Chapter 2

2. Theoretical Framework

2.1. Introduction

Vygotsky's (1978) theory that psychological processes need to be understood in terms of their developmental history has important implications for the current study as it calls for the analysis of behaviour that is observed within the social and cultural context of its manifestation as well as in terms of its developmental history. According to the early socio-cultural or cultural-historical theorists (Lev Vygotsky, 1987, 1981, 1978, 1962; Alexei Leontiev, 1982; 1981, 1978 and Alexander Luria, 1979, 1976), thinking, or cognitive activity, is conceived as being inextricably interwoven with the context of its manifestation. That is, an understanding of the circumstances, or context, of the activity is essential for the purpose of developing an adequate theory of cognitive development and functioning. In this view, context could be viewed as comprising both the physical and the conceptual structure of the problem, as well as the purpose of the activity and the social milieu in which it is embedded (Rogoff, 1994). This framework is of specific relevance for the current study of the relationship between the context of schooling, in terms of its social and cultural history on the one hand, and the classroom practices of teaching and learning and their cognitive consequences on the other hand.

The specific questions that arise out of this consideration of the relationship between the cultural context of the practice of schooling and its consequences on the participants' psychological development and functioning includes, among others:

- How should the notion of cultural context be theoretically understood, and
- How does this context relate to, and influence, the institutional practices of schooling and their consequences for cognitive development and functioning.

Vygotsky's theory, and its related post Vygotskian, Activity Theory paradigms—discussed below provides a theoretical framework within which to interpret, and explain the cognitive consequences of the rapidly evolving socio-cultural practices of the present schooling system. The quest to understand the evolving context of schooling

begins by considering the notion of context in its relation to human mental developmental and functioning.

2.2. Towards a theoretical conception of a cultural context of cognitive development and functioning

To understand classroom practices and their cognitive consequences in African settings it becomes crucial to develop a theory of context that incorporates the complexity of the educational phenomenon in this particular setting. Cole (1996), and Cole; Gay; Glick and Sharp (1971 have outlined the difficulties that context, situations, or locally organised activities, may pose to the researcher's quest to understand cognitive development and functioning. Four decades after these studies were conducted, the phenomenon of learners performing poorly on school tasks but manifesting competent performance on non-school tasks and everyday-life problem situations continues to characterise African schooling. To understand the phenomenon in its complexity, it is necessary to consider the circumstances of its manifestation.

Cole (1996) discusses two apparently contradictory, but essentially complementary, ways in which the notion of context is generally conceived in sociocultural studies. The first view conceives of context as "that which surrounds" a particular event, task or activity to be studied. This view is often represented, according to Cole, as a set of concentric circles representing different levels that surround the unit in the middle. The middle unit may involve a task or an activity in which subjects are engaged. Cole (1996) argues that when using the "surrounds" interpretation of context, the psychologist seeks to understand how the successive levels of the concentric circle shape the task, conceived of as the unit in the middle. In applying this notion of context to educational issues, a teacher-pupil exchange may be conceived as the unit in the middle, while the concentric circles are comprised of the lesson in which the exchange takes place, the classroom within which the lesson occurs, the school which is constituted by the individual classrooms, and the community within which the school is located (Cole, 1996).

These levels of context are, however, not to be understood as temporally ordered in a simple manner. “That which surrounds” may, in fact, occur before, after, or simultaneously with, say, the pedagogic act in the middle of the concentric circle. The complex temporal interdependence among levels of context suggests strongly that the levels of context constitute one another. In the example of classroom teaching and learning, above, a teacher-pupil exchange, for instance, cannot be viewed as being influenced by the higher levels of context, in the sense that one could say that the lesson is shaped by the classroom it is part of, while the classroom is shaped by the type of school it is in, and so on. Rather than their actions being caused by the successive levels of context, the participants in the lesson must be actively engage in a consensual process of creating a lesson. Therefore, while more inclusive levels of context may constrain lower levels, they are not to be understood as causing them in a mechanistic manner. Teachers may, for example, differ in the way in which they interpret the curriculum, while classroom environment may offer different learning opportunities to learners who are differently prepared for schooling (Cole, 1996).

Cole (1996) discusses a second view of context, as “that which weaves together”. This view, conceives of context as constituted by an intertwining threads that stretches into a continuous rope that does not immediately reveal its internal discontinuous fibres, of which the rope is, in fact, made:

> [...] sometimes I like to think of a rope. The fibers that make up a rope are discontinuous; when you twist then together, you don’t make them continuous, you make the thread continuous...even though it may look in a thread as though each of those particles are going all through it, that isn’t the case [...] Obviously I am not talking about the environment, I am not talking about inside and outside. I am talking about the conditions of the system (McDermott, 1990; in Cole, 1996: 135).

This notion of context suggests that there is an inextricable relation among the various elements that make up the context. When a classroom activity is viewed in this way, this notion of context suggests that the past aspects of such an activity, in terms of the previous lessons already conducted, previous learning and teaching histories of

teachers and learners and, perhaps, their projected goals of learning, are simultaneously implicated. However, the “here and now” of the classroom activity, metaphorically represented by the fibres that are, in fact, discontinuous, constitutes the creativity of the agency of teachers and learners, whose actions do not necessarily have a causal connection to the past elements of the activity. In spite of the relative independence of the present activity, its manifestation is to be viewed as developmentally connected to, and mutually constituted in, the complex whole of an intricate system of human social activities. Vygotsky’s theory (1987, 1981, 1978, 1962) provides a powerful tool for accounting for the process by which psychological phenomena originate from the activities of human society and culture. This allows for explanation of the process and the means by which psychological functions arise from the relations and activities of the culture and society of the subjects.

2.3. Vygotsky’s Theory of the Cultural Development of Higher Psychological Functions

During the first half of the twentieth century, Lev Vygotsky (1987, 1981, 1979, 1978, 1962) developed a theory that accounts for the cultural origin and development of psychological processes. This framework is important for the current study in that it takes into account the cultural context of development. Specifically human psychological processes, the “higher psychological functions” are viewed as originating in human social and cultural activities. These activities comprise the cultural context that gives rise to the development of the higher psychological processes. Therefore, to explain psychological processes in an individual, one’s analytical focus must begin with the analysis of the social and cultural context within which individual psychological development and functioning occurs. For example, to understand the ways in which learners make sense and use concepts that they learn in school, we need to analyse the teaching and learning activity of schooling. This analysis implies that we understand not only the knowledge of the teacher, her beliefs and assumptions about knowledge and learning and her learners’ readiness to learn, but also the manner in which school knowledge is organised as curriculum content and structure and how this informs and influences the teacher’s practice. In this way, both the specific character of the concepts

represented by the curriculum and the specific modes of the teaching and learning of these concepts in the classroom, as well as the resultant knowledge of the learners, are understood as arising from, and influenced by, the social and the cultural setting of the institution of schooling.

There is an apparent similarity between the research agenda of the early sociocultural scholars and the present South African research concerns, especially with regard to the quest for the appropriate educational means for transforming thinking processes to bring about more effective and productive participation in the rapidly changing social and political dispensation (see Matusov, 2006). However, there is a wide temporal (historical-societal) gap between the sociocultural situational contexts of the present South African investigators *vis a vis* their classical scholarly forerunners (especially Vygotsky and Luria) in the former Soviet Union who conducted their work during the early years of the twentieth century. Clearly the political and economic ideologies of the early twentieth century would differ substantially to those that would pertain with regard to the present global dispensation dominated by a single global political and economic power (compare some of the ideological consequences for this phenomenon on research and scholarly activity in Matusov, 2006). The point of particular interest here is on the relationship between the concrete socio-political setting in South Africa and the specific socio-political and educational concerns that inform and influence the present research agenda and the specific interest in the Vygotskian theoretical framework.

More specifically, Vygotsky and his collaborators were particularly interested in the impact that the socio-political changes occurring in their society in the first half of the twentieth century would have on people's psychological constitution. Simultaneous with this, they were also interested in the impact that formal schooling had on the development of mental functions, and how school teaching could be structured in such a way that it facilitates the learning and development of skills and knowledge appropriate for the rapidly changing socio-economic context of the post-revolutionary Russia (cf. Stetsenko, 2003). The period comprising the beginning of the twentieth century was characterised by rapid social and political change in Russia. After the revolution, the social organisation was changing from a largely agrarian to a commercial

and technologically driven society. The feudal system was being replaced by a new socioeconomic activity characterised by collectivised agricultural activity, industrialised economic system, provision of schooling and literacy programmes to the broader Russian populace, as well as an electoral political system (Luria; 1979; 1976; Cole, et. al., 2006).

The changing social situation, together with the introduction of formal schooling, provided a research setting for investigating the psychological consequences that these changes, and the teaching and learning of new concepts and ideas during schooling, would have on the rural Russian population. This situation, although qualitatively different from the prevailing conditions in South Africa today, have some elements that may be equivalent to the present South African situation.

In South Africa today, society is undergoing rapid socio-political changes ushered in by the demise of the repressive apartheid political system and the introduction of a democratic national dispensation. The new political dispensation was accompanied by widespread changes in the organisation of society. Crucially, and with far reaching consequences, are the fundamental changes that the entire South African schooling is going through. These changes in the schooling system, and the radical transition that they represent, have far reaching consequences for classroom practices. The new curriculum calls upon teachers to change the way in which they have understood the entire process of teaching and learning; the role that they have assumed during this process; their beliefs and assumptions about knowledge and learning and the role of learners in the pedagogic encounter. It is essentially their notions of being in the classroom and that of being a teacher that the new dispensation, through the medium of the curriculum, calls upon teachers to change and adopt new ways of being that are radically different from that which pertained in the old political order.

It is these intricate relations between the subjects' society and culture and their psychological consequences that the present study focuses on investigating. Vygotsky understood mental functioning of the individual as something that can be understood only by first examining the social and cultural processes from which it derives (cf.

Minick, 1987). This involves, as Wertsch and Tulviste (1992) have argued, an analytic strategy that may appear to be paradoxical in that it calls on the investigator to begin the analysis of mental functioning in the individual by going outside the individual. This strategy was clearly formulated in Vygotsky's general genetic law of cultural development:

> Any function in the child's cultural development appears twice, or on two planes. First it appears on the social plane, and then on the psychological plane. First it appears between people as an interpsychological category, and then within the child as an intrapsychological category [...] Social relations or relations among people genetically underlie all higher functions and their relationships (Vygotsky, 1981b: p.163).

According to this framework, individual psychological development is fundamentally rooted in social and cultural relations. To understand individual psychological functioning we cannot look at the individual in isolation from his social relations. Individual psychological processes are conceived as partially social in their character; so that one can speak equally appropriately of mental processes occurring inter-psychologically, that is, between people, in dyadic or small group interactions, as intra-psychologically, within individuals (Wertsch and Tulviste, 1992). Vygotsky's theoretical framework, therefore, gives analytic priority to the social, inter-mental or inter-psychological functioning in that it views intra-mental (or intra-individual) psychological functioning as deriving from the mastery and internalization of social processes.

While Vygotsky gives analytic priority to the social and cultural processes in understanding individual psychological functioning, he held a particular understanding of these concepts in his overall theoretical framework. Vygotsky viewed cultural and social processes as analytically distinct but inextricably linked in concrete human activities (Wertsch and Tulviste, 1992). In his clarification of the notion of the social and the cultural, Vygotsky provides the following outline:

> [...] the word "social" when applied to our subject has great significance. Above all, in the widest sense of the word, it means that everything that is cultural is social. Culture is the product of social life and human social activity. That is why

> just by raising the question of the cultural development of behaviour we are directly introducing the social plane of development (Vygotsky, 1981b: p.164).

Vygotsky seems to conceive of the social and the cultural as practically indistinguishable while the distinction could be made only for purposes of theoretical analysis of the concepts. Vygotsky did not, however, provide an adequate explanation of these notions within his framework, particularly with regard to their respective implications for the development and functioning of human psychological processes. One example of this can be seen in his definition of the concept of the zone of proximal development (ZPD) (Vygotsky, 1978), which is defined in terms of human social relations during dyadic problem-solving situations. This definition was never extended to accommodate the possibility that such socio-pedagogic relations, occurring in the learner's zone of proximal development, may produce different learning and developmental results when carried out in different cultural contexts. That is, the mediation of school-specific concepts during classroom learning, for example, may have a different, and inappropriate developmental consequence if they are not mediated properly and related meaningfully to learners' existing knowledge and experiences while expanding the horizons of this knowledge and providing new learning and understanding.

This apparent lack of an adequate explication of the concepts of the "social" and the "cultural" in Vygotsky's theoretical analysis has led Wertsch and Tulviste (1992) to suggest that his use of these concepts was primarily motivated by his methodological approach to studying human psychological processes rather than by a need to provide a purely theoretical account for the concepts themselves. Therefore, Vygotsky's emphasis seems to be on developing an account of how culture, manifest in human social relations, accounts for the emergence and development of human psychological processes from their natural, elementary, processes. To this effect he argues that, "culture creates special forms of behaviour, changes the functioning of mind and constructs new stories in the developing system of human behaviour" (Vygotsky, 1983a: p.29).

Culture, in this sense, functions like a tool by which humans change themselves into social and cultural species, fundamentally different from their non-human counterparts. The change, in terms of Vygotsky's general framework, takes place at different levels: firstly, at the social, inter-mental or inter-individual plane, and secondly, at the psychological, intra-mental or internal developmental plane. Other humans mediate the child's thinking by structuring and organising it from the outside, changing the natural, elementary, processes into mediated processes through the use of cultural tools such as language. These cultural-psychological tools are subsequently transformed by the activity of the child into intra-mental, psychological, processes that the child uses to control its behaviour. First, there is a level where others use culture to mediate the child's thinking and development, and, second, a level where the child herself uses culture to mediate and regulate her own thinking and development. At both levels, culture does this by " …determining the structure of a new instrumental act, just as a technical tool alters the process of a natural adaptation by determining the form of labor operations" (Vygotsky. 1981c: p.137).

The elaboration of the development of the pointing gesture (Vygoysky, 1978) provides an appropriate example of the first transitional stage in the development of specifically human psychological processes. This example illustrates the fundamental shift from the elementary mental functions where behavioural control is predominantly with the environment, to the culturally mediated higher mental functions. According to Vygotsky, the development of pointing starts as an unsuccessful attempt to grasp objects placed beyond a child's reach; a behaviour that, initially, is an object-oriented motor movement but which changes into an indicatory gesture or act of pointing and a means of establishing relations in a social situation. What was, initially, an object oriented motor movement, and a lower or elementary function, is physically simplified and modified, gradually, into a form of gesture which conforms to the socially significant meanings and functions established by others. This process involves the child integrating the adult's meaning into its elementary, unmediated, behaviour system and modifying its actions to fit the culturally mediated forms of actions and meanings (Vygotsky, 1978: pp.56-57).

In Vygotsky's framework, this illustrates the cultural mediation of human psychological behaviour whose developmental circle is only concluded with the intra-individual, or intra-psychological, process of internalisation or interiorisation. Internalization involves not only the transference of external, social, processes into the internal, mental, plane of the child, but also the transformation of socially and culturally mediated functions into the internal, intra-psychological plane of the child's development. While the first transitional stage in the development of the specifically human, culturally mediated, higher psychological processes accounts for the developmental relations, and the inter-processural, transformation that occur between the natural, elementary processes and the culturally mediated, higher psychological processes, the second transitional stage in Vygotsky's conceptual system focuses on the qualitative transformation that is accounted for by the quality of the mediational process. This involves the characterization of the qualitatively different mediational process that characterise a particular socio-institutional activity vis a vis the general, everyday-life, social activities. Formal schooling is characterised as involving a qualitatively different mediational processes and cultural tools that fundamentally distinguish it from other systems of human social activities. As a result, the socio-institutional mediational processes of formal schooling, within the Vygotskian system, are presumed to constitute a second (major) transitional stage. This stage is characterised by the interaction or the clash between the child's cultural learning and developmental processes and the learning and developmental demands of the institution of formal schooling (Vygotsky, 1978; 1962; Kozulin, 1990; 1986).

2.4. The socio-institutional organization of psychological processes

The institution of schooling, and its cognitive consequences on learners' learning and development, was at the heart of Vygotsky's theoretical and research interests. This is evidenced by Vygotsky's specific interest in developing the conceptual system for explaining the relationship between learning and development. In this regard, Vygotsky (1978) introduced the concept of the zone of proximal development (ZPD), a concept

that is now widely applied in educational research and pedagogical practice (cf. Chaiklin, 2003). Vygotsky defined the zone of proximal development as:

> [T]he distance between the actual developmental level as determined by independent problem solving and the level of potential development as determined through problem solving under adult guidance or in collaboration with more capable peers (1978:p.86).

In this well known definition, Vygotsky defines the ZPD in terms of the relations between the psychological functions that have already developed in the child and those functions that are in the child's developmental potential, as determined by child's assisted performance. The relations between actual developmental level and the potential developmental level, determined through unassisted and assisted performance, respectively, has captured the attention of most modern educators and educational researchers as providing justification for pedagogical relations and as an alternative to educational models that suggested learner autonomy and unencumbered classroom learning enquiry (Chaiklin, 2003; Kozulin, 2003).

In his definition of the concept of the zone of proximal development, Vygotsky (1978) emphasised the micro-social relations between teacher, or adult, and learner, with regard to task engagement. Herein is the very source of the power of the concept of the ZPD for pedagogical purposes. However, as Chaiklin (ibid.) has argued, the explanatory potential of the concept of the ZPD, with regard to child development, is often lost in favour of its pedagogical dimension. In other words, we tend to lose sight of the original purpose for explaining development and how development is possible when learning guides it and creates the zone of proximal development for the child. Vygotsky's account of the ZPD also defines the child's developmental potential as variable among children of the same age and supports the idea that the chronological age of a learner is not necessarily equivalent to his psychological age. As a result, the teaching that is properly structured to suit an individual child's ZPD is crucial in terms of bringing about cognitive development. The concept of the ZPD further provides Vygotsky (1978) with evidence of the educability of human beings and the capacity of the human society and culture to lead the development of thought in ways that are never encountered in other non-human species:

> [P]rimates cannot be taught (in the human sense of the word) through imitation, nor can their intellect be developed, because they have no zone of proximal development. A primate can learn a great deal through training by using its mechanical and mental skills, but it cannot be made more intelligent, that is, it cannot be taught to solve a variety of more advanced problems independently. For this reason animals are incapable of learning in the human sense of the term; *human learning presupposes a specific social nature and a process by which children grow into the intellectual life of those around them* (Vygotsky, 1978: 88, emphasis in the original).

This point has far reaching consequences for educational practice because it demands a revolutionary conception of the relations between learning and development, specifically with regard to the role of educational processes in the learning and development of learners in formal educational settings. Learning that is oriented towards development of children's intellectual capacities, within their society and culture, creates ZPDs that might never have emerged if they were not introduced into formal education. Vygotsky (1978) contends that human mediation, specifically classroom instruction, if offered in the child's ZPD, produces qualitative transformation of thought and contributes to the development of mental capacities that otherwise would not develop. While Vygotsky's analysis conceives of the relationship between learning and development broadly, in terms of how learning creates ZPDs, the focus remains on consideration of the implications of this analysis for formal learning in school:

> Our analysis alters the traditional view that at the moment a child assimilates the meaning of a word, or masters an operation such as addition or written language her developmental processes are basically completed. In fact, they have just begun at that moment. The major consequence of analysing the educational process in this manner is to show that the initial mastery of, for example, the four arithmetic operations provides the basis for the subsequent development of a variety of highly complex internal processes in children's thinking (Vygotsky, 1978: 90).

Vygotsky argued that the developmental process lags behind the learning process and although the sequence results in ZPDs, learning is not development. However, properly organised learning results in mental development and sets in motion a variety of developmental processes that would be impossible without learning. There is therefore a unity, but not identity, between the learning process and the developmental process. The process of learning is converted into the child's development through internalization, which involves the transformation of external social relations (involving learning) into internal psychological processes. In this regard, the aim of psychological and educational analysis of development is, according to Vygotsky, to describe these relations and to reveal the course of the developmental processes in learners that are stimulated by the course of school learning.

The concept of ZPD in Vygotsky's framework had important implications for educational processes. It challenged psychological testing procedures whose goal was to determine mental capacities of children with the purpose of specifying curricula and pedagogical limits on their learning. Furthermore, it challenged the assumptions that special education programmes should focus exclusively on concrete content and procedures for learning, the "look-and-do" approach, and be limited to this method. The concept of the ZPD most crucially with regard to the present study has far reaching implications for the new South African educational system. It suggests that learning which is oriented towards the already completed developmental levels, or what learners already know and can demonstrate through unassisted performance, is not effective.

This approach, in school learning, does not aim for a new developmental achievement on the part of learners, but lags behind this process (Vygotsky, 1978). This approach to learning and development, again, has implications for the analysis of the nature of educational processes in the past political dispensation in South Africa, specifically as to how the predominant mode of learning, then, produced limitations on learners' developmental potential. It is of interest to consider if the new curriculum in South African, and its application in concrete teaching and learning situations, is providing learners with opportunities to engage in effective learning that produces mental development.

2.5. Applications of the Zone of Proximal Development to classroom teaching and learning

Vygotsky provided a general framework for the analysis of how the socio-institutional processes of formal schooling, specifically with regard to the classroom practices of teaching and learning, create new ZPDs for learners. Studies conducted within the Vygotskian Sociocultural and Activity Theory research framework illustrate the application of the concept of the ZPD, and how this concept accounts for the developmental relationship between the processes of learning and development (Arievich and Stetsenko, 2000; Hedegaard, 2002; 1996; 1990; Wertsch, 1985; 1984; 1981; Zuckerman, 2003; Gindis, 2003; Schmittau, 2003; Miller, 2003; Haenen, Schrijnemakers & Stufkens, 2003).

2.5.1. The Zone of Proximal Development and Pre-School learning

Wertsch (1984; 1979) discusses how adults, in a task problem-solving situation, provide strategic guidance to the children in their zone of proximal development. The task situation involves pre-school children, under guidance from their mothers, constructing a copy object, in the form of a cargo truck, in accordance with the model object. The construction, to be made from the individual pieces of blocks of different colours and shapes, is to be based on another object, a model, which children are instructed to consult. The model should guide the children in their decisions about the appropriateness of each individual piece that they choose from the given pile to construct a copy of the object. In this task, Wertsch presents the following strategic steps (Action Pattern 1) as prerequisite for constructing an accurate copy object in accordance with the model:

Action Pattern 1

Step 1: Consult the model to determine the identity and the location of the piece needed next.

Step 2: Select the piece identified in Step 1 from the pieces pile.

Step 3: Add the piece selected in Step 2 to the copy object in accordance with its location in the model.

These reflect the adult's definition of the task situation but the child may define the task situation differently. In Wertsch's (1984; 1979) study above, the child represented the task objects in a manner that did not take the model into account. The action pattern (Action Pattern 2) that corresponds to the child's representation can, according to Wertsch, be represented as:

Action Pattern 2

Step A: Select a piece from the pieces pile.

Step B: Add the piece selected in Step A to the copy (1984: p. 81).

Wertsch argued that the adult task representation that informed the strategic steps specified in Action Pattern 1, above, involved the zone of proximal development of the instructional activity. The representation that informed the steps in Action Pattern 2 defines the child's actual level of development. The inter-psychological, semiotic mediational processes that involve the dyadic instructional activity create an intersubjective situation and guide the child into a qualitative transition towards an understanding of the task that initially lay in the child's zone of potential development.

This example illustrates the application of the concept of the zone of proximal development in spontaneous socio-cultural settings of dyadic relations. The form of adult mediation and children's spontaneous activities can be related to the specific societally determined activities and traditions (cf. Elkonin, 1971 in Hedegaard, 1990). Wertsch (1984; 1979) identifies two distinct forms of semiotic mediation that have specific relevance to the current study. The first one involves the explicit use of the model, as a means for generating task mastery, through the use of directives that comprise the strategic steps specified in Action Pattern 1. This is a form of mediational process that produces conceptual forms of learning and thinking (see Kozulin, 1990).

The second mediational form involves the use of directives that require the child to carry out actions that produce appropriate results without the need for the child to understand the principles that underlie the nature of the task. That is, the adult could direct the child

to pick up the red colour piece and place it next to a blue one to produce a copy object, without the child having to understand that the pieces and their locations correspond to the model. In spite of the adult directives producing competent actions on the part of the child, this later form of mediated activity system reproduces what, in Vygotskian terms, may be referred to as complexes or pre-conceptual forms of thinking.

Classroom practices of teaching and learning that are based on the modalities of the first mediational strategy in Action Pattern 1and are, for example, based on the use of models, are likely to generate task mastery that facilitates abstract-theoretical, and school-specific, forms of knowledge and learning. However, the practices that are based on the second mediational strategy in Action Pattern 2, and which involve the use of directives that require learners' to carry out actions that produce appropriate results without understanding the principles that underlie the nature of the task at hand, would be inappropriate for fostering formal, scientific and theoretical forms of knowledge and learning in school. These patterns of mediation are investigated in the present study.

Vygotsky also emphasised the crucial role of language and speech for the development of conceptual forms of thinking (Vygotsky, 1978; 1962; Kozulin, 1990; Wertsch 1993; 1986; 1984; 1979). An assertion that there is a qualitative transition through children's ZPD that is orchestrated by the dyadic, socio-culturally determined, inter-psychological and inter-subjective, task-based processes is therefore consistent with the Vygotskian framework. More crucially, Wertsch's example above may be used to understand the socio-culturally shaped dyadic practices and their cognitive consequences on children's learning and development in their everyday, spontaneous, and pre-school activities. These dyadic, meditational processes constitute the use of symbols such as models and language for mediating learning and development. Language, the way in which it is used to mediate learning and development in school, differs qualitatively from its, spontaneous, everyday use. Wertsch's example of the meditational processes involved in Action Pattern 1 and Action Pattern 2, discussed above, illustrates the differences between school-specific modes of teaching and learning on the one hand, and the everyday, spontaneous, modes of teaching and learning on the other hand. These

differences are considered in the discussion of classroom teaching and learning in chapters four and five respectively.

The construct of the ZPD provides insight into the learning and developmental consequences that a particular meditational strategy would produce. The two lesson situations below further illustrate the application of the concept of the zone of proximal development to educational processes, specifically to classroom teaching and learning practices that would be useful for thinking about possibilities for improving contemporary South African classroom practices.

2.5.2. The Zone of Proximal Development and School Learning

Vygotsky (1978) introduced the concept of the zone of proximal development to illustrate the qualitative changes that occur in children's thought processes as a result of the formal learning in school. Vygotsky argued that learning as it happens during the child's pre-school years is markedly different from the learning that occurs during formal schooling, which is concerned with the learning of the fundamentals of scientific knowledge. The introduction of the scientific form of knowledge to children, and the associated methods of its acquisition, creates, in learners, new zones of proximal development. Thus, learning formal knowledge in school changes the course of development and creates new developmental pathways, which might not occur otherwise. By scientific concepts or scientific knowledge, Vygotsky does not necessarily mean the knowledge of the natural science disciplines. Scientific knowledge refers to the humanities, languages, arts, as much as it refers to physical science. This form of knowledge is characterised by its systematicity, abstractness and generalisability (Vygotsky, 1978; 1962).

The distinction between the scientific concepts that relate to formal learning in school and the spontaneous concepts that are acquired out of school in everyday-life is crucial for understanding the internal developmental relations and changes that school learning generates. Kozulin (1990) has argued that the level of acquisition of scientific concepts represents the potential level of development, while the spontaneous concepts acquired represent the child's actual level of development. Leontiev also supports the view:

> The degree to which the child masters everyday concepts shows his actual level of development, and the degree to which he has acquired scientific concepts shows the zone of proximal development (1985; In Hedegaard, 1990: 48).

For the child to acquire scientific concepts, she should have some experience with generalisations that involve the spontaneous, everyday concepts. As was illustrated through Wertsch's (1984; 1979) model-copy construction task above, these generalisations may take one form or the other, depending on the specific culturally organised mode of the semiotic mediation that children are exposed to.

Kozulin (1990) argues that scientific concepts appear as changeable dynamic structures. These concepts are not assimilated by the child in a ready-made form, but require a special adaptational process in their interaction with the spontaneous, everyday concepts. This process explains the transformational changes that characterise the development of the child's thought as she actively integrates scientific concepts with her already existing everyday representations. Scientific concepts, therefore, cannot be taught effectively by rote learning because they necessarily involve a genuine act of thinking on the part of the child. This involves the child formulating meanings and making sense of the concepts, models and ideas on her own.

There is an inherent structural relationship between scientific concepts, encountered as a result of educational processes, and spontaneous concepts, acquired during everyday situations. Vygotsky concludes that the scientific concepts represent education while the spontaneous concepts represent development (cf. Kozulin, 1990; Daniels, 2001). This implies an interaction, and a contradiction, between the demands of society and culture on the child, to acquire specific forms of knowledge that are socially valued, and the individual child's interests and needs represented by his spontaneous activity (which may also involve adults when assistance is required, as in Wertsch's example of the copy-model construction task above).

The learning of scientific concepts is mediated from the start, not by objects in the environment of the child, but by other concepts that are systematically related to the specific concept to be learnt. That is, systems of concepts that imply intricate levels of

generality mediate the child's relationship with the object of learning. According to Kozulin (1990), scientific concepts originate in the highly structured activity of school learning and are characterised by hierarchical and logical organisation. Spontaneous concepts on the other hand are experientially rich and bound by concrete life contexts. The differences in the forms of concepts and knowledge that characterise school learning on the one hand and everyday life activities, on the other, suggest qualitative differences in the mediational processes that should characterise each of these contexts. As a result of formal learning in school, scientific concepts, once assimilated into the child's thinking, develop downward from abstract generalisations toward greater concreteness and everyday applicability. The development of the scientific concepts creates structures for the upward development of the spontaneous concepts towards greater systematicity, consciousness and more deliberate use. Meanwhile, the spontaneous concepts, in their development, clear the path for the downward development of the scientific concepts. This is a fundamental structural transformation that is orchestrated in the thought processes of the child after assimilating the scientific concepts (Kozulin, 1990; Vygotsky, 1962).

However, this developmental relation that accounts for the qualitative changes that result from the formal learning of the school-specific form of knowledge and concepts can only be assumed when there has been an appropriate mediational process. To this effect, Kozulin (ibid.) suggests that, if assimilated in a ready-made form, without being properly related to the existing spontaneous representations, scientific concepts run the risk of remaining as empty verbal formulas with little application to problem situations beyond the specific topics of school learning in which they have been acquired. Hedegaard (1996; 1990) similarly argues that the school's primary task should involve the teaching of scientific concepts in a theoretical way, using a theoretical, rather than an empirical, epistemological procedure. Hedegaard argues, that if the scientific concepts are learned as empirical concepts (something akin to Vygotsky's spontaneous concepts), children will have difficulty applying the knowledge they have learnt in school to problems beyond those that they encounter in the formal learning situations. In other words, the learning and teaching that proceeds on the basis of methods that are not appropriate to the specific knowledge form, fails to create new ZPDs for learners. Such

learning does not involve children in new kinds of learning activity. Herein lies the fundamental problem with teaching and learning that fail to create new ZPDs in learners and treat formal learning in school as quantitative accumulation of facts and content. This research will focus on identifying the current practices of teaching and learning in South African primary schools in the Venda region and evaluating the extent to which they are effective in promoting different types of learning. The literature offers the following examples of lessons that illustrate the application of developmentally oriented learning in the learners' ZPDs.

The first example of the application of the ZPD is from Hedegaard's (2002, 1996; 1990) experimental teaching programme in a Danish primary school system. In this "teaching experiment", the same class was followed from third to fifth grade. The study involved children's learning of social science (i.e. biology, history, and geography) concepts. The themes or "problem areas" covered, especially in the first year of the experiment, included the evolution of species, the origin of man, and the historical change of societies. These themes, especially the learning of the concept of evolution by the Grade Five learners might seem, to most South African teachers, to be too advanced for ten year olds. However, the concretization of tasks, in the sense of relating the subject matter to the learners ZPD or relating the task meaningfully to the real life experiences and learning potential of the learners without however reducing the formal, abstract, knowledge and concepts to their concrete, empirical, knowledge form, seems to produce meaning-based learning actions on the part of the learners. The teaching of the abstract and scientific concept of evolution, and its related concepts of change, adaptation, extinction, species, nature, animals, etc., in this example, were conducted by simplifying the tasks by way of relating them to the genuine, everyday-life, questions children ask, such as the questions about creation. The children were taught the scientific concepts about evolution through engaging them with the "big questions" of life, about which they were already interested. The teacher got them to participate in the creation of knowledge about the subject matter and guided the learners' activities through the use of methods that are appropriate for the school-specific theoretical, scientific, form of knowledge. For example, they took advantage of the children's interest in questions such as: Where do we come from? Where does the universe stop?

Have animals always looked like they do today? Have there always been human beings? How where humans created (Hedegaard, 1990: 280)?

To get learners to acquire the scientific concepts and methods, Hedegaard (2002; 1990) engaged learners in activities such as exploration of problems, imagination of possibilities, dialogue, recording findings from learners' own explorations, modelling the knowledge they formulate, analysis of the results of their exploration of the problems and evaluating their findings and formulations. This procedure for researching the questions and seeking viable answers was used as a means by which the researcher sought to reveal the contradictions between the children's spontaneous concepts and the scientific concepts. Learners used methods in their exploration of problems that are associated with the scientific, formal learning activity to develop a complex understanding of phenomena in their environment. The teacher worked with the learners in their ZPD in the sense that the learning activity was explicitly aimed at generating, in learners, concepts and modes of thinking which were qualitatively different from those with which they were already familiar, from their everyday learning situations.

Classroom interaction in the ZPD involved, for example, the teacher providing a summary of the exploration to be undertaken by learners with regard to the specific problem area. For instance, in exploring the life of the polar bear, learners were to address the following questions:

- What do we know and what do we not know about the life of the polar bear's survival in Greenland?
- How can we model what we know, and how are we going to explore what we do not know (Hedegaard, 1990)?

Learners would work on these questions, recording the steps they attain in their exploration and building a model about their emergent knowledge of the life of the polar bear. The exploratory activities involve the teacher guiding learners in the appropriate activities, such as visiting libraries, reading the relevant materials on the life of polar bear, watching films, and participating in class discussions. The teacher guides learners

to evaluate their own models of the life of the polar bear, and to analyse what their knowledge so far tell them about why some animals survive while some die, and, still, why some change into new species. This mode of teaching is based on the Vygotskian assumption that children's learning that occurs in their ZPD is capable of resulting in qualitative changes in the content and structure of their thinking.

For the current study, the principles applied in Hedegaard's (ibid.) study are of crucial significance. The application of the notion of the ZPD to children's learning of qualitatively new concepts and mode of thinking has far reaching consequences for practical educational concerns in the South African schooling context. The analysis of learners' context of learning, in Chapter 1, suggests that the educational approach and the dominant teaching-learning methodologies were related to the associated traditions in the history of schooling and society in Venda and South Africa, at large. The missionary schooling system, for example, emphasised the vicarious rote-memorisation of texts and factual information, an epistemological approach that seems to have been reproduced during the apartheid schooling system for completely different reasons. This approach failed to recognise that children are autonomous and actively integrate new knowledge into their pre-exiting mental schema and modes of learning. The extent to which these practices remain in current South African education are of interest in this study.

The second example of a teaching and learning approach that illustrates the application of the zone of proximal development during school learning is from Arievich and Stetsenko's (2000) discussion of Gal'perin's model, also based of the Vygotskian theoretical framework. Arievitch and Stetsenko describe a lesson designed by Gal'perin and Georgiev (1960), within Gal'perin's (1981) research programme, for teaching the five-to-six year old children elementary mathematics. This lesson illustrates teaching and learning practices that create the ZPD for learners' learning of basic mathematical concepts, a crucial foundation for future success in this subject area. In this programme, children were introduced to the concept of a unit (i.e., 'one'), as well as other related concepts and mathematical operations. To introduce learners to the concept of a unit the researchers begin by introducing learners to the idea of

measurement. This was based on the theoretical assumption in mathematics that all numbers emerge as a result of measurement (Lebesgue, 1958 in Arievitch and Stetsenko, 2000). The researchers began by showing learners how important measurement is in everyday situations, such as in stores where it is used to establish the correct amount of goods. Learners were taught the qualitative and quantitative aspects of measurement. The qualitative aspect of measurement is characterised by the fact that everyday properties of objects can only be measured with an appropriate measure. To gain the precise knowledge of the properties of objects and what measurement is appropriate for them, learners were guided to engage in concrete activities whereby they compared the different objects by length, size, volumes and weight. The teacher guided them in this exploration and in the ensuing discussion with their peers. As a result, learners learned to discriminate between different properties of objects and, at the same time, learned to choose the appropriate measure for each property.

The quantitative aspect of measurement is characterised by the fact that the measure is not necessarily a separate object but is a matter of choice and convenience, which, once chosen, must be used until the particular measurement is complete. Therefore, during the practical exploratory activities, where the teacher guided the learners in the comparison and measurement of the objects, learners learned to stick to their chosen measure. In order to compare different objects by certain properties such as size, length, weight, and volume, the learners learn to properly measure and record the results of each measurement. The records of the measurements that learners made during their measuring activities enabled them to understand quantitative concepts such as: “larger”, “smaller”, “equal”, etc. As children compare the objects in terms of the qualities of their properties, they simultaneously gained the understanding of the concept of a unit within a system. This concept involved the understanding of the quality of a property of the measured object, quantitatively, within a system of number operation: e.g. less that 1 or greater than 1.

In this way, the concept of a unit was not introduced to children’s learning empirically, through verbal communication of factual information about the concept. The concept

was introduced theoretically, that is, through engaging learners in the learning activities that emphasise the appropriate procedures for the acquisition of scientific concepts. Learners also acquired the ability to formulate adequate models that represent the phenomena in its complexity. Learners mastered the method of analysis at the same time that they actively explored the properties of objects and compared them under the guidance of the teacher. The concrete measures of the objects according to the specific qualities that their properties manifest, and the recording and verbalisation of the results, provided learners with fundamental cognitive tools for further learning of the related concepts and subject matter content.

The lesson examples above illustrate the importance of the concept of the ZPD for introducing new, school-specific learning and knowledge to children from their early school years. The learning that occurs in school follows the methods of knowledge acquisition and modes of enquiry that build a firm basis for learners' future learning. Teachers assist learners in their acquisition of concepts through engaging them in activities that generate their interest in understanding complex ideas and the adult world, when related meaningfully to their personal activities. That is, children engage in simple exploratory activities that model the societal activities through which the formal knowledge and concepts about which they learn in school have been generated. This approach requires that teachers have a good grasp and understanding of the subject matter that they teach. For the South African teacher, whose practice has been shaped within the authoritarian traditions of the apartheid schooling this approach may not come easily. It requires that the teacher is able to structure the learning environment appropriately for meaningful, developmentally oriented learning to take place.

2.6. Conclusion

The current study proceeds from the assumption that psychological processes do not arise in total isolation from the socio-cultural context of their manifestation. Psychological development and functioning is primarily a social and cultural process. The individual aspect of human psychological development and function, as Vygotsky has demonstrated, is derivative and secondary. Social processes, while not separate from

individual processes, are, however, not reducible to the individual. Human psychological processes, such as reflection and conceptual forms of thinking, are shaped by the social and cultural mediation of behaviour. These processes are social and cultural in that they arise during interactions between two or more people whose relation is governed by pre-existing rules of the society and culture in which they are located.

This understanding guides the present analysis of classroom relations in the traditional, Venda, society in South Africa. This society is undergoing major social transition as a result of the socio-political and economic transformation in South Africa at large. The methods of classroom teaching and learning that evolved from the pre-colonial traditions of Venda childcare and socialisation processes, as well as from the missionary and apartheid schooling respectively, are again forced to evolve further into new forms that are informed by the new, post-apartheid and democratic, political dispensation.

The cultural-historical dimensions of the practices of schooling are manifest both in its institutional organisation and in its classroom practices. The past practices of schooling and culture are, from the present theoretical perspective, instantiated, at the same time that they are transformed, in the “here and now” of schooling and classroom teaching and learning. The present study considers, using experimental tasks and classroom observation, how the present, post-apartheid, schooling and curriculum changes produce associated changes in classroom teaching and learning and in learners’ development.