hardly reveal the complex ways in which social, political, economical and educational factors interact to determine the health of a country’s education system. For example, the United States of America (USA) is politically and economically one of the most powerful countries in the world, yet Lambert and McCombs (2000) report that its education system is in crisis, and Everson (1999) points out that education standards are at the centre of widespread education reform for the purpose of improving academic achievement in USA schools. Despite approximately 10 years of educational reforms, the USA finds itself being outscored in the TIMSS by at least 10 other countries (Plomp, 1999). If a country such as South Africa wants to transform its education system, I believe we need to look inward, identify the unique obstacles we face, find solutions that work for our society.

Most of the so-called developing countries are faced with problems ranging from the formulation and implementation of educational policies and education reform strategies to more pragmatic issues such as setting educational standards, assessment, achievement and equity. Ravela’s (1999) reminder that educational underachievement in a developing country such as Uruguay appears to result mainly from poverty, is hardly a revelation. Yet, there appears to be significant

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educational problems even in developed countries such as the United Kingdom where educational problems frequently centre around the inability of the education system to meet the needs of ethnic minority groups. For example, Gipps (1999) reports that African Caribbean, Pakistani and Bangladeshi learners in the United Kingdom frequently achieve less well than their White counterparts, while Indian learners achieve better than White learners in some urban areas.

In the Education for All (EFA) Assessment, which forms part of the joint international UNESCO-UNICEF Monitoring Learning Achievement (MLA) project, it is reported by Chinapah, H'ddigi, Kanjee, Falafayo, Fomba, Hamissou, Rafalimanana and Byamugisha (1999) that none of the 11 participating African countries<sup>1</sup> met the minimum learning achievement targets<sup>2</sup> in Numeracy that were set at the World Conference on Education for All in Jomtien, Thailand in 1990. Only two African countries (Morocco and Tunisia) met the Literacy target, and three (Madagascar, Malawi and Tunisia) met the Life Skills targets.

In a separate report on the same EFA 2000 assessment, Strauss and Burger (2000) report that South Africa was among the three lowest scoring countries in respect of achievement in Numeracy and Life Skills, where South African Grade 4 learners achieved a mean performance of 30% and 47.1% respectively. In respect of Literacy, South African learners achieved a mean performance of 48.1% and were outperformed by eight other African countries<sup>3</sup>. Importantly, Chinapah *et al.* (1999) acknowledge as a serious limitation the fact that the MLA project was primarily quantitative and thus unable to provide in-depth qualitative information about teacher-learner interactions, and stress the need to “understand the dynamics in teaching and learning [in order to] establish what must be taught and how each learner must be better prepared to optimise his/her learning potential and attributes” (p. 70). In addition, Brooks and Brooks (1999) say that educational improvement can only be “achieved through attention to the complicated, idiosyncratic, often paradoxical, and difficult to measure nature of learning” (p. 20). Therefore, although large scale studies may be able to compare how various countries fare in respect of global achievement on certain outcomes, by no means do they provide sufficiently detailed information about more specific factors, particularly those that influence teacher-learner interactions in the classroom, that create barriers to learning.

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<sup>1</sup> They are Botswana, Madagascar, Malawi, Mali, Morocco, Mauritius, Niger, Senegal, Tunisia, Uganda and Zambia (Chinapah, *et al.* (1999, p. vi).

<sup>2</sup> Minimum learning targets required at least 80% of the participants to score at least 50%.

<sup>3</sup> They were Madagascar, Mali, Morocco, Mauritius, Senegal, Tunisia, Uganda and Zambia.

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The practical implementation of OBE and Curriculum 2005 in South Africa is one specific factor that has created many barriers to learning that are not necessarily visible upon inspection of large scale educational assessment results. Mason (1999) says the following about the implementation of OBE in South Africa:

Responsible and committed teaching and administration are sorely missing in many instances. Many teachers and administrators are severely under-prepared on a daily basis, under the influence of alcohol at work or absent altogether. The reasons for this are complex, not least among them the sheer exhaustion and demoralisation consequent on years of teaching in apartheid's desperately under-resourced schools. (p. 138)

The complexity of Curriculum 2005 methodology and terminology, its revolutionary and radical nature, inadequate delivery of in-service teacher training and lack of financial resources to ensure sustainable implementation of the new curriculum are a but a few of the complex reasons that have been cited as the main reasons for the disappointing implementation of Curriculum 2005 (Chrisholm, 2000; Jansen, 1998; Van der Walt, 2000).

The outcomes based philosophy embodied in Curriculum 2005 represented a shift away from rote learning practices and a general model of learning that views the teacher as the expert "transmitting" knowledge to her learners. Instead, the outcomes based philosophy was conceived around social constructivist principles which emphasised the social nature of knowledge and the recognition that knowledge does not exist independently of the knower, because it is construed by the knower. OBE emphasises the active role of the child in learning and views the role of the teacher as that of mediator, a role which acknowledges the fact that all people create their own meaning and that the teacher is meant to mediate the social construction of meaning. Against this background, the development of self-regulated learning should play a central role in cognitive intervention in the context of OBE. Self-regulated learning contributes to lifelong learning, which is one of the primary goals of OBE in South Africa.

Unfortunately, the emphasis on constructivist learning principles led to teaching strategies that were supposed to promote active participation through groupwork, "discovery" learning, and restraint on the part of teachers because they were not allowed to "lecture" or "tell" their students anything. With regard to children's thinking, teachers began viewing their role as one of facilitation rather than teaching. As Mason (2000) points out, a facilitative approach to teaching encourages the teacher to stand back and passively look on as children "discover" knowledge instead of actively and critically mediating knowledge construction by helping children to

deconstruct and reconstruct their understanding of problems. In addition, the notion that knowledge can be discovered further reinforces the notion that perfect knowledge exists independently of the knower, a notion that works against the assumption that knowledge is construed through social and cultural interactions rather than discovered. Such a “discovery oriented” perspective reflects little else than a transmission model of learning which assumes that information “enters” the mind of the learner in a perfect state and is “stored” there without undergoing any kind of deconstruction or transformation. In terms of the development of self-regulated learning, a transmission model of learning does little to encourage children to participate actively and to take responsibility for their learning. However, simply requiring children to participate actively does not necessarily lead to the development of self-regulated learning either and it is this question that the present study investigates: what conditions are necessary for children to become self-regulated learners?

The distinction between facilitation and mediation, as the distinction between discovery and construction, may appear to some to be inconsequential, but they reflect fundamental philosophical differences in the way that people view the world. Such philosophical differences impact fundamentally on teachers’ classroom practice. For example, Curriculum 2005 places a premium on the instruction of processes of knowledge construction such as higher-order thinking and problem-solving. Teachers, who for the most part were not trained formally in OBE-related philosophy, are expected to teach<sup>4</sup> complex problem solving skills and at least one study has shown that, despite teachers’ best efforts, this is not happening (Taylor, 1999).

There may be a host of reasons for teachers’ lack of skill in teaching complex problem-solving. These may include lack of knowledge about what complex problem-solving entails, their own exposure and experience with complex problem-solving, how to teach complex problem-solving in academic contexts, and so on. However, teachers may also fail to teach complex problem-solving simply because we, as psychologists and educators fail to grasp its complexity! In essence, this study is about examining how the complexity of children’s thinking contributes to the development of self-regulated learning.

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<sup>4</sup> I use this term to indicate the traditional notion of teaching as “telling”, “instructing” and “informing” and to distinguish it from “facilitation” and “mediation”.

## 1.2 A THEORETICAL PERSPECTIVE ON CHILDREN'S THINKING IN FORMAL CONTEXTS

### 1.2.1 *Phases in the development of cognitive and learning theory*

Children's thinking has been extensively studied across a range of formal and informal contexts. Research which investigates children's thinking in informal contexts often focuses on the nature of the home environment (Sternberg, 2000) and the quality of the interaction between the child and caregiver as a predictor of eventual cognitive functioning (Klein, 2000; Gauvain, 2001; Hubbs-Tait, Culp, Culp, & Miller, 2002). The present study focuses on children's thinking in formal contexts where children are expected to develop their knowledge, skills and values in collaboration with a teacher through structured activities.

Research on children's thinking in formal contexts deals with a wide variety of different problems associated with formal learning, but less often includes a systematic investigation of the nature and quality of the entire context of thinking and learning. For example, in a recent volume on learner-centered education, Mayer (2000) relates how the study of learning has moved through phases of being associated with response acquisition, knowledge acquisition, and knowledge construction. In the response acquisition phase, mechanistic, behaviourist theories of cognition informed instructional practice, while the knowledge acquisition phase was characterised by a shift towards an information processing approach to cognition and a corresponding curriculum-centered approach to instruction. Mayer (2000) notes that it was only in the 1970s and 1980s that the knowledge construction phase of cognition led to instructional practices which recognised the learner as an active participant, rather than a passive recipient. The three phases in learning theory that Mayer (2000) describes emphasise children's thinking in formal contexts as the result of the environment acting on the child (behaviourist), the mastery of information (information processing) and the nature of knowledge construction (constructivist).

The influence of behaviourist approaches to cognition is rather restricted in current learning theory. Based on classical and operant conditioning principles, Long (2000) suggests that behaviourist approaches can appear simplistic and encourage an approach based on rote learning. While behaviourist approaches may have some merit in simple problem-solving tasks that require routine solutions, they are generally problematic when complex thinking skills and behaviours are called for. Moreover, Long (2000) notes that it is becoming increasingly evident that the behaviours that follow a stimulus are not just the consequence of automatic association between stimulus and response, but the outcome of a more cognitive task that allows a person

to predict what will follow stimuli and develop expectations as a result thereof. Thus the stimulus-response model of learning will not be considered in the discussions in 1.2.2 to 1.2.5.

In addition to the three major themes in learning theory that Mayer (2000) identifies, another theme which has significantly influenced the study of children's thinking in formal contexts will be discussed in the following sections, namely the contextual approach to cognition. The contextual approach to cognition favours a social constructivist framework that emphasises social interaction and collaboration. The contextual (social constructivist) approach should be distinguished from the cognitive constructivist approach descended from Piaget that emphasises the cognitive construction of meaning without giving explicit attention to the importance of social interaction.

### 1.2.2 *Information processing approaches to cognition*

Mayer (2000) suggests that the information processing approach to cognition can be traced back to the cognitive revolution of the 1950s and 1960s which provided educators with a knowledge acquisition metaphor for learning. Groome (1999) explains that the information processing approach, together with computer modelling approaches and cognitive neuropsychology, all represent the field of cognitive psychology.

Long (2000) describes the information-processing approach as the most recent and productive approach in the context of educational psychology and claims that it applies to virtually every topic of educational study. Yet, the information processing approach to cognition has been much criticised for its mechanistic, reductionist approach to human cognition and the fact that humans are viewed as *limited-capacity processors* (Groome, 1999, p. 8) whose thinking processes are compared to the workings of a telephone exchange. Mayer (2000) explains it like this:

Within this new cognitive metaphor, the learner becomes a processor of information and the teacher becomes a dispenser of information. As the acquisition of knowledge becomes the focus of psychologists, the curriculum becomes the focus of instruction...According to this view of learning, the goal of instruction is to increase the amount of knowledge in the learner's repertoire so that learning outcomes can be evaluated by measuring the amount of knowledge acquired (p. 359).

So the emphasis that the information processing approach places on information processing in the brain of the learner largely ignores the social, cultural and other dimensions of cognition (Bowers, 1999), and leads to instructional practices that focus on knowledge acquisition instead

of problem solving. As such, the information processing approach promotes a process-oriented approach to cognition in the sense that complex problem solving is viewed as a series of cognitive processes which the learner engages in as she attempts to solve a problem. Nell (2000) contrasts the information processing approach to cognition with the psychometric approach to cognition by saying that the psychometric approach is essentially a structuralist approach, whereas the information processing approach emphasises process rather than structure. Both the information processing and psychometric traditions have for a century strongly influenced the assessment of human intelligence.

It should be noted at this point that intelligence and cognitive functioning are not synonymous. Intelligence refers (coarsely) to the *facility* with which individuals can engage in a task (cognitive, social or otherwise) with the express purpose of solving a problem inherent to the task at hand. Psychometric theories of intelligence (being primarily concerned with the structure of the intellect) are interested in the *outcomes* of complex problem solving. Information processing theories of intelligence are interested in the *process* of complex problem solving, but they are by no means developmental theories of cognitive functioning. Cognitive functioning is a broader construct which entails a study of the *nature* of human thought, knowledge and learning as the individual develops in a particular context over time.

Theories of intelligence are often based on theories of cognitive functioning. A good example is the incorporation of an information processing approach to cognition in the development of the Wechsler Adult Intelligence Scale – III (WAIS-III) and the Wechsler Memory Scales – III (WMS-III) with the addition of a Perceptual Organisation Index, Processing Speed Index, and Working Memory Index (Nell, 2000). Another example is Robert Sternberg's (1984a) triarchic theory of intelligence. Sternberg's triarchic theory of intelligence is largely a response to contextual theories of cognitive functioning by constructing a theory of intelligence that incorporates componential, experiential, and contextual theories of cognitive functioning (Sternberg, Forsythe, Hedlund, Horvath, Wagner, Williams, Snook & Grigorenko, 2000).

The legacy of information processing theory continues to contribute to our understanding of thinking and learning. For example, Sternberg *et al.* (2000) recently highlighted the importance of tacit knowledge in practical intelligence and explained how practical knowledge is psychologically and statistically distinct from academic intelligence, personality and styles of thought. Tacit knowledge, which is defined by Sternberg *et al.* (2000) as procedural if-then

statements, is thought to be a central concept in practical intelligence, which is thought to predict certain aspects of school functioning better than does academic intelligence.

In addition, research on connectionism,<sup>5</sup> neural networks (Phaf, 1994) and cognitive neuroscience, which add a biological aspect to information processing (Mazzoni & Nelson, 1998; Posner, 1998) has gained momentum in the last two decades, although the complicated nature of these studies have prevented them from being fully embraced by the majority of psychologists as a plausible metatheory of human cognition, and even less so by educators as a learning theory that could inform educational practice. Nor are they intended to become super-theories of human cognition. Groome (1999) admits that a mutually advantageous, symbiotic relationship exists between the normal and clinical fields of neuropsychology, and that this collaboration is necessary to advance our understanding of the brain and how it functions.

However, as Mayer (2001) points out, cognitive psychology was about to die of its own irrelevance by the 1970s simply because it could not account for thinking in realistic situations. The same cannot be said of constructivist and contextual approaches to cognition which are very much concerned with thinking in realistic situations.

### 1.2.3 *Constructivist approaches to cognition*

Mayer (2000) suggests that cognitive theory matured in the 1970s and 1980s as the metaphor for learning shifted from a view of the learner as a passive recipient of knowledge to an active constructor of knowledge. Although the roots of constructivism go back to the eighteenth century (Von Glasersfeld, 1989), constructivist approaches to cognition were only recently “rediscovered” in the cognitive development theory of Jean Piaget, specifically his concept of the adaptive function of knowledge (Von Glasersfeld, 1989).

Constructivist theory, as Von Glasersfeld (1989) has pointed out, is essentially a theory of knowledge, and how people represent their knowledge. Cobb (1994) describes constructivism as an approach that analyses cognitive processes located in the individual and so makes a distinction between constructivism and sociocultural theory which, he says, refers to a process of enculturation. Consequently, many constructivists find their epistemological roots in the theory of

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<sup>5</sup> Connectionism assumes that information is processed on an asymbolic level as opposed to classical information processing theory which assumes information is represented in the brain by symbols.

Piaget while socioculturalists (or social constructivists) are more associated with Vygotsky (Cobb, 1994).

Von Glasersfeld (1995) argues that constructivism should be viewed within a postmodernist (postepistemological) framework and says that it arose mainly out of a dissatisfaction with Western theories of knowledge. The consequence of such a postepistemological way of thinking, Von Glasersfeld (1995) suggests, is that the concept of **truth** as the correct representation of states of the external world must be replaced with the notion of viability. Viability is a relative concept and, unlike the concept of truth, means that knowledge is viable only if it allows one to cope within a given context. Such a statement is consistent with postmodern thought which questions the existence of a “grand narrative” because grand narratives are based on static views of reality (Higgs & Smith, 2002). Postmodern constructivist thought therefore emphasises the local and specific nature of knowledge rather than elevating it to the status of singular truth.

Constructivist theory is an epistemological theory, and not a pedagogical theory. Constructivist theory itself does not prescribe how teachers should interact with children in order to facilitate thinking. Nevertheless, Brooks and Brooks (1999) suggest that ‘constructivist’ teachers display particular behaviours in the classroom which distinguish them from non-constructivist teachers. Some of the most important characteristics of ‘constructivist’ teachers, are that constructivist teachers (i) seek and value learners’ points of view, (ii) structure lessons to challenge learners’ suppositions, (iii) structure lessons around big ideas and not small bits of information, (iv) recognise that learners must attach relevance to the curriculum, and (v) assess learning in the context of daily classroom investigations, and not as separate events (Brooks & Brooks, 1999, p. 21).

Regarding the relevance of constructivism to teaching, Von Glasersfeld (1989) suggests that constructivist theory changes the concept of knowledge merely by introducing a distinction between what is regarded as **training** (the acquisition of skills which are described as patterns of action) and **learning** (which is equated with the active construction of viable conceptual networks, i.e. understanding), and this distinction forces teachers to re-evaluate their instructional goals and to adjust their teaching to accommodate the active role of the learner. To do this, Von Glasersfeld (1995) suggests that the teacher must be concerned with what goes on inside the learner’s head, listen and interpret what the learner says and so try to build a model of the learner’s conceptual structures. In the context of the present study, I believe the purpose of

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cognitive interventions that focus on the acquisition of specific or localised skills, especially when they are domain-specific, is to train children rather than to expect them to learn. Cognitive interventions for the purpose of learning require the active construction of conceptual networks that depends on the creation of a state of disequilibrium so that the learner may adapt and reorganise her knowledge. Interventions that focus on the acquisition of skills do not necessarily require states of disequilibrium, and therefore adaptation and reorganisation of current conceptual structures do not occur and learning does not take place.

Constructivist theory has been criticised for the fact that it is overly permissive and lacks rigor (Brooks & Brooks, 1999), and that it ignores the historicity of the learner and does not account for the failure of the politically and socially disadvantaged groups to achieve at the same levels as privileged groups (Magadla, 1996). However, Cobb (1994) argues that a forced choice between constructivist and sociocultural theories is unwarranted, because “the sociocultural perspective informs theories of the conditions for the possibility of learning, whereas theories developed from the constructivist perspective focus on what students learn and the processes by which they do so” (p. 13).

The point is that constructivist theory, while it represents a significant shift beyond behaviourist and information processing theories, in itself does not address all aspects of children’s thinking in formal contexts, and perhaps does not intend to do so either. Apart from constructing meaning through mental adaptation to the environment, we also know learning to be a social process, which makes it important to consider contextual (social constructivist) theories of learning if one is to understand children’s thinking in formal contexts more fully.

### 1.2.4 *Contextual approaches to cognition*

Research concerning contextual theories of cognition has proliferated in the past three decades. As an alternative to mainstream cognitive psychology, the contextual approach to cognition is represented by a collection of theories which focus on thinking and learning as social processes influenced by the learner’s historical, cultural, and political experiences. The theories in this paradigm are rather diverse, and may focus on aspects of cognition such as *community inquiry* methods in learning (Brown & Campione, 2000), the role of *mediation* (Feuerstein, Klein & Tannenbaum, 1991; Kozulin & Presseisen, 1995; Burgess, 2000) and *classroom discussion* in cognitive development (Conteh, 2000; Larson, 2000), *cooperative learning* (Mercer, 1996) and *learner-centered* education (Lambert & McCombs, 2000).

The ascension of contextual theories on cognitive development in the 1970s and 1980s occurred partly in response to greater social and political awareness of the plight of marginalised ethnic groups. In America, the 1960s were characterised by political activism and a fight for human rights, particularly those of minority groups. Martin Luther King focused the attention of the world on the plight of African Americans. Some time later, in South Africa, the Soweto uprising of 1976 marked the beginning of political instability as Black South Africans fought for equal rights, particularly in education. The last four decades of the twentieth century were characterised by a heightened awareness of the plight of minority and disadvantaged groups around the world, and researchers and theorists of human cognition came under increasing pressure to re-evaluate their theories of human cognition, as well as the role of cognition in education and psychology if these were to have any relevance in diverse societies.

Political pressure helped to provide the thrust for the development of approaches to cognition that viewed intellectual development as not only a hereditary function, but also as a function of the environment. Awareness of the position of minority groups certainly provided the thrust for Feuerstein's theory of cognitive modifiability, which was inspired by his work with culturally different immigrant children from North Africa and the Yemen at a time when Israel was in turmoil (Burgess, 2000). Feuerstein realised that minority groups were generally not mediated into the culture of the dominant group, and this posed major problems for minority groups who had to cope within an essentially unfamiliar culture with unfamiliar cognitive, behavioural and social patterns. In South Africa, the situation is not much different. Political and educational transformation has created a need for cognitive psychology to become cross-culturally relevant (Nell, 2000), as well as pointing to the need for cognitive education among learners and teachers alike (Cilliers, Park & Thiart, 1999:37).

Contextual theories of cognition have special significance within the South African context because they highlight the importance of non-cognitive dimensions in children's thinking and learning. For example, it appears as if African culture has traditionally attached greater value to *collective responsibility*, *empathy* (Goduka, 1999), and *social association* (Onyewadume, 2000) in learning. Several other authors (Meyer, Moore & Viljoen, 1997; Van Vlaenderen, 1999) also distinguish between an *African worldview* which is often equated with a field-dependent style of learning (Goduka, 1999) characterised by intuition, emotion and extrinsic motivation, and a *Western worldview* which favours a field-independent style of learning, characterised by intrinsic motivation and self-regulated learning. For example, Callendar (1997) describes the African

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cultural ethos as spiritual, emotional and social, with an emphasis on the value of genuine personal expression.

The philosophy of *Ubuntu*<sup>6</sup> is considered by some (e.g. Goduka, 1999) to be an important philosophical and theoretical foundation in education that could serve as a framework to affirm and validate unity in diversity. Because of the African tradition of *menschlichkeit*<sup>7</sup>, Goduka (1999) suggests that educational models must *inter alia* nurture learners' construction of cultural identity and cultural voice, and promote empathic interaction among members of diverse cultures. Yet at the same time, African-Western classifications of learning could create more problems than they provide solutions. For example, an African-Western dichotomy most often rests on a simplified racial non-white/white distinction between societies and may trivialise the experiences of black South Africans living in an urban westernised context. It creates a dichotomy of white South Africans as predominantly Western, rational and logical and black South Africans as predominantly non-Western, irrational and emotional. Such classifications may point to broad patterns in societies, but they should be regarded cautiously since they tend to ignore completely the very diverse contexts in which South Africans live, whether they be advantaged/disadvantaged, urban/rural, city/informal settlement, rich/poor, conservative/progressive communities, and so on. For example, viewing the majority of African learners as primarily emotional and/or social learners could preclude them from being exposed to learning opportunities that favour rational and analytical learning simply because it is thought that they "do not learn that way". Such practices could serve to perpetuate a situation in which black South African learners are taught differently than white South African learners because they are perceived as being incapable of logical and rational thought. Such practices are discriminatory and do not afford all learners equal learning opportunities.

Nevertheless, the concept of *menschlichkeit* has been formalised on various levels in South African education. The Constitution (Act 108 of 1996) founded a democratic South Africa on the values of dignity, equality and the advancement of human rights. The National Education Policy Act (NEPA) (No. 27 of 1996) determined that education must "contribute to the full personal development of each student, and to the moral, social, cultural, political and economic development of the nation at large..." (RSAb, 1996). The Education White Paper 6 on Special Needs Education was conceived in an effort to offer quality education to all children and to build

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<sup>6</sup> The term *Ubuntu* is defined by Goduka (1999: 39) as a philosophy of humaneness that emphasises communality and collectivity. It is characterised by the expression *Umntu ngumntungabantu* which means *I am because we are, we are because I am*.

<sup>7</sup> Humanity, humaneness.

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a caring society that accommodates the needs of all learners (RSA, 2001). The Education Labour Relations Council (Resolution No. 8 of 1998) reminds educators that they have the responsibility to establish a classroom environment that stimulates learning, and to consider and utilise learners' own experiences as a valuable resource. The Norms and Standards for Educators which were determined in terms of section 3(4) of the NEPA (Act No. 27 of 1996), state that one of the key roles of educators is to provide a supportive and empowering environment which shows an appreciation for people of different cultures. The South African Qualifications Authority (SAQA) further endorses this view by recommending that learning programmes must make learners aware of the importance of their participation as responsible citizens in the life of local and global communities, as well as being culturally sensitive across a range of social contexts while reflecting on and exploring a variety of strategies to learn more effectively (SAQA, s.a ). Finally, the critical cross-field outcomes<sup>8</sup> adopted by SAQA through the formulation of the National Qualifications Framework (NQF) not only advocate that learners must be able to use science and technology effectively and critically, but they should also be able to work effectively with others as members of a team, group, organisation and community (SAQA, s.a.).

Despite the proliferation of constructivist and contextual approaches to cognitive and learning theory and an implicit acknowledgement that learning is more than a mental operation, the majority of cognitive theories that inform on children's thinking in formal contexts focus selectively in a reductionist fashion on two themes that Mayer (2000) identifies as (i) a focus on learning and cognition within subject matter domains, and (ii) a focus on the detailed assessment of individual learning strategies and outcomes, a situation which Mayer (2001) suggests a reflection of primarily educational and psychological approaches to the study of cognition and instruction.

Despite wide recognition that cultural, motivational and affective aspects of learning are interdependent with cognitive development (Ceci & Nightingale, 1990; Markus & Kitayama, 1991; Weinstein, 2000), cognitive studies for the most part do not integrate cultural, affective and motivational dimensions with cognitive dimensions in their studies, at least not to the point where it is recognised that the dynamics of society, culture, emotion and motivation has a fundamental influence over thinking and learning. Indeed, in a detailed discussion about individual differences in academic achievement, Long (2000) report on a series of studies that show for example, that

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<sup>8</sup> Critical cross-field outcomes are broad goals that underpin the specific learning outcomes of learning programmes in SA.

**birth order** can account for up to 86% of the variance in children's formal examination results 17 years later, **parent behaviours** (quality of verbal interaction) can account for up to 59% of children's cognitive accomplishments at three years of age, and **socio-economic status** can account for up to 29% of the variance in intelligence scores. Moreover, up to 20% of the variance in academic achievements can be accounted for by personality factors (Long, 2000).

In a recent study by Hubbs-Tait *et al.* (2002) that investigated the relationship between children's cognitive abilities and maternal cognitive stimulation, they report significant relationships between emotional support from caregivers and later cognitive functioning. In addition to other measures of emotional support, positive feedback explained significant variance found in children's perceptual scores. Furthermore, statistically significant relationships were found between children's vocabulary and verbal reasoning scores and their parents' levels of emotional support and intrusive behaviour. (Hubbs-Tait *et al.*, 2002). From studies such as these, one can conclude that cognition is not a monolithic concept consisting of logic only, but is multi-faceted and intimately interlinked with our personalities, emotions and social functioning.

The study by Hubbs-Tait *et al.* (2002) primarily involved the interactions between preschool children and their caregivers, not school-going children and their teachers. Nevertheless, results such as those reported by Hubbs-Tait *et al.* (2002) do point to the importance of studying cognition more broadly by including other aspects such as emotional and social relationships, traditionally regarded as non-cognitive, in studies of cognition.

### **1.3 COGNITIVE INTERVENTION IN FORMAL CONTEXTS**

#### **1.3.1** *A definition of cognitive intervention*

Cognitive intervention is broadly defined in this study as a concerted effort on the part of the teacher to mediate the emergence of knowledge, skills and values in the learner by providing focused and structured learning opportunities to improve a learner's (i) capacity to learn and (ii) capacity to benefit from instruction.

Children's *capacity to learn* is understood to be directly related to the facility with which they are able to use cognitive processes to choose, adapt and apply cognitive skills and strategies in order to solve complex, real-life problems through active construction of conceptual structures. The capacity to learn is distinguished from the learner's *capacity to benefit from instruction*,

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which refers to the learner's inclination (or disposition) to engage in learning, which is determined (beyond cognitive factors) by personal, social, emotional, and cultural factors.

In the context of this study, cognitive intervention is not considered to be a way of training intelligence (Sternberg, 1984b). The difference between cognitive intervention and training intelligence, is that the former takes place within a holistic framework that incorporates the personal development of the learner within a social and cultural context, and utilising principles of disequilibrium, adaptation and re-organisation of knowledge. The latter is defined as an approach that focuses on the provision of specific learning tasks with a view to teaching the learner specific skills and procedures in order to improve the learner's performance on a particular problem-solving task.

Whereas intelligence training is considered within the context of this study as an exclusively cognitive approach that focuses on micro-skills for solving the problem at hand by means of certain skills, the goals of cognitive intervention transcend the task to include other domains of human functioning such as emotional, social, linguistic and academic development.

### 1.3.2 *Formally structured cognitive intervention programmes*

Traditionally, cognitive intervention has been associated with formally structured curricula that target the development of specific thinking skills, often outside the classroom. Some of the well-known programmes in South Africa include Reuven Feuerstein's (1980) *Instrumental Enrichment*, Katherine Greenberg's (1990) *Cognet*, Haywood, Brooks and Burn's (1992) *Bright Start*, Edward De Bono's (1976) *CoRT (Cognitive Research Trust)*, and Matthew Lipman's (1991) *Philosophy for Children*.

Thinking skills curricula, such as the afore-mentioned programmes, are generally constructed around particular principles that are associated with a particular theoretical approach to cognition. For example, *Instrumental Enrichment (IE)*, *Cognet* and *Bright Start* are all organised around Feuerstein's principles of mediated learning experience, whereas *CoRT* emphasises a heuristic approach to creative thinking, and *Philosophy for Children* emphasises philosophical inquiry.

Although it is generally agreed that cognitive intervention can help children to improve their thinking skills and learning achievements (Johnson & Gardner, 1999), cognitive intervention

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programmes do not always lead to long term gains. For example, a South African study that investigated the use of Feuerstein's *IE* with 10 pre-adolescent children over a period of three months showed that the program did not lead to any significant changes in children's group IQ scores or scholastic achievement (Lomofsky and Green, 1990). In addition, Long (2000) reports on a study in the United Kingdom by Blagg in 1991 that showed that *IE* did not have any measurable effects on children's academic progress although children did appear more active in their learning and more aware of the various strategies available to them. These results point to a commonly acknowledged difficulty in cognitive intervention concerning the transfer of knowledge and skills not only regarding the *IE* programme (Skuy, 2002), but in general (Alexander & Murphy, 1999).

In a Canadian study based on a sample of 21 grade 5/6 learners which investigated the combined use of *IE* with a computer thinking program, Maxcy (1990) reports encouraging results that point to the usefulness of *IE* as an adjunct to computer training. However, the small sample size makes it impossible to generalise results, and the author does not report any levels of significance in terms of the observed differences between the experimental and control group, making it difficult to rule out chance effects as a possible cause for the differences in scores.

Skuy (2002) reports that intervention programmes based on mediated learning experience (MLE) can be used effectively to promote cross-cultural co-existence and integration and so contribute to the transformation of the South African education system. One study that Skuy (2002) reports on concerns the use of *IE* with a group of disadvantaged black learners in a gifted child programme. Participants were divided into an experimental group receiving *IE* and academic enrichment, a second experimental group who received a combination of *IE*, *CASE* (a creativity and socioemotional development programme extending the principles of *IE* to emotional development and creativity enhancement) and extra tuition in school subjects, and a control group which received no intervention<sup>[P1]</sup>. The programme showed learners who received *IE* to be significantly superior to the control group in terms of the degree of metacognition and bridging skills demonstrated, while a test of verbal reasoning significantly differentiated both experimental groups from the control group. Skuy (2002) also reports on a study which combined *IE* with a model of multicultural education and suggests that a combination of MLE and a programme for multicultural awareness may offer a good framework for promoting awareness and cross-cultural integration in South African schools.

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A programme which appears to produce long-term gains, is the Head Start programme in the United States of America, which was initiated in the 1960s as a way of improving preschoolers' intellectual abilities. Sternberg (2000) claims that long-term follow-ups have indicated that children who participated in the program, were more than a grade ahead of matched controls by the time they reached adolescence. They also scored higher on a variety of tests of scholastic achievement, were less likely to receive remedial treatment, and had fewer behavioural problems. Long (2000) also mentions that longterm gains in the Head Start programme were more likely when the intervention was long term, intensive and involved changes in the children's home backgrounds.

In the United Kingdom, Long (2000) reports that the Cognitive Acceleration through Science Education (CASE)<sup>9</sup> programme which is based on Vygotskian principles and focuses on metacognition, appears to be highly effective in raising the overall level of children's academic achievements in the long term as shown by their GCSE performance three years later. In the CASE programme complex, real-life situations are used and children are encouraged to reflect on their own thinking and to discuss their approach to problems with other children. Moreover, Long (2000) reports on studies that indicate that CASE has a generalised effect on thinking in a range of curriculum subjects and that the effects continue to be strong and positive even when implemented by workers other than the original team.

### 1.3.3 *Context-dependent approaches to cognitive intervention*

Apart from formally constructed cognitive intervention programmes, there are also a fair number of instructional approaches that aim to deal with the improvement of children's thinking in the classroom within the context of subject-matter. Ceci and Nightingale (1990) established earlier that context is important in the assessment of cognitive functioning because context acts to elicit certain strategies and resources over others. For example, Ceci and Liker (1986 in Ceci & Nightingale, 1990) found that expert gamblers' ability to do mental arithmetic on the WAIS was unrelated to their ability to do it at the race track. Ceci and Nightingale (1990) also reported on a study by Bronfenbrenner and Ceci that demonstrated how 10-year olds' ability to perform a distance estimation task increased when performed in an embedded context as opposed to a disembedded context.

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<sup>9</sup> This programme is not the same as the one reported on in Skuy (2002), also named CASE (Creativity and socioemotional development).

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In context-dependent approaches to cognitive intervention the onus rests on the teacher to teach thinking and it is generally done by teaching thinking skills and strategies while studying learning content. In this respect, Sternberg and Martin (1988) point out that virtually all teachers believe they teach for thinking, yet most teachers are uncertain whether their learners are actually learning to think. There are many reasons why teachers may think they teach for thinking while they do not, or why teachers very well do teach thinking, but the learners fail to benefit from these opportunities.

Sternberg and Martin (1988) believe that teaching style may be one reason why teachers think they teach thinking when in fact, they do not. Sternberg and Martin (1988) distinguish between a *didactic* (transmission) teaching style which is geared towards presenting new information, a *fact-based* (information-processing) teaching style suitable for recall of information, and a *dialogic* (sociocultural) teaching style which is geared toward the encouragement of critical thinking and discussion. Only the latter is really suitable for cognitive intervention, and yet many teachers find themselves primarily using either of the first two styles. Perhaps, as Sternberg and Martin (1988) suggest, this is because the dialogic style requires much more effort (which is not always forthcoming) on the part of the learners, and it is generally easier for teachers to expect less from their learners.

In addition to teaching style, there may be several other peripheral factors which limit the effectiveness with which teachers teach thinking. Firstly, teachers' knowledge of their subject and the skills which they use to convey that knowledge play an important role in the success of their learners. In a report on the President's Education Initiative (PEI) Trust (Taylor, 1999), some of the findings indicate that teachers who participated in the study have a poor understanding of the subjects they are teaching, that teachers only have a superficial procedural grasp of what they are doing, and that the teachers in the study generally showed an inability to relate different parts of a discipline to one another and to teach higher order cognitive skills.

In addition to their training, the monetary, psychological and social rewards (or perceived lack thereof) associated with teaching contribute greatly to teacher morale in general, which in turn influences teachers' motivation and their attitudes toward their learners. Long (2000) reports on a study by Borg *et al.* in 1991 that reveals that about one third of teachers experience moderate or severe levels of stress associated with learners' misbehaviour and time/resource difficulties. In Africa there is also an acknowledged shortage of teachers with appropriate training and teaching skills (Samoff, 2001).

While it is acknowledged that weaknesses such as those pointed out in the PEI project are partially due to inadequate training received by teachers teaching in historically black schools (Fleisch & Potenza, 1999), it appears that some of the bewilderment also stems from uncertainties and misconceptions surrounding the adoption of outcomes-based education (OBE) and the implementation of Curriculum 2005 (C2005) (Kok, Myburgh & Van Loggerenberg, 1999), and that teacher development workshops aimed at 're-training' teachers in the principles of OBE and C2005 are not succeeding very well (Pithouse, 2001).

Recently, Gersten, Vaughn, Deshler and Schiller (1997) pointed out that there may be a variety of reasons why research-based practices are not being adopted by teachers. Although their review primarily addresses teachers' adoption of research-based instructional practices, they make some valuable points that might be equally relevant to the degree to which teachers would consider adopting research-based cognitive interventions. Cognitive interventions invariably require teachers to change their instructional practice, and so there is much to be gained from paying attention to the way in which educational research in general translates to educational practice.

For example, Gersten *et al.* (1997) point out that researchers often underestimate the fact that teachers do not know how to implement material presented in research because it is based on fairly abstract theories. In addition, researchers often treat teachers as subjects who have to implement their research plans as opposed to professionals with extensive theoretical and practical knowledge bases. The failure of research-based interventions to deal with classroom realities, the lack of integration with current teaching practices and ambitious or ill-defined interventions that expect too much too soon are only some of the many factors that Gersten *et al.* (1997) say will impact negatively on the adoption of intervention practices by teachers.

Despite the numerous problems associated with teachers' adoption and/or implementation of cognitive interventions in the classroom, some studies have nevertheless shown that context-dependent approaches to cognitive intervention could be successful. In a study by Leshowitz, Jenkins, Heaton and Bough (1993) that aimed to improve the thinking skills of Grade 7 – 12 learners with learning disabilities, significant improvements were found in learning disabled students' ability to identify main ideas, critically evaluate claims made in newspaper articles and graph data. Leshowitz *et al.* (1993) developed an instructional unit focusing on teaching the principles of scientific reasoning and used student-teacher dialogues to engage the students in

an active process of critical inquiry. They found that, after working through the instructional unit, the special education students' performance exceeded that of a control group composed of regular education students who had not received instruction in critical thinking.

McNeil and Alibali (2000) report that children who were given externally imposed learning and performance goals in procedural instruction during a Mathematics lesson outperformed children who were not given learning and performance goals, and children who were not given learning and performance goals were more likely to apply their initial mental set in problem solving than children who were given goals. Vauras, Rauhanummi, Kinnunen and Lepola (1999) conducted a study to examine the effects of strategy training on at-risk learners' reading comprehension and Mathematics performance. They found that, although the children generally showed significant qualitative cognitive change, some students who were resistant to treatment efforts did not improve as much. From the results of this study, Vauras *et al.* (1999) report that the two factors that contributed to the success of strategy training, were early metacognitive and motivational readiness factors. Vauras *et al.* (1999) explain that higher psychological and motivational vulnerability leads to resistance in some children, making it more difficult for them to benefit from cognitive intervention.

An important aspect of the Vauras *et al.* (1999) study, like that of Hubbs-Tait *et al.* (2002), is that the study maps the relationship between cognitive and affective variables in order to explain why some children fail to develop critical thinking skills despite adequate instruction, and why cognitive interventions do not always lead to gains in academic performance. These studies also show that it may be important to pay closer attention to the development of learning inclination (disposition) as an aspect of cognition that is relevant to children's attitudes toward problem-solving. Even though children may develop (through cognitive intervention) in terms of their declarative and procedural awareness and knowledge of thinking skills, attention to the emotional dimension of thinking may shed light on the development of children's conditional awareness of thinking skills, that is, the extent to which they know when to use the thinking skills that they have acquired in cognitive intervention programmes.

#### 1.3.4 *The current status of cognitive intervention*

The field of cognitive intervention is well-researched. Some of the most popular areas of investigation include research on interventions that target the development of *perceptual skills* (De Bono, 1976, 1991), *cognitive deficiencies* (Feuerstein, 1980), *critical thinking skills*

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(Leshowits *et al.*, 1993), *higher order thinking skills* (Lombardi & Savage, 1994), *self-regulatory skills* (Boekaerts, 1997), *general skills of thinking and reasoning* (Marzano, 1998), and *classroom discussion* (Larson, 2000). Research has also been carried out in various academic contexts, ranging from *communicative language teaching* (Swartz, 1991), and *reading* (Das, Parilla & Papadopoulos, 2000), to *science* (Shepardson, 1999), *mathematics* (McNeil & Alibali, 2000), and even *counselling* (Falik, 2000).

In a review of some of the most current and promising approaches to cognitive intervention, Newsome (2000) points out that the study and practice of cognitive intervention is beset by problems such as researchers' and theorists' inability to identify and understand the psychological and cognitive mechanisms that underlie thinking skills, the absence of systematic and extensive research on the nature of thinking and its development, and lack of consensus about the meaning of terms such as 'critical thinking', 'problem solving' and how complex reasoning skills are related to one another.

Newsome (2000) concludes that it may be time to re-assess the direction in which research in cognition and cognitive intervention is moving and suggests:

At this point in theory development there seems to be a need to reassess the major models and theories of thinking skills in a sympathetic yet critical manner...It may be desirable to seek a more comprehensive framework or paradigm for understanding thinking skills than those now in use. Such a framework could encompass the models and theories now in use and help to foster newer ones as well. Within a newer framework or paradigm, the principles of cognitive psychology, neuropsychology, cognitive science, developmental psychology, and theories of human intelligence might be more easily integrated (p. 200).

However, apart from reviewing some major models and theories of cognition that have been offered by psychologists and philosophers, Newsome (2000) unfortunately fails to offer any suggestions as to how such a comprehensive framework of cognition might be constructed, or what it might entail. Whether a comprehensive framework of cognitive functioning is at all an attainable goal, is a question well worth asking. What does seem clear though, is that approaches to cognitive intervention appear doomed to be nothing more than fragmentary, incoherent attempts at developing cognition as long as the cognitive theories they are based on continue to reflect the theoretical confusion characteristic of research in cognition.

To underscore this point, I wish to draw an analogy between two different but related fields that both address problem-solving in different contexts. The first is **cognitive intervention** which

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deals with problem-solving in academic and educational contexts, and the second is **psychotherapy** which deals with problem-solving in predominantly intra- and interpersonal contexts. As with theories of cognition and approaches to cognitive intervention, the field of psychotherapy is characterised by many different psychological theories and treatment models, each claiming to be unique and superior in terms of treatment outcomes (Miller, Duncan & Hubble, 1997).

Despite the preponderance of research data that show that all psychotherapeutic treatment models work about equally well, psychotherapists curiously continue to believe that certain treatments work better for particular problems than others. I believe that much the same situation exists in the field of cognitive intervention. A host of cognitive intervention programmes are used in schools and organisations and most rely on research evidence that point to the superiority of their approach to teaching thinking. Yet, while it is acknowledged that some cognitive intervention is better than no intervention at all, it remains unlikely that any current approach to cognitive intervention can assert superiority over other approaches.

The question that arises is this: Why is it important to have unique cognitive intervention programmes or psychotherapeutic tools if hardly any evidence exists for the usefulness of such a situation? Miller *et al.* (1997) provides the following insight:

Obviously, the emphasis on difference must be about something other than concern for increasing the effectiveness of therapy<sup>10</sup>. What that something might be is, of course, a matter of conjecture. One possibility, however, is that model developers are trying to influence and impress their primary consumers – not clients, but *other therapists*<sup>11</sup>. Therapists are the ones most likely to be interested in one theory or the other, to use the various models to conceptualize and organize their clinical work, and to buy professional books and attend training workshops....To succeed in the “therapy model marketplace,”<sup>12</sup> the proponents of a particular brand of treatment must somehow manage to make their model stand out from the competition....One way to distinguish a treatment model from others without validating data is to develop a special language or way of talking about the theory and techniques that is exclusive to that model....In essence, models are made to *seem* different....because they *sound different*. (p. 9-11).

However cynical this may seem, one has to acknowledge that the developers of various commercial cognitive intervention programmes do gain considerably from the extent to which their consumers (teachers, psychologists, schools and organisations) believe in their claims of

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<sup>10</sup> Read *cognitive intervention*.

<sup>11</sup> Read *teachers/psychologists/schools/organisations*.

<sup>12</sup> Read *cognitive intervention marketplace*.

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uniqueness and superiority. And while it is clear that many cognitive intervention programmes do produce positive outcomes, it cannot be automatically assumed that those effects are due to the unique approach of the programme. As current data on the effectiveness of psychotherapeutic models show, positive outcomes may very well be associated with a set of factors common to all treatment models. Similarly, positive results across cognitive intervention programmes are perhaps more indicative of their commonalities rather than their distinctiveness.

For example, Miller *et al.* (1997) point out that the common factors that contribute most to successful therapy are (i) extratherapeutic factors (clients and their environment) which are estimated to account for about 40% of all improvement, followed by (ii) therapy relationship factors which are estimated to account for about 30% of the improvement, and then (iii) model and technique factors, and (iv) expectancy, hope and placebo factors, each of which account for approximately 15% of improvement in therapy. Is it not possible that the gains often reported with various cognitive interventions may also be attributable rather to a set of elements common to all cognitive interventions rather than their unique approach or method? For example, Skuy (2002) states that the effectiveness of *IE* is heavily dependent on the quality of the mediator and suggests that a focus on interpersonal interaction can have a positive influence on cognitive functioning, pointing to the importance of relationship factors as discussed by Miller *et al.* (1997). Furthermore, Skuy (2002) reports in a separate study that students who are task-oriented, flexible and adaptable tended to perform significantly better on certain cognitive intervention and transfer tasks, pointing to Miller *et al.*'s (1997) client factors as the most important variable to influence the success of therapeutic (and therefore cognitive) intervention. This may help to explain why learners simply do not benefit equally from cognitive intervention.

Long (2000) reports on numerous studies that investigated the effects teachers have on the academic achievement of their learners and show that teacher effects are rather limited and mostly not more 10%. Long (2000) argues that the main reasons may be that teachers' effectiveness is largely constrained by learners' abilities (client factors), and that teachers nowadays appear to do more supervision than teaching and they are normally able to have only very limited and superficial interactions with individual children (relationship factors). Studies that investigate the effectiveness of various approaches to cognitive intervention usually do so over a period of time during which special time is allocated and dedicated to a particular type of cognitive intervention. Therefore, it may very well be that the gains reported in such studies could as much be attributed to the more intense, focused and meaningful interaction between the instructor and the child, hope and expectancy factors on the part of the child, increased

motivation and positive response to the task because of individual or increased attention, and not only to any particular approach to cognitive intervention.

Cognitive intervention is a collaborative process of joint problem-solving which involves both the instructor and the child on cognitive, psychological and social levels. It is fairly widely acknowledged that real-life problems are complex and that children need to learn to deal with such complexity if they are to become effective problem-solvers, regardless of the context of the problem. To help them, we need to address cognition as a complex phenomenon and this could mean less attention to idiosyncratic aspects of cognition as they are revealed in particular tasks and domains and more attention to the complex cognitive dimensions that inform all cognitive intervention efforts.

In meta-narrative 1.2, the research questions and subquestions that guided Chapter One are addressed and refined in order to provide the modified research problem that will direct the literature review in Chapter Two.

**META-NARRATIVE 1.2**

