Chapter 1: An introduction to the Study

1.1 INTRODUCTION

This PhD study focused on understanding and explaining how educators understand and experience learners who may have Attention Deficit Hyperactivity Disorder in their classrooms. Attention Deficit Hyperactivity Disorder (referred to as ADHD), according to the Diagnostic and Statistical Manual of Mental Disorders-IV-Text Revised (APA, 2000), is a developmental disorder that tends to be identified in childhood, where learners display inattention and hyperactivity, impulsivity or a combination thereof (Barlow & Durand, 1995; Carson, Butcher & Mineka, 1996; Quay & Hogan, 1999).

1.2 PURPOSE AND AIM OF THE STUDY

The purpose of the study is to understand and explore educators' experiences of learners[1] who may have ADHD[2] in the classroom. The aim of this study is to determine what and how educators make sense of learners who may have ADHD in their classroom. Purdie, Hattie and Carroll (2002) state that in order to address the educational success of learners who may have ADHD it is important that educators (and parents) directly address their educational difficulties. This can be achieved if the educator knows how to address the educational difficulties, keeping in mind the challenges facing a learner with ADHD. Therefore, this study will determine the specific experiential knowledge that educators may have to be able to address the challenges of learners who may have ADHD.

Determining what and how educators make sense of learners who may have ADHD in their classroom information can assist in determining how educators include learners who may have ADHD in their classroom and what kind of psycho-educational and psycho-social information is needed in order to make it inclusive. This information may be pertinent to teacher training institutions, as institutions could gain valuable information as to how educators from different schools experience learners who may have ADHD in their classroom. The problem statement, here below, illustrates how the study came about.

[1] The term 'learners who may have ADHD' is used throughout the thesis. 'Learner' is stated first as it is considered politically correct to consider the person before the disorder.
[2] Learners have not been clinically assessed. Therefore, for the purpose of this study reference is made to learners as 'learners who may have ADHD'.

1.2.1 *Problem Statement*

Imagine the following:

> The place is a classroom, within a primary school that is situated approximately 25 kilometres from the Pretoria city centre. The Grade 1 classroom is a hub of activity and the learners are excited to start their day. The educator needs to raise her voice to get the learners settled and to have them sit in their seats. There is however one particular learner who does not seem to hear the educator and goes on to run around the classroom.

For some educators this scene may sound familiar and for others perhaps not. There are learners who appear to be more challenging than the rest. They appear not to be able to listen to instructions, nor do their work in the classroom or at home, they do not seem to have many friends and they cannot sit still in the classroom. The educator is faced with having to 'discipline' the learner. These learners may be at risk[3] of having ADHD. Learners at risk or who have ADHD display behaviour that may be similar to the vignette above. The educator may not have the necessary skills or instruments to identify such learners at risk of having ADHD, and they often go through the school system labelled as being the 'naughty' learners. According to Holz and Lessing (2002) approximately 3%-7% of South African learners could be diagnosed as having the disorder. ADHD in South Africa is discussed in more depth in chapter 2, section 2.4.1. The focus of this PhD research stemmed from my interest in how learners who may have ADHD behave within the classroom and how educators experience this.

Thus, the main research question is: **"How do educators experience learners in their classrooms who[4] may have ADHD?"** This question guides the study. The main question has been developed into sub-questions, and is as follows:

1. How do educators experience teaching and teaching the learner who may have ADHD?
2. How do educators manage their classrooms with learners in their classrooms, who may have ADHD?
3. How has the experience of educating learners who may have ADHD influenced or affected the educator?

[3] The term 'at risk' has been used as the learners in this study have not been formally diagnosed.
[4] Throughout the thesis reference is made to educators' experiences of learners, relating to the educator as subject and learner as subject within a sentence. However, learners are noted as subjects and therefore the term "who" instead of "whom" is used.

1.2.2 *Rationale*

I have been working in schools as a researcher and a psychologist for many years. During 2003, I had the opportunity to work in schools within the Tshwane area. The educators that a CEA[5] colleague, Vanessa Scherman, and I encountered seemed to be facing problems, such as those outlined above in the vignette. Of course, not all such examples of misbehaviour can be pinpointed to ADHD, but the educators expressed that they felt that they needed assistance in being able to handle the learners who 'misbehave' or are 'naughty'.

If ADHD exists in our schools, one can ask whether educators can deal with such learners. Are learners at risk of having ADHD misunderstood at school, both by the educator within the classroom and also by his/her[6] peers? Is it possible that perhaps educators and classroom peers either do not recognise or do not understand ADHD? There are not many studies of ADHD in the classroom specifically (Purdie *et al*., 2002) within a South African perspective. The studies that are available on the learner at risk of ADHD in the classroom, in South Africa, either focus on inclusive education (Holz & Lessing, 2002), the diagnosis of the learner (Meyer, Eilertsen, Sundet, Tshifularo & Sagvolden, 2004) or how to treat the learner with cognitive individual therapy (Karande, 2005; Yeschin, 2000). Thus, this PhD study will contribute to the body of knowledge concerning ADHD *within South African classrooms*.

This thesis is a contribution, to the body of research existing in South Africa on ADHD, to investigate how educators experience learners who may have ADHD in the classroom. A study that explores the experiences of educators, explores how educators respond to behavioural and academic problems within the classroom. Inclusive education, as stated above, means that educators need to include learners who may have ADHD and they need to be regarded in the classroom. Purdie *et al*. (2002) state that in order to address the educational success of learners who have ADHD, it is important that educators (and parents) directly address their educational difficulties. This can be achieved if the educator knows how to address the educational difficulties keeping in mind the challenges facing learners who may have ADHD.

The narratives of the educators may inform principals, parents, ADHD support groups, teacher training institutions what educators experience in the classroom. This information may be useful when looking at what kind of support educators would need from school staff,

[5] CEA refers to the Centre of Evaluation and Assessment, a research centre within the Faculty of Education, University of Pretoria.
[6] Throughout this thesis reference is made to persons in both female and male terms in order to present gender in an unbiased manner.

what kind of further training would be needed and what kind of information and contact would be needed with parents.

A learner with ADHD may be considered to have a 'barrier towards learning' as ADHD may inhibit his/her ability to learn. As such, the Department of Education (2001) highlights the importance of classroom educators in the White Paper 6 Special Needs, and how they can contribute to the inclusion of learners. The White Paper 6 and other Department of Education documents like the Guidelines for Inclusive Learning Programmes (DoE, 2005) is discussed in more detail in chapter 3. However, according to the Department of Education (2002), schools should create the conditions for learners to succeed, addressing their barriers to learning, as experienced by individual learners (Holz & Lessing, 2002). Within South Africa there are certain schools that may have procedures or strategies in place, for example having a resident educational psychologist or learning support educator[7] present, but less privileged schools may not have the same benefits (Barber, 2001). However, what happens when an educator or school does not have the skills or instruments to identify and manage these learners? How do less privileged schools include learners at risk of having ADHD? How do educators include these learners in their classrooms? Chapter 3 discusses the role of the educator in depth.

The studies that have been conducted often pathologise[8] ADHD in the learner and sometimes do not refer to its results of pathologising learners, within the social context. The preliminary literature review suggests that the focus of researchers and practitioners is to view ADHD within the medical model pathologising the learner. (An explanation of the literature will be included under the literature review, chapter 2). There have been attempts to understand the learners at risk of having ADHD, namely the disorder itself from a medical model perspective (Purdie *et al*., 2002), yet few, if any studies have looked at how ADHD may affect the learner relationally, specifically looking at the learner's relationship with his/her educator.

Although I have mentioned that studies and researchers often pathologise the learner, it is important that for the purpose of this study, the DSM-IV (Diagnostic Statistical Manual of Mental Disorders, which is the manual that psychologists, psychiatrists and doctors use to make clinical diagnosis) has been included refer to criteria of identifying learners whom may have ADHD, since it a disorder that is diagnosable. However, I opt to remain sensitive to the possible negative effects of pathologising, based on a diagnosis of ADHD.

[7] The term 'learning support educator' refers to the educator that is specifically trained to deal with learning and behavioural disorders.
[8] The use of the term pathologise refers to the tendency of health care professionals to label a person with a disorder/syndrome, therefore labeling him/her with a medical condition that is often perceived as a deficit.

As ADHD is a disorder that is considered to be identified at an early age, namely around seven, according to the DSM-IV-TR, (2000), the learners who will indirectly take part in this study will be between six and nine years of age. If learners who may have ADHD are not identified and attended to, research indicates (Burke, Loeber & Lahey, 2001; Whalen, Jamner, Henker, Delfino & Lozano, 2002) they may become socially isolated and underachievers throughout their school careers. Identifying and attending to learners who may have ADHD could allow the learner an opportunity to improve his/her academic and behavioural performance, as correct[9] interventions can be implemented by educators and parents.

1.3 *ATTENTION DEFICIT HYPERACTIVITY DISORDER*

According to the Diagnostic and Statistical Manual of Mental Disorders-IV-Text Revised (APA, 2000) Attention Deficit Hyperactivity Disorder (ADHD) is a developmental disorder characterised by inattention and hyperactivity, impulsivity or a combination thereof[10].

Quay and Hogan (1999) explain that there are three sub-types of ADHD; namely (1) predominantly inattentive, (2) predominantly hyperactivity-impulsive and (3) combined. There are also certain criteria for the symptoms in terms of the duration of the symptoms (symptoms need to be present for at least six months or longer), maladaptiveness (the behaviour lead to impairment in social, academic and occupational settings), age of onset (no later than seven) and impairment in two or more settings, for example school and home (Barlow & Durand, 1995; Gordon & Asher, 1994; Quay & Hogan, 1999).

1.3.1 *Inattention*

Some of the diagnostic criteria for **Inattention** include: (1) The learner often fails to give close attention to detail, and makes careless mistakes; (2) the learner has difficulty sustaining attention in tasks; (3) the learner does not seem to listen when spoken to directly; (4) the learner does not seem to be able to follow through on a task or instruction; (5) the learner has difficulty with organising tasks; (6) the learner will avoid, dislikes or is reluctant to take part in tasks that require mental effort; (7) the learner often loses things, (8) the learner is easily distracted and (9) the learner is forgetful in daily tasks (APA, 2000; Barlow & Durand, 1995; Quay & Hogan, 1999).

[9] As psychologist I recognise that each individual learner may have individual medical, psychological and educational needs. Therefore a 'correct intervention' is reference to an intervention that suits a particular learner and that meets his/her needs.
[10] Reference is made to the DSM-IV-TR as it is recognised as one of the two authoritative sources of mental health disorders. The other source is the ICD-10 by the World Health Organisation. This is discussed in chapter 2.

1.3.2 *Hyperactivity*

With regards to **Hyperactivity** the diagnostic criteria include: (1) the learner often fidgets or squirms which is considered maladaptive and not consistent with his/her development level; (2) the learner will often leave his/her seat even though he/she is required to remain seated; (3) the learner will run or climb which is considered to be inappropriate behaviour for the learner; (4) the learner often has difficulty with keeping quiet especially when taking part in fun activities; (5) the learner seems to be always "on the go" and (6) talks excessively (APA, 2000; Barlow & Durand, 1995; Quay & Hogan, 1999).

1.3.3 *Impulsivity*

With regards to **Impulsivity** the diagnostic criteria include: (1) the learner will often blurt out answers before the question has been completed; (2) the learner has difficulty taking his/her turn and (3) the learner will interrupt or intrude on other learners or adults. If one takes this into account, one can understand why educators could find it difficult to provide learners who may have ADHD with assistance within the classroom setting (APA, 2000; Barlow & Durand, 1995; Quay & Hogan, 1999).

1.4 *RESEARCH QUESTIONS*

The research questions were developed and stated in 1.6.2, a brief description is given of how the research question and sub-questions are developed. However, in chapter 4, the research question and sub-questions are discussed in greater detail. The main research question guided the development conceptual framework, research design and methodology.

1.5 *THE CONCEPTUAL FRAMEWORK*

The conceptual framework used in this study is based on Bronfenbrenner's Ecological Model (Bronfenbrenner, 1979; Bronfenbrenner, 1989; Stolzer, 2005, Bronfenbrenner & Morris, 2000; Friedman & Wachs, 1999). The conceptual framework, with the research questions, has supported the researcher in framing the data collection, data analysis and presentation of the findings. The focus of the conceptual framework is the experience of the educator of the learners who may have ADHD in their classroom. The educator forms part of the micro-system. The classroom and the learners, including learners who may have ADHD, form part of the meso-system. The conceptual framework will be discussed in detail in chapter 3.

1.6 RESEARCH DESIGN

This study employed a narrative research design (Creswell, 2002), as the researcher aimed to understand, explore and discuss the experiences the educators have had with learners who may have ADHD in their classrooms. In a narrative research design researchers describe the lives of persons, tell stories of people's lives and write narratives of persons' experiences (Creswell, 2002).

The focus of a narrative research design is to collect data, describe people's personal stories and discuss the meaning of the person's experiences. Personal accounts or a personal experience story was used as a method of narrative research (Creswell, 2002; Clandinin & Connelly, 2000).

Creswell (2002) states that the narrative research design has recently been implemented in educational studies that have highlighted educator reflection, educator knowledge (what they know and what they do not know, how they think professionally and how they make decisions in the classroom) and "voicing" educator experiences. I aimed to provide the means for educators to voice their own personal experiences of the learners who may have ADHD in their classrooms. The negative behaviour that is acted out by learners who may have ADHD, as listed above in the literature chapter, can impact negatively on the teaching and learning that takes place in the classroom. Therefore, this negative behaviour can be expressed as an "educational problem". Narrative researchers, thus, seek to explore an educational research problem by understanding the experiences (Creswell, 2002).

1.6.1 Interpretive Paradigm

This PhD study is an interpretive inquiry (Richardson, 1996) using a narrative research design (Clandinin & Connelly, 2000). According to Clandinin and Connelly (2000) a narrative research design seeks to understand the personal and social experiences of educators in interaction with others. In chapter 4, Interpretive inquiry, the ontological position and the role of the researcher is discussed in more detail.

1.6.2 Ontological Position

Qualitative research and using interviews in particular offer the opportunity to explore how everyday life is experienced and how meaning is understood. I, as researcher, have had the unique opportunity to probe, explore or negotiate the participants' experiences regarding learners who may have ADHD in the classroom. This PhD study is considered to be

constructivist in its ontological position as it supports the notion that social phenomena are socially negotiated in interaction (Bryman, 2004).

1.6.3 *The Role of Researcher*

A researcher forms an integral part of the process as he/she observes and participates in the collection of data (Parker, 1994), by bringing in his/her unique experiences and understandings to the process. The researcher does not stand outside nor is objective to the whole research process. Instead the researcher plays an important role in understanding and re-constructing the personal accounts and narratives of the participants. As a result the researcher can be viewed as a co-participant.

As researcher, I aimed to make sure that each participant understood the purpose of the research. In the interviews with the educators I aimed to listen to the responses allowing for the participants/educator to speak of his/her experience without any judgement. Therefore, the goal was for the participants to be able to speak without feeling as if they were being evaluated; without thinking that they needed to say the 'correct' thing.

1.7 METHODOLOGY

The schools, used in this study, were selected using purposive and convenience sampling. Semi-structured interviews guided by an interview schedule were conducted with 17 educators from three different primary schools in Tshwane. The interviews were recorded to obtain textual data that was analysed using content analysis. The themes that emerged from the data were then conveyed in the form of a narrative. The procedures that were applied are briefly discussed here below.

1.7.1 *The Research Process*

A systematic approach was followed, as it allows for the process of collecting data and developing narratives to be transparent and clear to the reader, the participants, the auditor and other interested parties. The research process, adapted from Creswell (2002, p.525), followed different parts that integrate unpacking of meaning and reflection of the research process. The research process is elaborated in chapter 4 with an accompanying diagram. The research process describes the data collection and how it was conducted. The systematic approach allowed for the study to be guided by the conceptual framework and the research questions.

1.7.2 *Sampling*

Purposive and convenience sampling (Gay & Airasian, 2003, Silverman, 2000) was selected for this study. Seventeen educators from three schools from the Tshwane region were interviewed. In chapter 4 the sampling is discussed in more detail.

1.7.3 *Interviews*

The research questions, as listed in section 1.2.1 have been posed in an interview schedule that was used in interviewing seventeen educators. The main research question: "How do educators experience learners in their classrooms, who may have ADHD?" has been posed. The main research question was further developed into sub-questions in order for the educator to articulate his/her experiences of learners who may have ADHD in the classroom.

One-on-one interviews were conducted with the seventeen educators. Interviews, as understood in this PhD, are conversations with a purpose that allow the researcher to discover the participants' views, experiences and/or opinions but being respectful to how he/she frames responses (Marshall & Rossman, 1999). Interviews are discussed in detail in chapter 4.

Certain procedures needed to be set in place in order to ensure and/or improve the trustworthiness of the data. The trustworthiness of the data is important to ensure that the true experiences of the educators are reflected in a fair and truthful way.

1.7.4 *Trustworthiness of the Data*

In order for the data that has been analysed, to be considered trustworthy certain checks have been put in place to verify the data and the analysis (Fade, 2003; Pope, Ziebland & Mays, 2000). For the purpose of this PhD study, certain structures to increase trustworthiness, namely: (1) credibility; (2) transferability; (3) dependability and (4) confirmability (Seale, 1999) will be implemented. Credibility, transferability, dependability and confirmability are terms used in qualitative research (Rolfe, 2006), that refer to the procedures that strengthen the study, making it trustworthy and verified (Morse, Barret, Mayan, Olson & Spiers, 2002).

The transcripts and themes that were elicited from the transcripts were given to the educators for member checking and to a colleague for peer review. The member checking and peer review will be discussed further, in chapters 5 and 7, as part of the study.

1.8 ETHICAL CONSIDERATIONS

1.8.1 Informed Consent

Two of the primary ethical considerations that were considered for this study were informed consent and confidentiality. According to Silverman (2000) informed consent is (1) giving information about the research that is relevant to the participant's decision about whether to participate; (2) it means that the participants understand the information given (that the participants understand the language of information etc.) and (3) includes ensuring that the participant's decision is voluntary. Informed consent was given by the school and individual educators after several meetings. Informed consent, as declared in the consent forms and the meetings, is discussed further in chapter 4.

1.8.2 Confidentiality

Confidentiality of the schools and educators is important in order for the educators to feel as if they can share their experiences with the researcher. Thus, confidentiality of both school and educator were kept throughout the research process, as stated in the consent forms. (The consent form has been attached as Appendix F).

1.9 CONCEPT CLARIFICATION

There are certain concepts that have been used throughout this thesis for the purposes of this study. The first concept that is used is *"educator",* which is also used in the title. The educators referred to in this study are specifically from South Africa. South African educators are currently going through much transition and challenges (Le Roux, 2000; Fleisch, 2004; Vandeyar, 2005). Therefore, it seemed pertinent to focus this study on the experiences of educators within the context of their classrooms and their schools. Educators have different roles that may influence their experience of teaching and learning. Educator's roles are discussed in more detail under section 3.6.1.2.

This study makes use of the word *"experience"* which refers to that which happens or an encounter that the educator may have undergone. (Gilmour, Kerr & Kumar, 2003; Dictionary.com, 2007 Compact Oxford English Dictionary of Current English. 2005).

"Experience," as used in this study, also refers to the knowledge/skill that the educator may have gained as a result of observation, encountered or undergone (Gilmour *et al*., 2003; Dictionary.com, 2007).

The word *"learner/learners"* is used throughout this thesis and refers to the school going child/children. The phrase *"learners who may have ADHD"* is used as learners from some schools may not have been formally diagnosed with ADHD. Although there were learners who were formally diagnosed in schools where educators were interviewed for this study, other learners from some schools have not been formally diagnosed. The learners from some schools that have not been formally diagnosed appear to express ADHD type behaviour and therefore educators were interviewed to investigate how they experience these learners, who may have ADHD, in their classrooms. This study focus is educator experiences with the goal of understanding learners with ADHD. As educators' experiences of learners who may have ADHD are explored, learners are indirectly involved. The educator and learner relationship is examined in chapter 3, section 3.6.1.1.

The last concept that is used throughout this study is *"classrooms".* A classroom is defined as a room where groups of students or learners are taught or a room or place especially in a school in which classes are conducted (Dictionary.com, 2007). Manke (1997) discusses the power dynamics that take place within a classroom between an educator and a learner. The roles of educator and learner are socially constructed, as educator and learner interact. The focus of this study is the educator experience of learners who may have ADHD which takes place in the classroom. Thus, the interaction between educator and learners who may have ADHD which encompasses teaching and learning takes place in the classroom.

1.10 THE ORGANISATION OF THESIS: OUTLINE OF CHAPTERS

The following is an overview of structure of the thesis. Chapter 2 focuses on the analysis of relevant literature to elaborate on the background of the study and further explore the research problem. Chapter 2 has been written, building on literature to highlight the complexities involved in ADHD.

The conceptual framework that was developed for this study is found in chapter 3. The conceptual framework is placed in the context of the situation with classrooms and educators in South Africa and the other possible theories of ADHD.

In chapter 4 the research design and methodology for the thesis is presented. The research design and methodology are discussed explaining what methods and strategies were employed in order to collect and analyse data.

The results and findings will be presented, as themes, in chapter 5, after content analysis is administered on the data of the transcribed interviews (see Appendix M). Chapter 6 will present a comparison of two educators' experiences and the experiences of the educators as a narrative. The conclusion chapter, chapter 7, focuses on the findings, conclusions, shortcomings and recommendations of the study.

1.11 CONCLUSION

As stated, the aim of this PhD study is to determine how educators may experience learners who may have ADHD in their classroom. The assumption is that this can be accomplished by adhering to a systematic process of reviewing the current available literature on ADHD, developing an interview schedule based on the research questions, collecting data, analysing the data, verifying the data and lastly presenting the findings. The following chapters deal with this research process in detail.

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Chapter 2: Literature Review of ADHD and Interventions for ADHD

2.1 INTRODUCTION

Behavioural variance among learners appears to be a common occurrence at school and at home and often does not require specialised attention. However, some cases of atypical behaviour do deserve the focused attention of an educator or parent. Attention Deficit Hyperactivity Disorder (hereafter referred to as ADHD) seems to be such a case. ADHD is catalogued as a pervasive developmental disorder that often manifests as misbehaviour (APA, 2000). Consequently, ADHD could be easily misunderstood for the reason that educators, parents and some health professionals often have little understanding of the complexity of the disorder. The complexity of ADHD stems from (a) the many factors that contribute to its etiology (cause), (b) its diagnosis, differential diagnosis and co-morbidity and (c) its epidemiology (prevalence). During the decision-making process involved in the diagnosis and treatment of ADHD, health professionals often have to depend on the subjective opinions of parents, yet without any regard for the educators' experiences of and with the learner, which practice adds to the complexity of ADHD.

The following chapter defines and discusses the definition of ADHD, describes the diagnosis and differential diagnosis involved, co-morbidity, the epidemiology, etiology, self-application of the learner with ADHD and interventions applying the conceptual framework proposed for this thesis. The subsequent critical literature review is discussed in close association with the conceptual framework proposed for this thesis, which originates from Urie Bronfenbrenner's ecological model (Bronfenbrenner, 1979).

2.2 DEFINITION OF ADHD

According to the Diagnostic and Statistical Manual of Mental Disorders-IV-Text Revised (APA, 2000), from this point on referred to as DSM-IV-TR, ADHD is a developmental disorder characterised by inattention and hyperactivity, impulsivity or a combination thereof. ADHD is a disorder usually first diagnosed in infancy, childhood or adolescence and found under the cluster of disruptive disorders (APA, 2000; Wodrich, 1994). A learner is thus often diagnosed in the first few years of formal education; where educators and educational psychologists are alerted to the atypical behaviour associated with ADHD (Andrews, 1999). Thus, it is often persons outside of the family unit that note that the behaviour of the learner appears to be atypical. There are three subtypes of ADHD; namely (1) predominantly inattentive, (2)

predominantly hyperactivity-impulsive and (3) combined (Gordon & Asher, 1994; Quay & Hogan, 1999). A description of the subtypes will be given below in section 2.3.

Learners can display ADHD behaviour with predominantly inattention, often referred to as ADHD-PI, ADHD with predominantly hyperactivity-impulsivity (ADHD-HI) or ADHD with combined inattention and hyperactivity-impulsivity (ADHD-C) (APA, 2000; Piek, Pitcher & Hay, 1999). Learners who present with predominantly inattention, previously known as Attention Deficit Disorder (ADD) (Green & Chee, 1994; Sonna, 2005) have difficulties with learning, paying attention during either academic work or play, often have difficulty avoiding careless mistakes, have difficulty in completing tasks, chores and projects, have difficulty in doing tasks sustaining mental effort, have difficulty in keeping track of homework, and belongings such as books, toys, clothes and school supplies, are easily distracted and have difficulty remembering.

Learners who present with predominantly hyperactivity-impulsivity will present with hyperactive behaviour and impulsive behaviour. The hyperactive behaviour (Green & Chee, 1994; Sonna, 2005) displays itself as a learner who squirms and fidgets constantly in his/her seat; often gets up from his/her seat; runs and climbs excessively in inappropriate places; has difficulty playing on his/her own and talks excessively. A learner that exhibits impulsive behaviour has the three following telltale signs of blurting out answers before the educator has finished the question; not being able to wait his/her turn and interrupts conversation or intrudes on others' activities. A description of the criteria is given in section 2.3, but a complete list of the criteria of ADHD can be found in Appendix A.

2.3 *DIAGNOSIS*

In order for a learner to be diagnosed with ADHD certain criteria is set out by the DSM-IV-TR (APA, 2000) that need to be met. Based on these criteria (see Appendix A) the symptoms need to have persisted for six months, the behaviour should be considered as maladaptive, inconsistent to his/her development and should be present by the age of seven; the impairment should be significant in at least two settings (like home and school) and there must be significant impairment with social, academic or occupational functioning. These criteria are pertinent to this study.

The criteria state that the behavioural impairment needs to be significant in two settings; the most likely of which are home and school, thus affecting the social, academic and/or occupational functioning of the learner. Thus, it would appear that ADHD presents itself in different settings, thus effecting different persons in those settings. Not only would the

learner diagnosed with ADHD display ADHD behaviour at home, to parents, family and friends, the learner diagnosed with ADHD would also then show ADHD behaviour at school, to educators, classmates, peers and staff. The educator who spends at least six hours a day with the learner would then be able to observe and experience this behaviour first-hand.

To be diagnosed with ADHD-PI (Attention Deficit Hyperactivity Disorder Predominantly Inattentive) the learner must display at least six of the following behaviours for at least six months to be diagnosed:

- ❒ Often fails to give close attention to details or makes careless mistakes in schoolwork, work, or other activities;
- ❒ often has difficulty maintaining attention in tasks or play activities;
- ❒ often does not seem to listen when spoken to directly;
- ❒ often does not follow through on directions and fails to finish school work, errands, or duties in the workplace (not due to oppositional behaviour or failure to understand instructions);
- ❒ often has difficulty systematising tasks and activities;
- ❒ often avoids, dislikes or is unwilling to engage in tasks that require sustained mental effort (such as schoolwork or homework);
- ❒ often loses things required for tasks or activities (e.g. toys, school assignments, pencils, books, or tools) and
- ❒ often seems to be easily distracted or preoccupied by extraneous stimuli or is often forgetful in daily activities (APA, 2000).

A learner with hyperactivity-impulsivity must display at least six of the following hyperactivity or impulsivity behaviours for at least six months to be diagnosed. Examples of hyperactive behaviour are: (1) often fidgets with hands or feet or squirms in seat; (2) often leaves seat in classroom or in other situations in which remaining seated is expected; (3) often runs about or climbs excessively in situations in which it is inappropriate (in adolescents or adults, may be limited to subjective feelings of restlessness); (4) often has difficulty playing or engaging in leisure activities quietly; (5) is often “on the go” or often acts as if “driven by a motor” or (6) often talks excessively. Examples of impulsivity behaviour are: (1) often blurts out answers before questions have been completed; (2) often has difficulty awaiting turn or (3) Often interrupts or intrudes on others e.g. butts into conversations or games (APA, 2000).

According to the International World Health Organisation (2007), the International Statistical Classification of Diseases and Related Health Problems (the tenth revision), states that Attention Deficit Hyperactivity Disorder is a disorder that is classified as a behavioural and emotional disorder with onset usually occurring in childhood and adolescence with the code

(F90-F98). The ICD-10 (World Health Organisation, 2007) goes onto describe ADHD as hyperkinetic disorder that is constituted by a

> "…lack of persistence in activities that require cognitive involvement and a tendency to move from one activity to another without completing any one, together with disorganised, ill-regulated, and excessive activity" (World Health Organisation, 2007).

ADHD or hyperkinetic learners, as classified by the ICD-10 (refer to Appendix C) are often reckless and impulsive, prone to accidents, and find themselves in disciplinary trouble because of non-thinking violation of rules rather than deliberate defiance. In order for ADHD to be correctly diagnosed, it relies on the health professional collecting correct information regarding the learner's behaviour (Karande, 2005). The current checklists, available to assist in making a diagnosis, is made up of questionnaires that a parent and educator need to fill out and are heavily criticised for the fact that it relies on the 'observed opinion' of others. Unlike other disorders that rely on more empirically based data, for example a blood test, ADHD diagnosis relies on someone's perception of someone else's behaviour. Recently, according to Sonna (2005), brain scans with the use of an EEG (electroencephalogram) can detect that the frontal lobes of learners with ADHD produced fewer beat waves than their peers; but also produce more alpha and/or theta waves, which are predominant when daydreaming. However, brain scans are less likely to be used in South Africa to diagnose learners with ADHD, primarily as it would not be cost effective. In South Africa, behaviour innate to ADHD is more noticeable in a highly structured classroom where learners are expected to keep still and to remain in their seats (Andrews, 1999). However, in classrooms where confusion exists because of a class size of more than forty learners and a lot of activity, learners who may have ADHD may be overlooked.

2.3.1 *Differential Diagnosis*

A differential diagnosis is the investigation conducted by the health professional to determine if the learner has ADHD and/or other symptoms of other disorders. A differential diagnosis needs to be made as the behaviour of a learner with ADHD could be mistaken for another psychological disorder. Brown (2000) highlights the fact that certain ADHD features may have symptoms similar to those found in Anxiety Disorder, where persons may appear restless and inattentive. Depression may manifest itself in problems of inattention, impulsivity and hyperkinesis (Brown, 2000). A differential diagnosis is needed by the health professional to identify if there are other symptoms that are not related to the ADHD, as discussed and illustrated by The Decision Tree in section 2.3.5 below. Thus, a learner may display ADHD-like behaviour, but may be reacting to a situation or event at home that may cause him/her to

be inattentive at school and cause restlessness. An in-depth understanding of the learner's clinical background and context; i.e. full history of what is occurring in that learner's life (and understanding) is necessary for a differential diagnosis.

2.3.2 *Co-morbidity*

Co-morbidity might complicate diagnosis and prognosis of ADHD. That is there can be other disorders (as co-morbidity) that exist with ADHD, for example a learner diagnosed with ADHD can have oppositional defiant disorder or conduct disorder, mood disorder, an anxiety disorder, learning disorders and communication disorders too (APA, 2000; Brown, 2000; Cohen, Vallance, Barwick, Im, Menna, Horodezky & Isaacson, 2000, Davis, 1994, Silver, 1993, Wolraich, Wibbelsman & Brown, 2005). Figure 1 below illustrates The Decision Tree and how ADHD is diagnosed. A learner can have ADHD and it can co-exist with one or a number of disorders as mentioned above. Therefore, a learner diagnosed with ADHD can also be of an above average and gifted IQ, but might not perform very well on the assessment due to his/her inability to be attentive (APA, 2000). According to Fornes and Kavale (2001) understanding the co-morbidities that may exist with ADHD and the psycho-pharmacological treatment thereof, contributes to a successful treatment of learners diagnosed with ADHD. A successful treatment, for example, could be described as being able to assist the learner with a pharmacological intervention that improves his/her concentration so that academic performance is improved. A list of co-morbid factors can be found in Appendix B.

The DSM-IV-TR states that the clinician is advised to gather information from multiple sources and from a variety of settings (APA, 2000). Thus, the clinician or health care professional such as general practitioners, paediatricians, psychologists and occupational therapists are most likely to work together, as a multi-disciplinary team, in the diagnosis of ADHD.

Health care professionals therefore have certain decision-making powers in the life of the learner diagnosed with ADHD, which should only be exerted in the best interests of the learner, for health care professionals' decisions are likely to impact on the learner, his/her family life and possibly on the quality of the learner's academic self-application. By understanding and aspiring to identify co-morbid conditions, health care professionals ensure that planning and implementation of treatment regimes take place responsibly. Although decision-making rests with health care professionals, the diagnoses of ADHD and potential co-morbidities are often not decisions that are informed by other persons involved in the learner's life.

The proper diagnosis of ADHD, by the health care professional, is reliant on a thorough assessment of the learner. The following section discusses the assessment of the learner diagnosed with ADHD in South Africa.

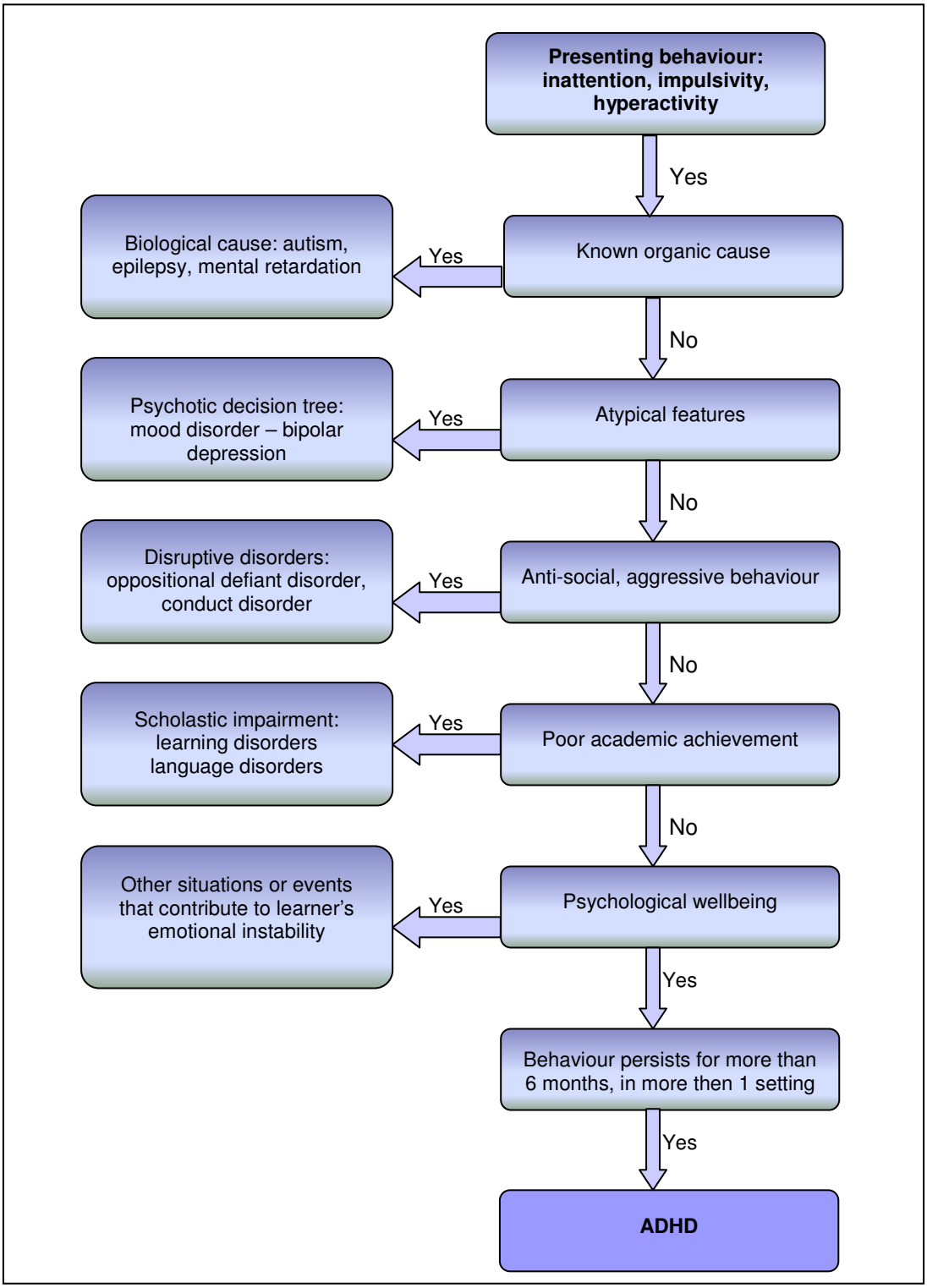

Figure 1: **Decision Tree** (Adapted from APA, DSM IV-TR, 2000; DSM III, 1980)

2.3.3 *Assessment of ADHD*[11]

Diagnosing ADHD is often difficult to do in that firstly, the health professionals in South Africa who may diagnose ADHD include a neurologist, paediatrician, general practitioner, psychiatrist and a psychologist. As ADHD is a disorder that relies on the health professional collecting accurate information regarding the learner's behaviour, the current assessment is questionnaires that a parent and educator need to fill out (Innovact, 2006). Criticism on the assessment is directed at the fact that parents and/or educators' observations can be subjective (Pelham, Fabiano & Massetti, 2005). For example, the Conners Rating Scales revised (CRS-R) that includes an educator, parent and adolescent self-report questionnaire, is criticised for it is based on a person responding to recollect subjective data on a learner. The parent and educator need to fill out a questionnaire that relates to the learner's observed behaviour at home or at school, the questionnaire, for example, asks if the learner sits fiddling with objects. The parents need to rate the response on a scale: "Not at all", "A little", "Pretty much" or "Very much". Therefore the parent and educator need to firstly observe the learner's behaviour and secondly need to provide accurate information for the correct diagnosis to be made. The response plotted on the scale between "Not at all", "A little", "Pretty much" or "Very much" is viewed as being subjective (Pelham *et al*., 2005).

There are also a number of checklists available, on the Internet, that may assist both the parent and the educator, including the American Academy of Pediatrics (Zimmerman, 2006), the National Institute for Mental Health (2006) and the South African Support Group (ADHASA, Attention Deficit and Hyperactivity Support group of Southern Africa, 2006). Similar cautions apply to the use of these checklists.

A neurological assessment is one method, according to Pocklington and Mayberry (2006), of determining if a learner has ADHD. Yet a study by Young and Gudjonsson (2005) suggests that, although ADHD has neurological underpinnings, neuropsychological tests may discriminate poorly between ADHD and mild psychiatric disorders. The DSM-IV-TR (APA, 2000: 88) states that neurological tests have not been established as a recognised and proven means of diagnosis. Neurological assessment is part of the information (i.e. together with information from parent and educator) that needs to be collected and recorded as part of the process leading up to a diagnosis. However, a diagnosis cannot rely solely on a neurological assessment due to the fact that it has been shown to discriminate poorly (Young & Gudjonsson, 2005).

[11] A diagnosis of ADHD is made through the use of an assessment. The assessment of learners with ADHD as well as the assessments available is discussed in this section.

Assessment and diagnosis of ADHD in learners require cross disciplinary cooperation and integrative thinking (Gordon, 1998). Thus, different persons from different systems (micro-, meso-, exo- and macro-systems) need to be consulted. The learner with ADHD would benefit from an assessment that has been a multi-disciplinary contribution, where each discipline views ADHD from a different field and perspective, which might enrich treatment regimes with different forms of treatment. In the following section The Decision Tree examines how a health care professional would step-by-step make a differential diagnosis and assess if there is co-morbidity.

2.3.4 *The Decision Tree*

The Decision Tree above (figure 1) proposes a path of decision-making that a health professional would take to diagnose ADHD. The Decision Tree commences with the bubble that "Presenting behaviour: Inattention, impulsivity, hyperactivity", which seems to be most prominent, that is where the learner or learners presents him/herself to the health professional with ADHD behaviour. The person could be a learner or adult, as adults could also be diagnosed with ADHD (APA, 2000). The presenting behaviour might include behaviours such as makes careless mistakes; is inattentive; does not seem to listen when spoken to directly; does not listen to instructions; disorganised; avoids school work or homework; loses things; is distracted; fidgets; cannot sit still; talks excessively; blurts out answers and interrupts conversations (APA, 2000). These behaviours could describe other disorders or could also be the result of events and/or situations and therefore another diagnosis, other than ADHD, cannot be ruled out. The Decision Tree therefore allows the health care professional to make an informed decision, taking into consideration other causes of behaviour.

The next step on The Decision Tree is the "Known organic cause". Under this heading the parent and/or guardian might consult with a general medical practitioner, e.g. the family doctor. The health care professional has to consider the presence of physiological causes for this behaviour, therefore collaboration with a number of medical professionals is advised, e.g. a neurologist, paediatrician, and/or psychiatrist. The parent relies on the medical doctor to consult other persons to make the best decisions in the interest of the learner. The health care professional seeks to rule out neurological disorders that may have similar presenting behaviour like autism and epilepsy. In addition, the health care professional will need to exclude other physiological causes for the atypical behaviour.

If there is no other "Known organic cause" for the behaviour, the third step, atypical features, on The Decision Tree should be followed. With this step the health care professional

determines if the learner's behaviour is atypical behaviour found in persons associated with a mood disorder, e.g. a learner with depression (or a mood disorder), may be disinterested in school activities or have a reduced attention span (APA, 2000). The health care professional would need to be particularly careful in making a diagnosis as a learner with ADHD may also have a co-morbid mood disorder; that is, a mood disorder that may exist together with ADHD. The health care professional is required to establish if the learner presents with ADHD and depression as a co-morbidity or if the learner has depression only. A thorough medical history and an assessment, as stated above, is imperative in this decision-making process. In order for ADHD to be correctly diagnosed, it relies on the health professional collecting correct information regarding the learner's behaviour (Karande, 2005).

The next step includes reviewing anti-social aggressive behaviour. The health care professional is required to verify if the learner displays anti-social and/or aggressive behaviour. The learner with ADHD may display some anger and frustration at home and school. The learner may feel that he/she is not competent at the task he/she is busy with, not being able to concentrate, not being able to apply his/herself. The health care professional is required to establish the behaviour of the learner in at least two different settings; establish if the anger is due to ADHD or if it exists indeed without ADHD being present. If the antisocial or aggressive behaviour is such that it manifests without ADHD behaviour, as set out in the APA criteria, then a diagnosis of Oppositional Defiant Disorder or conduct disorder needs to be considered. Again the health professional is then required to enquire how the learner interacts with people and authority (Bailey, 2000). The health care professional would need to ascertain how the learner interacts with authority figures, including his/her educator.

The next step in the process of diagnosis is to determine if the behaviour is due to the poor school achievement. The learner with ADHD is often reluctant to be involved in a work activity that requires mental effort, and academically the learner may not perform according to his/her potential at school to the best of his/her ability. However, a learner that has a learning disorder or language disorder may also be reluctant to do any school work and may perform poorly in school work. Therefore, a health care professional would need to establish if the learner has either a learning or language disorder that would be the cause of the poor school achievement. This would be assisted by the health care professional, and the parents need to consult with a psychologist, educator, school and/ or occupational therapist.

With the last step in The Decision Tree one is to exclude all other situations or events that may contribute to the learner's atypical behaviour e.g., a traumatic event could account for a learner not being able to concentrate in class. Therefore a complete history that includes information of the home and school situation is essential. Persons both inside and outside of

the family system could contribute to an understanding as to what could contribute to a learner behaving atypically.

The parent and guardian may be ignorant to the behaviour of the learner; as he/she may believe that ADHD behaviour is 'normal'; 'gifted', 'cheeky', 'naughty'. In order for a correct and accurate diagnosis to be made, information from a number of sources would be beneficial. However, the learner's family or primary care system is not the only source of information for the health care professional. The health care professional should also consult with educators and staff members of the school, as well as medical practitioners, paediatricians, neurologists, psychologists and occupational therapists. The decision made by the health care professional (as positioned in the macro-system described in chapter 3) impacts learners with ADHD directly.

Another important source of information for the health care professional to make the diagnosis is the school. The school can be a wealth of information, as the learner spends about thirty hours a week at school. The educator then spends a great percentage with that learner and is an observer to his/her behaviour. This will be discussed further in this chapter and in chapter 3.

The following section discusses the prevalence of ADHD. The prevalence of ADHD is an important aspect of this study as literature suggests that it is likely that South African educators come across learners with ADHD in their classrooms. This is discussed further below.

2.4 EPIDEMIOLOGY

The epidemiology (or prevalence) of ADHD, according to the DSM-IV-TR (APA, 2000), has been estimated at 3-7% in school age learners. This figure is said to exceed depending on the study (Carr, 2000; Purdie *et al*., 2002). According to Purdie *et al*. (2002) the possible reasons for the varying number in prevalence can be due to changes in diagnostic standards (evident in the difference in text of the Diagnostic and Statistical Manual of Mental Disorders-III (1983), Diagnostic and Statistical Manual of Mental Disorders-IV (1994), and DSM-IV-TR (2000). Other possible reasons include the overlap between ADHD and other externalising disorders, economic factors that have led to a reduction in mental health, education and managed care services, promoting the "medicalisation" of ADHD (Purdie *et al*., 2002).

In the United States of America, the 2003 National Survey of Children's Health (NSCH) describes the results of that analysis, which indicated that, in 2003, an estimated 4,4 million learners aged 4-17 years were reported to have a history of ADHD diagnosis; of these, 2,5

million (56%) were reported to be taking medication for the disorder (Williams, Chapman & Lando, 2005).

It appears as if ADHD is more frequent in boys than in girls (APA, 2000; Purdie *et al*., 2002; Quay & Hogan, 1999, Valente, 2001). The male-to-female ratio ranges from 2:1 to 9:1 depending on the type (Predominantly Inattentive type is less pronounced) and setting (where clinically referred learners are more likely to be male) (APA, 2000).

2.4.1 *ADHD in South Africa*

According to the DSM-IV-TR (APA, 2000) ADHD occurs in various cultures. A study that took place in South Africa (a project by University of the North and Denmark) demonstrated that learners with ADHD are present within our South African (rural) schools (Meyer *et al*., 2004). Meyer *et al*. (2004) stated that there were little intercultural differences; that is the structure and frequency of ADHD-like behaviour between various South African cultures as well as between other western cultures. However, from the same study there were similarities across language groups, taken from the teacher ratings from the six different languages (Afrikaans, English, Northern Sotho, Xitsonga, Tshivenda, Setswana), from over 6000 primary school learners from the Limpopo province (Meyer *et al*., 2004) that were similar to findings reported in the USA and Europe. The following section discusses the etiology or causes that attribute to ADHD. The incidence of ADHD in South Africa has thus been illustrated to occur within our schools and classrooms.

2.5 *ETIOLOGY*[12]

There are different and opposing views on the cause or etiology of ADHD. The possible causes of ADHD have been directed at neurological, genetic, parental and food (Samples, 2005), additives/nutritional deficiencies (Purdie *et al*., 2002; Biederman & Faraone, 2005). There appears to be no consensus amongst researchers as to what directly causes ADHD (Purdie *et al*., 2002), therefore the phenomenon ADHD is broadly defined. As a result there are many research studies and literature on ADHD (Dryer, Kiernan & Tyson, 2006; Biederman & Faraone, 2005). There appears to be a lack of a conceptual model that describes the links between the affected brain structures, cognitive functions, behaviour and the environment (Rapport, 2001).

It is important to note that the following sections from 2.5.1-2.7.5 have been written, highlighting the complexities of ADHD, guided by the conceptual framework in chapter 3.

[12] Etiology spelling taken from APA (2004)

Also, the complexities that have been highlighted in the sections below bring to the fore the importance of the system, that is being able to work with the parents, educator and community in order to provide the best care or treatment for a learner who may have ADHD. In chapter 3, literature on ADHD, teaching and learning will be written from the perspective of the educator. The following is a description of ADHD and how it relates to learning. ADHD and specifically attention is located in the brain structures and therefore relates to cognitive functions that enable the learner to learn.

2.5.1 *Executive Function*

Executive function (Brocki & Bohlin, 2004; Brown, M.B. 2000, Brown, T.E. 2006; Brenton, 1994) is the name that is given to the neurological model that highlights the link between attention to memory and to a cluster of other cognitive functions, contrary to the psychiatric (or the psychopathology) model, in which inattention has been linked to primarily disruptive behaviour. Burnett, Maruff, Vance, Luk, Costin, Wood and Pantelis (2001) describe executive functions as the improvement of information, the organisation of attentional resources, the inhibition of inappropriate responses and the monitoring of behaviour with respect to the current emotional or motivational state.

There seem to be several control functions, which are commonly called as “executive” in neuro-psychology and which may operate quite independently (Lehto, 1996). Learners with ADHD differ significantly on executive function measures (Berlin, Bohlin, Nyberg & Janols, 2004; Geurts, Verte, Oosterlaan, Roeyers & Sergeant, 2004). The executive functions are thought to be located in the frontal lobes of the brain and include higher-order cognitive processes which serve the purpose of “maintaining an appropriate problem-solving set for attainment of a future goal” (Berlin, *et al.*, 2004).

Brocki and Bohlin (2004) conclude from their developmental study of executive functions that there appears to be three stages of maturation: early childhood (6-8 years of age), middle childhood (9-12 years of age) and adolescence. Executive function would therefore be important to educationalists. Educational psychologists (as well as neuro-psychologists) may need to be conversant in both the psychopathology model (that is the model that views ADHD as a psychological disorder, attributing pathology to a learner with ADHD) and the neurological model (that is the model that views ADHD caused by a ‘malfunction’ in executive function attributed to structures in the brain and its neuro-psychology). Thus the neurological model views ADHD as a neurological disorder that impacts on a learner’s ability to attend in the classroom. The educational psychologist would need to be aware of the fact that ADHD is seen as a disorder that involves inattention (and possibly with ADHD with predominantly

hyperactivity-impulsivity or ADHD combined type) that may lead to disruptive behaviour. The disruptive behaviour, but more specifically inattention, may have a direct impact on the learner's ability to learn within a classroom.

Brown (in Brown 2000) explains that executive function is a wide range of central control processes in the brain that connect, prioritise and integrate operation of subordinate brain functions that allow a person to function effectively. Thus, many of the symptoms labelled under inattention are symptoms of executive function impairments. Learners, therefore, who can manage basic behavioural self-control, but are inattentive, may not be identified until they progress into secondary school.

Attention Deficit Hyperactivity with predominantly inattentive (ADHD-I) subtype is considered by Brown (in Brown 2000), as most common in the general population as compared to the prevalence of ADHD with predominantly hyperactivity-impulsivity that is common in boys in clinical settings.

Séguin, Boulerice, Harden, Tremblay and Pihl (1999) categorise executive functions into (1) set-shifting; (2) planning; (3) contextual memory; (4) inhibition; (5) fluency and (6) working memory. Working memory is considered by Brown (2000) as comprising activated information in long-term memories, the information in short-term memories, and the decision-making process that manages which information is activated in long-term memories and retained in short-term memories. Working memory, therefore, has a limited capacity and there are functional restrictions on how much information can be activated simultaneously. Individuals differ in the effective capacity of working memory. Burnett *et al.* (2001) explains that spatial working memory has the ability to hold multiple bits of spatial information simultaneously in memory; which is not present in learners who are receiving medication for ADHD.

Crucial elements of attention are arousal and energy. Varying intensities of arousal and activation engaged and disengaged from a constant flow of internal and external stimuli affects attention that involves the information within the cortex (Brown, 2000). Brown (2000) explains that emotion affects attention. This is evident in learners who appear to be tired and irritable and find it difficult to focus on the task at hand.

Emotion affects attention not only as a disruption that needs to be managed but also as a vital element in generating and sustaining attention (Brown, 2000). This can be seen in learners with ADHD who seem to be hyper-focused on an activity that they are interested in; for example a learner who cannot get up to go and bath because he/she is focused on the

Play Station game that he/she is playing. Thus, emotion may affect the broad range of attentional functions in ways that weaken or strengthen cognitive functioning.

Attention is a distributed process, thus it is served by many brain structures. Neuro-imaging studies show evidence of at least three anatomic networks that function separately and together to support various aspects of attention (Brown, 2000). The interconnecting networks include (1) an orienting network consisting of parietal, midbrain and thalamic circuits; (2) an executive attention network including the left lateral frontal areas and the anterior cingulated; (3) a vigilance network comprising the right frontal and right parietal lobes and the locus coeruleus (Brown, 2000).

Other functions of the executive functioning that may contribute to further understanding ADHD may be neurotransmitter chemicals like dopamine. Research on the role of neurotransmitter chemicals (catecholamines) in ADHD, have not been able to differentiate between inappropriate and hyperactive-impulsive symptoms. Yet it appears that ADHD may be related to dopamine reduction in certain areas of the brain, which is supported by the numerous studies (Levy, Hay & Bennett, 2006; Misener, Luca, Azeke, Crosbie, Waldman, Tannock, Roberts, Malone, Schachar, Ickowicz, Kennedy & Barr, 2004; Tannock, 1998) that have demonstrated that dopaminergic medications are effective in alleviating a variety of inattention symptoms. It is documented that anti-depressant medication, that increases dopamine levels in the brain, is prescribed alongside Ritalin and other stimulants for learners with ADHD (Green & Chee, 1994). Thus, these studies suggest that the neurotransmitter, the dopaminergic system, may play an important role in alleviating ADD symptoms. Inattention symptoms found in ADD may reflect the insufficient functioning of aspects of the dopaminergic transmission in the human brain.

The mind map presented in figure 2 below is a mind map of attention, representing my understanding of the various views on attention and how it relates to executive function, that are often found in the literature. The mind map is therefore a visual representation of the preceding literature study.

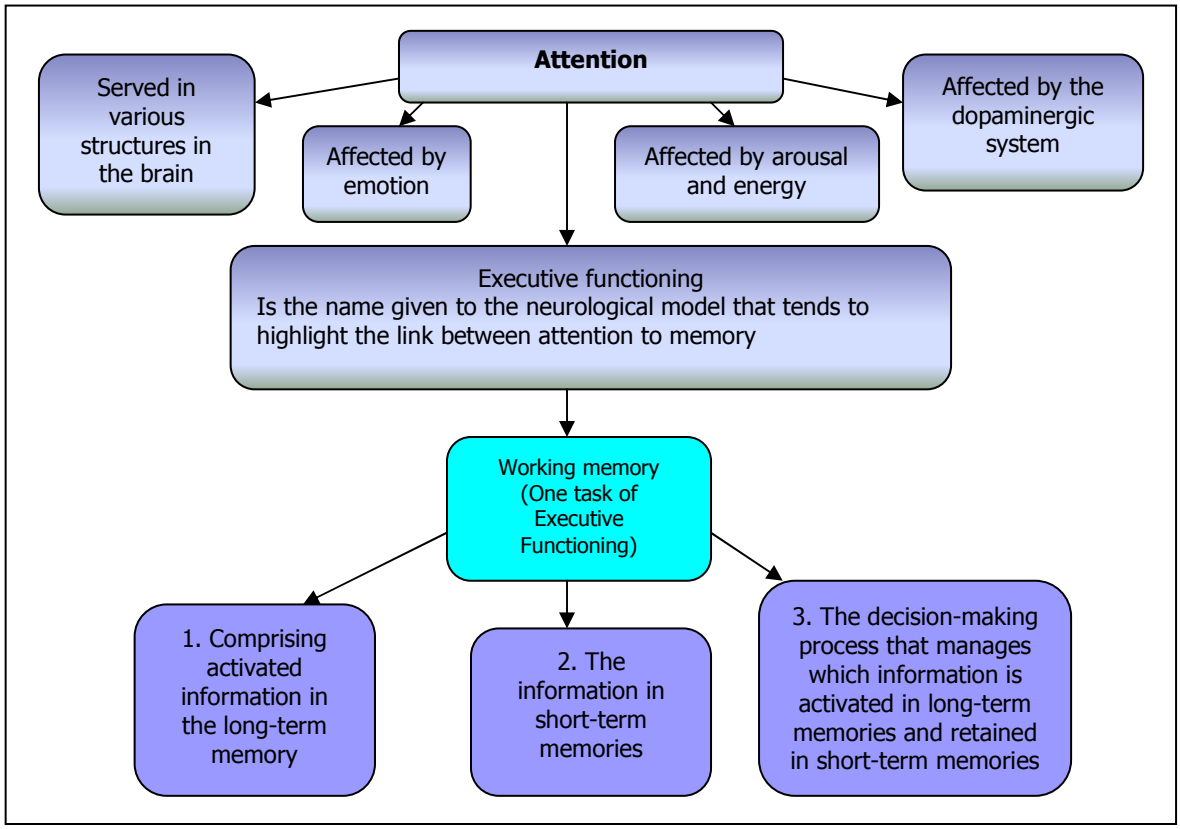

Figure 2: A Mind Map of ADHD from the Neurological Model Perspective

Neurological research is of great importance to advancing the knowledge and understanding of ADHD. The following section deals with the neurological research that has been explored in the field of ADHD.

2.5.2 Neurological Research

A body of research utilises and aims to explain ADHD from a neuropsychological and neurocognitive perspective through the use of neurological research (Du, Wang, Jiang, Livesley, Jang, Wang & Wang, 2006). Neurocognitive research has furthermore attempted to explain the gender differences found in learners with ADHD (Rucklidge, 2006).

Research (Green & Chee, 1994; Hynd & Hooper, 1992) using methods like the Single Photon Emission Computed Tomography (SPECT) and Positron Emission Tomography (PET scans) that assess the level of activity in the various parts of the brain, suggest that: (1) the frontal lobes and their close connections are found to under function in ADHD; (2) the areas of the brain that collect auditory and visual input seem to be overloaded in ADHD, suggesting that they are bombarded by unnecessary and inappropriate information and (3) when

stimulant medication (like Ritalin) is used the ADHD difference that is seen in the brain scan can be reversed to a great extent. A brain scan, whether a SPECT or PET scan, is one method of detecting ADHD in the learner, albeit costly. The alternative is to assess a learner using a neurological test. However, a study by Young & Gudjonsson (2005) proposes that neuropsychological tests may discriminate poorly between ADHD and mild psychiatric disorders.

Miller, Miller, Bloom, Hynd and Craggs (2006) explain that learners with ADHD, especially with atypical right-hemisphere perisylvian morphology may have an underlying risk of social comprehension. Miller *et al*. (2006) illustrates learners with ADHD who also have right-hemisphere atypicalities had difficulty in showing concern for others' feelings, listening attentively, and being a responsive, skilful partner in communication. The implications of this could be that a learner with ADHD (who also have right-hemisphere atypicalities) could be perceived by others as being difficult to understand.

Hemispheric specialisation is often linked to gender, and therefore has a genetic basis as well, in keeping with genetic research findings. Genetic research is aimed at contributing to the current body of knowledge on ADHD by being able to isolate genes, in order to find the cause and diagnose ADHD. The section below explains studies that have been in the field of genetics.

2.5.3 *Genetic Influences*

Genetic studies have investigated the relationship between phenotypic and genetic ADHD symptomology[13] (Levy *et al*, 2006; Nadder, Silberg, Rutter, Maes & Eaves, 2001; Whitmore, Hart & Willems, 1999). Twin studies[14] have been implemented to investigate genetic influences of ADHD between girls and boys (Martin, Levy, Pieka & Hay, 2006). In a twin genetic study Nadder, Rutter, Silberg, Maes and Eaves (2002) explain that different forms of genetic liability control ADHD in males and inattention in females. This was achieved by measuring male, female and same gender twins in the Virgin Twin Study of Adolescent Behavioural Development (VTSABD) (Nadder *et al*., 2002).

Current genetic research is attempting to isolate the gene that is responsible for ADHD (Wigg, Couto, Feng, Crosbie, Anderson, Cate-Carter, Tannock, Lovett, Humphries, Kennedy, Ickowicz, Pathare, Roberts, Malone, Schachar & Barr, 2005). In their study Misener *et al*. (2004) have isolated the genes (Haplotype 3) as being responsible for the inattentive

[13] Symptomology refers to the behaviour presented by a learner with ADHD. This is the criteria for diagnosis referred to in section 2.3. The criteria are also listed in Appendix A.
[14] Twin studies refer to studies using identical twins. Genetic research often makes use of identical twins as they share the same genetic material.

symptom dimension, in particular and two other genes (DRD 1 and D1) as contributing to ADHD behaviour. The following section deals with how the learner with ADHD is able or unable to apply him/herself at school.

2.6 *SELF-APPLICATION OF LEARNER'S WITH ADHD*

A learner within a classroom setting needs to be able to apply him/herself in order to achieve academically. The learner is required to have gained certain cognitive, language and social skills to be able to thrive in the school environment. The learner with ADHD appears to be lacking these very skills that allow him/her to achieve academically. The subsequent section discusses the different studies that have been investigated in the field of the learner being able to apply him/herself at school.

2.6.1 *Learning Disorders*

Studies show that emotional and behavioural disorders (including Oppositional Defiant Disorder and Conduct Disorder) and learning disorders often co-morbid with ADHD (Dietz & Montague, 2006; Lucangeli & Cabrele, 2006; Volk, Neuman & Todd, 2005). The following section discusses the learning disorders that appear to co-morbid with ADHD.

A learning disorder can be diagnosed when a learner demonstrates abilities below the level that would be expected given their chronological age and grade level in school (DSM-IV-TR, APA, 2000). Learning disorders (also referred to as LD) consist of the following: (1) mathematics disorder (also known as dyscalculia); (2) reading disorder (also known referred to as dyslexia) and (3) disorder of written expression (also known as dysgraphia) (DSM-IV-TR, APA, 2000). In order for a learning disorder to be diagnosed certain criteria need to be met. For a diagnosis, according to the DSM-IV-TR (APA, 2000), of a mathematics disorder or dyscalculia to be made, the following criteria need to be found:

A learner's mathematical ability, as measured by individually administered standardised tests, is significantly below that expected, given the person's chronological age, measured intelligence, and age-appropriate education. The disturbance in criterion A notably interferes with academic achievement or activities of daily living that require mathematical ability. If a sensory deficit is present, the difficulties in mathematical ability are in excess of those usually associated with it.

As stated above, learners with ADHD have been shown to have a learning disorder together with ADHD (Dietz & Montague, 2006; Lucangeli & Cabrele, 2006; Volk *et al.*, 2005). Thus the health care professional and educator needs to be aware that the learner may have a co-

morbid learning disorder. A concrete example of how a learning disorder can influence an assessment could include the following: if the learner with ADHD does have a co-morbid learning disorder, the learning disorder, like dyscalculia, may be a barrier to the learner's performance on the numeracy subtests on an IQ assessment. Therefore the learner may perform much lower on the IQ test than is expected. The learner's inability to perform in numeracy tasks, in the IQ tests, may reinforce the notion that he/she is unable to complete the task; which may contribute to a low self-esteem.

As such, Monuteaux, Faraone, Herzig, Navsaria and Biederman (2005), stress the fact that that dyscalculia and ADHD are separate disorders; where ADHD is treated pharmacologically (with a stimulant like Ritalin) and dyscalculia requires academic remediation (remedial classes and/or extra tuition). Furthermore, the assessment of ADHD is clinical; dyscalculia can be psychometrically defined and requires psychological testing. ADHD cannot be psychometrically defined, which adds to the complexity of ADHD. Hazell, Carr, Lewin, Dewis, Heathcote and Brucki (1999) demonstrate in their study that learners with LD have different learning difficulties found as secondary in learners with ADHD. (Thus, learners who have a LD have different difficulties to learners who have ADHD and have a LD as secondary co-morbidity*).*

Learners with ADHD would profit by having their school work as colourful as possible as a study by Imhof (2004) demonstrated that learners with ADHD respond to colour stimulation with improved control of attention and motor activities. On the other hand, learners with ADHD seem to have a slower stop signal reaction time and impairments to their verbal memory (Toplak & Tannock, 2005; West, Houghton, Douglas & Whiting, 2002).

In addition to difficulty with arithmetic/numeracy/mathematics, learners with ADHD often experience language-related difficulty. Language is used as a means of communication; thus learners who find it difficult to express themselves with language (written or orally) and may discover academic tasks to be difficult. Almost all class or academic tasks require learners to express themselves with language (written or oral). The following research studied how learners with ADHD fared in memory tasks in comparison to language impaired learners.

2.6.2 *Language and ADHD*

Learners with ADHD are not as "disordered or deficient" in language as learners with language impairment (Cohen *et al.*, 2000). In a study by Cohen *et al.* (2000) language achievement and cognitive processing traits in learners with ADHD and LI (Language Impairment) were investigated. It was found that learners with language impairment were at

the most disadvantageous, regardless of the nature of the psychiatric diagnosis, as the working memory measure used to assess the core cognitive deficit of ADHD in executive functions were more closely associated with LI than with ADHD (Cohen *et al.*, 2000).

2.6.3 *Behaviour*

Aggressive and anti-social behaviour is 'acted out' by learners with ADHD; as a study by Zalecki and Hinshaw (2004) supports the argument that girls with ADHD are more visibly and relationally aggressive than girls without ADHD. Temperament traits or personality traits and ADHD behaviour symptoms appear to be related but not identical (Nigg, Goldsmith & Sachek, 2004). It would be advantageous for parents and educators to note, especially with regards to tasks being completed, that learners with ADHD prefer immediate reward (Tripp & Alsop, 2001). Consequently, Antrop, Roeyers, Van Oost and Buyesse (2000) demonstrated in their investigation that learners with and without ADHD benefited from extra non-temporal stimulation.

Observers who label learners with ADHD attribute behavioural difficulties or the social problems displayed by these learners to some cause that is outside of the control of the learner (Stinnett, Crawford, Gillespie, Cruce & Langford, 2001). Thus, the label of ADHD allows the learner to not have personal responsibility (Stinnett *et al.*, 2001).

Studies that relate to learners' behaviour at school (Heiman, 2005) stress that parents and educators need to be involved in assisting learners how to establish friends. Lopez-Williams, Chacko, Wymbs, Fabiano, Seymour, Gnagy, Chronis, Burrows-MacLean, Pelham and Morris (2005) are of the opinion that athletic performance and participation is an important aspect of a learner's social world and relevant in terms of how learners with ADHD are accepted or rejected by their classmates and peers - as a learner's negative behaviour increased, the likelihood that the learner would receive negative nominations from classmates also increased.

One of the learning disorders, as mentioned above, is the disorder of written expression also known as dysgraphia (APA, 2000). Dysgraphia is characterised by the following (APA, 2000):

- ❒ The learner may have illegible printing and cursive writing (despite appropriate time and attention given to the task).
- ❒ Shows discrepancies: mixtures of print and cursive, upper and lower case, or irregular sizes, shapes or slant of letters.
- ❒ Has unfinished words or letters, omitted words.
- ❒ Inconsistent spacing between words and letters.

- ❒ Exhibits strange wrist, body or paper position.
- ❒ Has difficulty pre-visualising letter formation.
- ❒ Copying or writing is slow or laboured.
- ❒ Shows poor spatial planning on paper.
- ❒ Has cramped or unusual grip/may complain of sore hand.
- ❒ Has great difficulty thinking and writing at the same time (taking notes, creative writing).

The skills needed to be efficient in writing may be a reflection of poor motor performance; for example copying or writing that is slow and laboured could be due to the fact that the learner's muscle movement is inept. The co-ordination and movement of muscles contribute to the learner being able to apply him/herself well to academic activities.

2.6.4 Motor Performance

A study by Piek *et al*. (1999) compared the movement ability and underlying kinaesthetic processes of boys with ADHD with a control group. It was found that a high percentage of learners with ADHD displayed movement difficulties consistent with developmental co-ordination disorder (Piek *et al*., 1999). This is important to note as poor developmental co-ordination could influence the learner in performing at academic tasks and physical tasks. Learners with ADHD-PI (predominantly inattentive) were found to have greater difficulty with focused attention and distractibility and poorer manual dexterity, whereas learners with ADHD–C (combined inattentive and hyperactivity-impulsive) have greater difficulty with "sustained" attention and distractibility.

Researchers have considered if motor performance is a prediction of behavioural disorders such as ADHD, Oppositional Defiant Disorder (ODD) and Conduct Disorder (CD). Kroes, Kessles, Kalff, Feron, Vissers, Jolles and Vles (2002) explain in their study that qualitative aspects of motor performance predict ADHD, yet motor performance does not predict ODD/CD. Biederman, Faraone and Monuteaux (2002) studied the impact of exposure to parental ADHD on clinical features and dysfunction of motor performance in offspring.

2.6.5 Parental Involvement

Parents play an important role in seeking persons and treatments that could assist learners with ADHD. As such, parent involvement is discussed in terms of how parent involvement influences the learner socially, emotionally, and cognitively. Parental involvement, thus, could have a direct impact on how the learner is able to apply him/herself to tasks. (Parental

involvement is discussed here below in terms of how parents influence the learner's treatment and treatment plan*).*

Parents' perceptions and/or interpretations of misbehaviour could determine how they lend support and seek out treatment for their learners (Bussing, Gary, Milis & Garvan, 2003). According to the study by Bussing *et al*. (2003) parental perception of the Caucasian boy, who needs to be taken to the doctor in order to find out possible reasons and causes for undesirable behaviour, is the 'indisposed learner'. On the contrary, Bussing *et al*. (2003) found that African-American girls that display misbehaviour are interpreted by parents as the 'sick' role, often prompts parents to modify and punish behaviour and not visit the doctor.

Parents' perception of the learner with ADHD may influence how the learner is able to apply him/herself at school. For example, a parent who does not accept that his/her learner has ADHD may not report it to the educator. Therefore, the learner may go to school and misbehave and/or is inattentive during class, which impedes his/her learning. The educator that has not been informed of the learner having ADHD may not be able to intervene and assist the learner where needed.

In order for a learner to be able to apply him/herself to a class activity, an intervention may need to be implemented. An intervention can take many forms, implemented by either the parent, or family system, educator and/or health care professional. The following section deals with interventions that are pharmacological or involves parents, the family as a system, communication between the parent and the educator themselves.

2.7 *INTERVENTIONS*

ADHD is treated[15] in a variety of ways, including pharmacological methods through the use of stimulants like Ritalin (Green & Chee, 1994), cognitive therapy, family therapy and psycho-educational interventions at school. Treatments for ADHD therefore can be directed at the learner with ADHD, through the use of medication, therapy and nutrition (Sample, 2005). It can be directed at parents through parental guidance and/or family therapy. Lastly, an intervention can be directed at the educator and school whereby the educator can implement education strategies to improve the scholastic achievement of the learner with ADHD. There have been many studies aimed at the treatment of ADHD. Treatment of ADHD, from pharmacology to classroom-based interventions, has been included under the heading of interventions. There is much literature available on drug interventions and the controversy around stimulant drugs. However, for the purpose of this study I chose to focus the literature

[15] Using the medical model the terms intervention and treatment are used interchangeably, to mean the management of a patient (Dictionary.com, 2007 The Free Dictionary by Farlex, 2007).

review on the health care professional and the importance of gaining relevant and insightful data when making a diagnosis. The following sections describe the studies that have been investigated that address interventions or treatment of ADHD. The impact and use of medication and/or stimulants on learners with ADHD are of importance to educators and parents.

2.7.1 *Pharmacology*

There are studies that have measured the impact of medication on learners with ADHD (Aman, Kern, McGhee & Arnold, 1993; Scheres, Oosterlaan & Sargeant, 2006; Taylor, O'Donoghue & Houghton, 2006; Wilens, McBurnett, Stein, Lerner, Spencer & Wolraich, 2005; Zachor, Roberts, Hodgens, Isaacs & Merrick, 2006) and the impact that medication can have in the improvement of learner-parent relationships (Chronis, Pelham, Gnagy, Roberts & Aronoff, 2003).

The following two sections deal with parent involvement and discourses of ADHD within a family. I have included these two sections in this chapter as I believe they contribute to understanding the literature and 'health professionals' story of ADHD. The section on parent involvement highlights that firstly parent involvement with ADHD is important. However, the study and the recommendations given are from the perspective of a health professional. Thus, the health professional is responsible for being able to gain as much information from a parent or guardian of learner with ADHD, but also be aware that there are other factors to consider when reviewing the learner's treatment.

2.7.2 *Parent Involvement*

The importance of family therapy with ADHD learners is stressed by Bailey (2000). The focus of family therapy according to Bailey (2000) is:

- ❒ Getting parents to work together on establishing firm rules, behaviour constraints and hold learners responsible for behaviour.
- ❒ Getting learners out of parental roles.
- ❒ Developing parental and learner support networks.
- ❒ Preventing family members from accommodating to the learner's misbehaviour.
- ❒ Developing more positive warm and nurturing patterns of interaction within the family.

Parents have an influential role in contributing to the process of diagnosis and intervention as stated above. Parents have an important role in contributing information to the health professional in order for the correct diagnosis to be made. Parents play an even more

important role in ensuring that the treatment plan is correctly implemented. The parent is responsible for the learner to receive his/her medication on time everyday if medication is part of the treatment. The parent is responsible for transporting the learner to any psychological therapy, remedial therapy or occupational therapy that is required.

The parent is responsible for being the 'link' between the different systems. That is, the parent forms the link between the learner and educator. The parents would also be responsible for any therapeutic treatment at home (Haarmeier & Thier, 2007). The parent is the link between the learner and the health professional, between the educator and the health professional and lastly between the learner and the broader community.

With the treatment plan, the parent or health care professional decide what is in the best interest of the learner. Bussing *et al*. (2003) suggest the following for health care professionals to ensure successful treatment:

- Develop an understanding of parents' ADHD knowledge or understanding and treatment preferences. As outlined above, the parents' perception of ADHD could influence the treatment plan. Educators contribute to the treatment plan, for example, by ensuring that the learner takes medication; avoids eating junk food at school; consults psychological/remedial/ occupational therapy where necessary.
- Parents and educators may have negative perceptions of pharmacological treatment, thus the health care professional is encouraged to inquire about medication attitudes and potential fears related to psychopharmacological treatment, allowing these fears to be discussed openly.
- Find out about self-care practices, including discipline and alternative medicine approaches, and provide professional feedback about what is consistent with scientific evidence and what cannot be expected to help learners.
- Mothers most commonly bring in learners for medical appointments, yet fathers or, for example, respected family elders may hold decision-making power over whether a treatment is acceptable or not. Determine what attitudes a father or respected family elder may have regarding medical treatment.
- By addressing these issues potential cases of resistance or non-compliance can be identified, addressed, and perhaps prevented.

2.7.3 *ADHD within a Family System*

A qualitative study by Navarro and Danforth (2004) explains that discourses of ADHD are constructed at medical schools where they become appropriated, reframed, embraced. Yet, of importance is that Navarro and Danforth (2004) went on to find that meanings of the

diagnosis of ADHD are negotiated in “shared constructions” dialogue within families, where resistance, acceptance and reconstruction of dominant cultural images and understandings take place in moral and practical dialogues. These discourses of ADHD appear to be, according to Navarro and Danforth (2004) centred on dominant discourses used in medical school and universities. Thus, although discourses around ADHD are constructed within the confines of medical school, these discourses can be resisted by families and educators where families can then reconstruct their own understandings and meanings of ADHD within a family conversation.

2.7.4 *Parent-Educator Partnerships*

Communication between the family and school can also construct new and shared meaning of ADHD. Thus, the family who has a learner with ADHD, should be able to openly state this to the school where the educator, the parent and the learner can construct their own narratives and meanings of ADHD. This partnership between parent, educator and school allows for the learner and his/her treatment to be given precedence. Communication between the different sub-systems, that is between educator and parent, will be discussed further in chapter 3.

2.7.5 *The Educator*

The diagram below illustrates the role that the educator plays and the processes that he/she brings into the classroom setting that could influence the learner who may have ADHD.

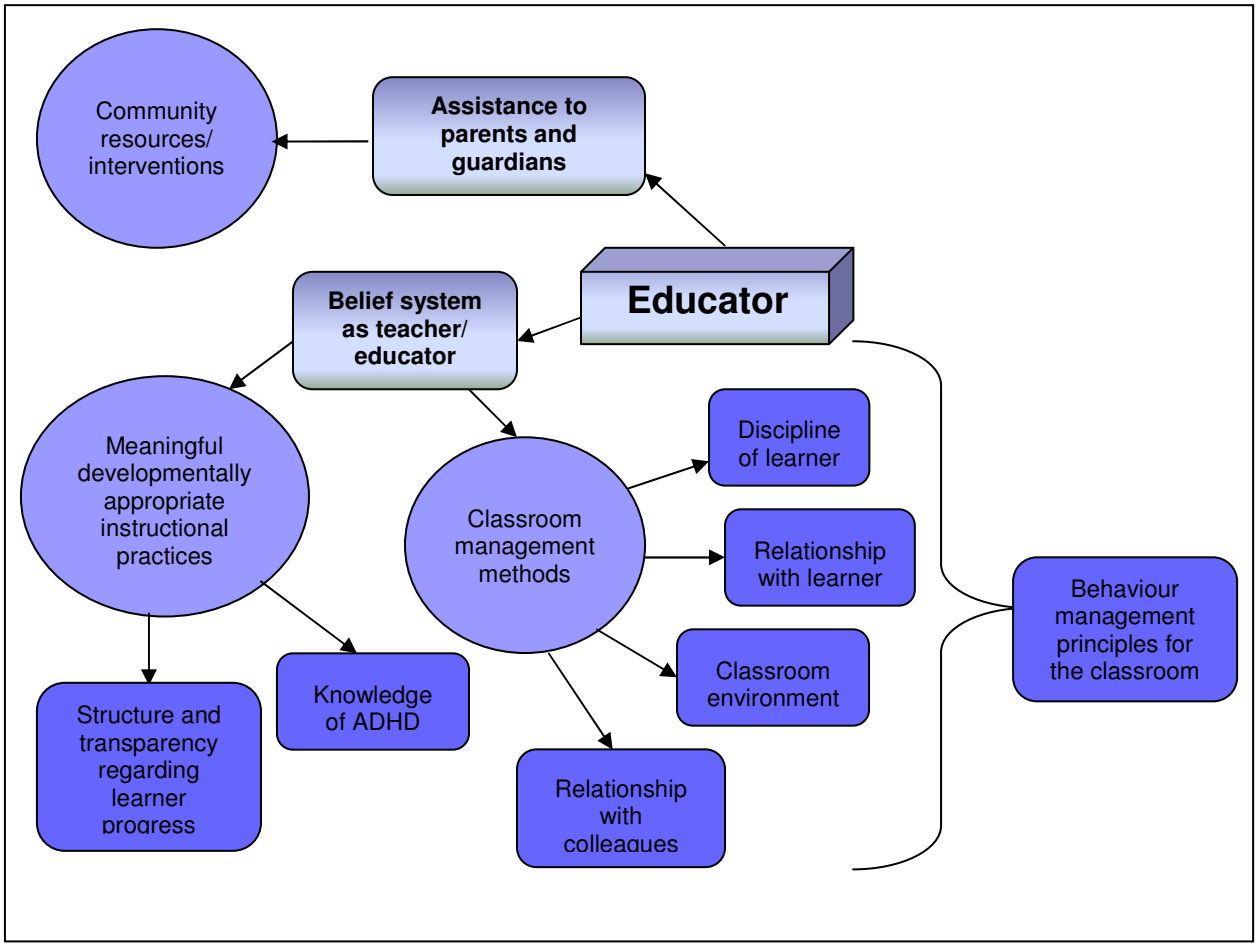

Figure 3: The Educator, Behaviour and Classroom Management (Emmer & Stough, 2001)

Figure 3 illustrates one view of the literature of behaviour and classroom management (Emmer & Stough, 2001). The educator is at the centre of this diagram and thus the centre of his/her classroom. The learner's teaching and learning is partly dependent on the educator. The behaviour and classroom management relies on the belief system as educator. That is the belief system of the educator may influence how he/she may be in the classroom. Therefore the educator's belief system (with regard to teaching) may influence how the educator implements meaningful and appropriate instructional practices. The instructional practices will determine if the educator is acquainted with ADHD. The educator's instructional practice could determine if he/she has structure and a transparent learner progress system. The educator's belief system could influence the classroom management methods that he/she implements. The classroom management methods might influence the educator's relationships with learners and colleagues at school. The classroom management methods implemented determine how the educator disciplines the learners in his/her classroom. The classroom management methods implemented could also influence the classroom environment.

2.8 CONCLUSION

In conclusion there are many studies that attempt to explain and understand ADHD (Barkley, 1994; Brown, 2000; Gordon & Asher, 1994; Piek *et al*., 1999; Purdie, *et al*., 2002; Quay & Hogan, 1999). The numbers of studies that are currently available on ADHD could indicate that it has become a subject that needs further understanding. The literature reviewed suggests that ADHD is a behavioural disorder that is a part of everyday life and therefore would be encountered by educators at school.

In chapter 3, further literature on educators and ADHD is reviewed in the aim that it provides background to this PhD study and provides a backdrop for the conceptual framework proposed in this thesis.

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