CHAPTER THREE

THE RELATIONSHIP BETWEEN BEHAVIOURAL VARIABLES, SELF-REGULATED LEARNING AND ACADEMIC ACHIEVEMENT

3.1 INTRODUCTION

The aim of this chapter is to discuss the influence of learning strategies on academic achievement, and the relationship between learning strategies and self-regulated learning. To grasp the role of learning strategies within the context of learning, the levels of processing information is briefly discussed in paragraph 3.2, whereafter learning strategies are defined in paragraph 3.4.2. The relationship between encoding, the level of processing and meaningful learning is illustrated in paragraph 3.3, followed by a discussion of the different categories of learning strategies. Cognitive strategies are discussed in paragraph 3.4.3.1, metacognitive strategies in paragraph 3.5, affective strategies in paragraph 3.6 and resource management strategies in paragraph 3.7. The relationship between learning strategies and self-regulated learning is elaborated in paragraph 3.8 and lastly, the relationship between learning strategies, metacognition, the level of processing and meaningful learning is discussed in paragraph 3.9.

3.2 THE LEVELS OF PROCESSING INFORMATION

Levels of processing information refer to the idea that the durability of learning depends on how students rehearse (Houston, 1981:183). The more intensive the students' rehearsal, the better and more durable their learning will be. Houston (1981:183) suggests that students can rehearse materials (e.g., a list of words) merely by attending to the physical nature of the stimulus (e.g., what it looks like). Such a process is considered to be "shallow/surface" processing, and results in minimal learning. Lastly, students can process or rehearse words on a "semantic/deep" level (e.g., having to do with the meaning of the words) (Houston, 1981:183). Two levels of processing information viz., a deep and a surface approach to information can thus be distinguished.

3.2.1 A DEEP APPROACH TO PROCESSING INFORMATION

With a deep approach to processing information i.e., learning, the student learns or studies with the intention of extracting a personal meaning from the text to be studied (Entwistle, 1988:24). Such an intention leads to an active processs of learning in which

the student challenges the ideas, evidence, and arguments presented by the author. The student tries to see interrelationships among the ideas presented, and seeks links between personal experience and the outside world (Entwistle, 1988:24; Herrriot, 1974:70). According to Entwistle (1988:24) with a deep approach, the student reconstructs knowledge within a personal framework, that is, the student adopts a holistic approach towards the processing or encoding of information (Entwistle, 1988:24; Houston, 1981:354). A holistic approach for example, is characterized by the learner's intention to understand the text as a whole (Marton, 1984:65).

A student who adopts a deep process to learning has a qualitative conception of the process, including the interpretation and reinterpretation of experience leading to self-actualization (Marton, 1988:65; Schmeck, 1988:322). In a reading situation, for example, when a student is reading a text, he will attempt to extract meaning from words, and carefully balance and cross-check evidence and interpretations with the details constituting evidence in order to teach a more abstract meaning (Schmeck, 1988:322). According to Biggs (1985:185), a student who adopts a deep approach towards information processing describes the writing of an essay as the preparation of an integrated argument supported by evidence. He or she uses a reflective strategy involving interpretation and the integration of components, producing higher-order knowledge from lower-order inputs.

3.2.2 A SURFACE APPROACH TO PROCESSING INFORMATION

According to Entwistle (1988:24), with a surface approach to information processing or learning the student is concerned with a verbatim recall of either the whole text or the facts and ideas presented in it, thus with rote learning (Entwistle, 1988:24; Herriot, 1974:25). With surface processing, there is little or no personal engagement in the act of learning (Entwistle, 1988:24; Houston, 1981:354). While a task is recognized to have meaning, the task presented is not seen as carrying personal significance. Students are thus more concerned with task completion than with improving their knowledge and skills (Entwistle, 1988:25).

Entwistle (1988:25) contends that, as a result of the mechanical process of memorization which is characteristic of a surface approach, students may fail to distinguish between essential points and incidental facts or between principles and examples. Students are unlikely to relate evidence and conclusions or examine the argument in a critical way (Houston, 1981:354). The process of learning thus can be seen as atomistic in that it fails to include the crucial stage of reorganization and reinterpretation, and the outcome

is a more or less complete reproduction of the text, which is unlikely to contain the central core of the author's message (Entwistle, 1988:25).

3.3 MEANINGFUL LEARNING

Meaningful learning relates to the deep approach to learning (Schmeck, 1988:322). Within the context of meaningful learning, learning is defined as an active, constructive, cumulative, and goal-oriented process (Shuell, 1988:277; Schunk, 1991:139). According to Shuell (1988:277) learning is active in that students must do certain things while processing incoming information in order to learn the material in a meaningful way. Constructively, new information must be elaborated and related to other information or prior knowledge so that students can retain simple information and understand complex material (Shuell, 1988:278; Weinstein and Mayer, 1986:317). Learning is cumulative as all new learning builds upon and utilizes the learner's prior knowledge in ways that determine what and how much is learned. Learning is not only goal oriented, but the success of learning is also determined by the learner's awareness of the goal toward which he is working and the expectations that are appropriate for attaining the desired outcome (Shuell, 1988:278).

Meaningful learning involves the acquisition of a complex body of knowledge, while simpler forms of learning involve a collection of separate and isolated facts (Shuell and Moran, 1994:3341). Meaningful learning also extends over a prolonged period and involves different phases of learning. During the initial phase of learning, for example, the acquisition of more or less isolated facts may provide the conceptual glue necessary for an initial structure. In a more advanced phase of learning, organizational strategies may provide the relationships necessary for high-level understanding (Shuell and Moran, 1994:3341).

According to Shuell (1990:532), the learning process also becomes more diverse as the learner relies on experiences associated with a particular course or books selected for self-study. As the learner becomes more familiar with the way along which he/she is traveling, the learner is likely to encounter a variety of relevant books, to attend lectures, to discuss issues with other students at more advanced levels (Shuell, 1990:532). At this level, the student uses his/her knowledge to interpret various situations (Shuell, 1990:532).

For educational purposes, it should be borne in mind that meaning does not reside in the material being learned. The material may possess a potential for being meaningful, but it is the learner who makes it meaningful by processing it in a meaningful way (Shuell

and Moran, 1994:3341). In step with Shuell's (1988:288) definition of learning discussed above, Shuell and Moran (1994:3341) explain how the characteristics of meaningful learning contribute to an understanding of information or learning material such as concepts.

3.3.1 The active learner and meaningful learning

According to Shuell and Moran (1994:3341) the learner must carry out various cognitive operations (e.g., cognitive and metacognitive strategies - also see paragraphs 3.4.2.1, and 3.6) on the information being learned in order to acquire it in a meaningful manner.

3.3.2 The constructive learner and meaningful learning

Knowledge is not an entity that can be passed intact from one person to another. Each learner perceives and interprets new information in a unique manner, and then elaborates this information by relating it to and integrating it with existing or prior knowledge related to the material being learned (Shuell and Moran, 1994:3342).

3.3.3 The cumulative learner and meaningful learning

New learning builds upon the individual's prior knowledge or cognitive structures. The large body of literature on prior conceptions and the difficulty involved in overcoming misconceptions illustrate the potent influence that prior knowledge has on learning (Shuell and Moran, 1994:3342).

3.3.4 The self-regulated learner and meaningful learning

Shuell and Moran (1994:3342) maintain that as learning progresses, the learner must make decisions about what to do next, i.e., rehearse a particular piece of information, seek an answer to a question that comes to mind, look for similarities among various pieces of information. Effective learners also monitor the learning process, by making periodic checks of how well the material is understood. The self-regulation of learning involves a number of factors, including metacognition (paragraph 3.5), self-efficacy (paragraph 4.2), and studying (Shuell and Moran, 1994:3342).

3.3.5 The goal-oriented learner and meaningful learning

Meaningful learning is more likely to be successful if the learner has at least a goal and holds appropriate expectations for achieving the desired goal (Shuell and Moran, 1994:3342). Providing instructional objectives is one of many ways to establish goals. (also see paragraph 2.4.1.4, and paragraph 4.3.2.8, for a discussion of how goals affect self-regulated learning and self-efficacy).

3.4 LEARNING STRATEGIES

3.4.1 INTRODUCTION

As indicated above (paragraph 3.3), meaningful learning requires that a student actively constructs knowledge in a cumulative way. Meaningful learning thus depends upon a student's application of learning strategies. The goal of learning strategies is to affect the way in which the learner selects, acquires, organizes, or processes new knowledge (Weinstein and Mayer, 1986:316). According to Weinstein and Mayer (1986:316), learning strategies have learning facilitation as a goal, and are intentional on the part of the learner. Learning strategies may include any of the following categories: cognitive strategies, metacognitive strategies, affective strategies, resource management strategies or any other strategy to attain a goal.

3.4.2 A DEFINITION OF LEARNING STRATEGIES

Learning strategies can be defined as the behaviours and thoughts a learner engages in during the learning process that are intended to influence the learner's encoding processes, to integrate new information with existing knowledge; and to learn and to retain information (O'Malley and Chamot, 1990:1; Weinstein, 1987:590; Mayer, 1988:11; Weinstein and Mayer, 1986:315; Pintrich, 1988:75). Examples of learning strategies are: outlining the key or main ideas of a chapter or lecture, paraphrasing, focusing on selected aspects of new information, analysing and monitoring information during learning, organizing and elaborating on information, comprehension-monitoring, and managing resources such as time and help from fellow students (Pintrich, 1989:130; Atkinson and Raugh, 1975:128; Mayer, 1988:11; Weinstein and Mayer, 1986:315; Pintrich, 1988:75).

An important issue concerning learning strategies is that learning requires awareness (Weinstein, Meyer and Van Mater Stone, 1994:360). Students need to be aware about

the learning strategies they use when they perform a task. For example, when a student realizes that there is a noise in the room where he is studying and decides to look for another place to study, it shows that he is aware of evironmental strategies. If a student has knowledge of the characteristics of a learning task, and of how to learn the task, it is an indication of an awareness of learning strategies. In the same manner, knowledge regarding their own abilities will help students to adapt their learning to the learning task (McKeachie, Pintrich and Lin, 1985:154). Flavell (1979:907) stresses that the student's knowledge of the learning task and of learning strategies are important variables that influence academic achievement.

According to Thomas and Rohwer (1986:25-29), Pintrich (1989:129) and Weinstein and Mayer (1986:316) learning strategies can be classified into different categories.

3.4.3 CATEGORIES OF LEARNING STRATEGIES

Different researchers on learning strategies describe different categories of learning strategies. Thomas and Rohwer (1986:25-29) and Pintrich (1989:129) distinguish between cognitive, metacognitive and time management strategies, while Weinstein and Mayer (1986:316) differentiate between rehearsal, elaboration, organizational, comprehension-monitoring and affective strategies. An analysis of these categories reveals that the following learning strategies are common to most of the categories: cognitive strategies, such as rehearsal, elaboration, and organizational strategies, comprehension-monitoring or metacognitive strategies such as planning, monitoring and regulating, and affective and resource-management strategies (Weinstein, 1987:590; Thomas and Rohwer, 1986:25-29; Pintrich, 1989:130,131; Weinstein and Mayer, 1986:317).

The functions of the different categories of learning strategies differ from one another (Pintrich, 1989:130). According to Pintrich (1989:130) the cognitive category includes strategies related to the students' learning or encoding of material as well as strategies to facilitate the retrieval of information, e.g., rehearsal, elaboration, and organizational strategies. These strategies also process information on either a deep or a shallow level, for example, elaboration and organizational strategies lead to deep/ meaningful understanding, whereas rehearsal strategies lead to surface or rote/meaningless understanding. (also see paragraph 3.4.3.1.1).

The metacognitive strategies involve strategies related to planning, regulating, monitoring, and modifying cognitive processes (Pintrich, 1989:130; also see paragraph 3.5). The functions of these strategies are to manage and to evaluate whether the learner

when using each of the categories of learning strategies in a learning situation, is on track or not.

Affective strategies include students' emotional reactions to the task (i.e., test anxiety) and their evaluation of themselves in terms of self-worth or self-esteem (Pintrich, 1989:126). The function of affective strategies are to enhance or to improve student's motivation in a learning stuation. (also see paragraph 3.6).

Resource management strategies include strategies that assist students in managing the environment and the resources available (Pintrich, 1989:133; see paragraph 3.7). The functions of these strategies are to help students adapt to the environment as well as to change the environment to fit their needs. These strategies also help students to organize, and to manage time while studying and to seek assistance from others (Pintrich, 1989:136).

3.4.3.1 *Cognitive strategies*

According to Weinstein and Mayer (1986:316), cognitive strategies can be outlined as rehearsal, elaboration and organizational strategies. Each of these three types of strategies has a basic and complex version, depending on the nature of the learning task (Weinstein and Mayer, 1986:316).

3.4.3.1.1 *Rehearsal strategies*

As rehearsal strategies are related to elaboration and organization, they are encoding processes used to process information into knowledge (Weinstein and Mayer, 1986:318). Rehearsal strategies lead to surface processing and rote learning and involve the learner in actively saying, or pointing to parts of the presented material during learning (Weinstein and Mayer, 1986:318; Pressley, 1986:139).

* REHEARSAL STRATEGIES FOR BASIC TASKS

Rehearsal strategies for basic tasks involve actively reciting or naming items from a list to be learned (Pintrich, 1989:130). The cognitive goal of rehearsal strategies is the selection and acquisition of units to be transferred to working memory. These strategies are related to the encoding process as the learner brings information into the working memory (Weinstein and Mayer, 1986:317). Basic rehearsal strategies are best used for simple tasks and the activation of information in working memory rather than the acquisition and integration of new information ((Carrier and Titus, 1981; quoted by

* ELABORATION STRATEGIES FOR BASIC TASKS

Elaboration strategies for basic tasks include forming a mental image of the information to be learned. The cognitive goal of elaboration strategies is construction, i.e., building internal associations between items in the to-be-learned material (Weinstein and Mayer, 1986:319). A student may use the keyword method for acquiring foreign language vocabulary (Weinstein and Mayer, 1986:319). For example, to remember a word pair such as "aple-fish," a learner could form an image of a fish taking a bite out of an apple.

The keyword method for acquiring foreign language vocabulary is the most popular attempt to teach a type of imagining strategy that also uses elaboration (Weinstein and Mayer, 1986:319; Mayer, 1988:15). For example, in memorizing an English word such as "timber" which means a certain type of wood, the keyword could be associated with a Xitsonga vocabulary word such as "timba" which means traditional sugar-cane being planted in the field among the Vatsonga people. Therefore a Mutsonga student could imagine (imagery link) a traditional sugar-cane instead of wood, in order to remember the English word "timber" which can be converted into the Xitsonga word "timba". A verbal "acoustic link" could also be established in which the second language is changed into an easily pronounceable Xitsong keyword. This keyword must sound like (part of) the second language word, for example, "timber" can be converted into "timba".

In a study of associative learning Raugh and Atkinson (1975: as quoted by Weinstein and Mayer, 1986:319) asked two groups of students to learn 60 Spanish-to-English vocabulary pairs in 15 minutes. The experimental group was given training in the use of the keyword method. During learning, the key words were provided and students had to generate their own images. The control group learned the same 60 vocabulary pairs in the same amount of time, but were not given training on how to use the keyword method. The experimental group scored 88% on a recall test compared to 28% for the control group.

* ELABORATION STRATEGIES FOR COMPLEX TASKS

The cognitive goal of elaboration strategies for complex tasks involves building internal connections between new information and "old" information, or prior knowledge, i.e., transferring knowledge from long-term memory into working memory and integrating the incoming information with the knowledge from long-term memory (Weinstein and Mayer, 1986:319). Elaboration strategies such as paraphrasing, summarising, creating analogies, explaining, and question asking and answering, help the learner integrate and connect new information with prior knowledge. By paraphrasing what they are reading,

32

Weinstein and Mayer, 1986:317). A student, for example, may rehearse a poem, the names of different countries, mountains, and rivers of the world on the map, and the names of different objects on a chart, in order to memorize them for future verbatim recall.

*   REHEARSAL STRATEGIES FOR COMPLEX TASKS

Weinstein and Mayer (1986:320) define rehearsal strategies for complex tasks as the most common form of strategies involving note-taking and selecting the important parts of the material to make sure that the material is transferred into working memory for further processing. A student for example, may read material aloud, take notes as he reads and underline only the important parts of a passage (Mayer and Cook, 1980:102).

An experiment on copying notes revealed that the facts that students correctly copy into their notes are far more likely to be learned than the facts that are not copied into notes (Weinstein and Mayer, 1986:318). In another study on copying a passage, Arkes, Schumacher and Gardner (1976: quoted by Weinstein and Mayer, 1986:318) asked two groups of students to read a passage about presidential candidates. Some students were asked to copy the passage in their own handwriting (copy group), whereas other students were asked to perform a nonconceptual task such as circling every letter "e" (control group). Both groups were told that they would be expected to take a recall test. The results showed that the copy group remembered approximately 50% more than the control group, but the copy group required nearly three times more study time than the control group. In another part of the study, students were not told to expect a recall test; in this case, the copy group recalled approximately three times as much as the control group and also required approximately three times as much study time. Thus, while copying seems to enhance factual recall, there is some reason to question its efficacy as a widely used learning strategy.

3.4.3.1.2 *Elaboration strategies*

According to Weinstein and Mayer (1986:319), elaboration strategies are coding processes used to process information into knowledge. Elaboration strategies like oganizational strategies lead to the deep processing of information, such as explaining information in detail. Elaboration strategies include paraphrasing, summarizing, creating analogies, generative notetaking and responding to questions.

serial order (Weinstein and Mayer, 1986:321). These studies suggest that there is a developmental progression in children's bases for organizing pictures during a memorization task. The tendency to group words on the basis of meaning increases with grade level. Furthermore, the level of the sophistication of a sorting style tended to predict recall performance irrespective of grade level. Subjects who gouped words on the basis of meaning showed greater recall than subjects who sorted in a random or orthographic fashion (Weinstein and Mayer, 1986:321).

* ORGANIZATIONAL STRATEGIES FOR COMPLEX TASKS

Organizational strategies for complex tasks involve the student oganizing the information he/she is trying to learn by creating some type of scheme for the material, such as creating an outline of the main events and characters in a story, making a time line for historical occurrences and separating vocabulary into parts of speech (Weinstein and Mayer, 1986:322; McKeachie *et al.*, 1994:362).

In a study of classifying passages, Weinstein and Mayer (1986:323) found that students could be taught to classify passages into categories, for example, to compare and to contrast these passages. The passage examined the relationship between two or more things, etc. The next was to train students to recognize the major prose structures and to outline passages from their own chemistry textbook. Trained students showed better results in recalling on high-level material and in problem solving than non-trained students.

3.5 METACOGNITIVE STRATEGIES

Metacognition is defined as an awareness of one's own knowledge and the ability to understand, control, and manipulate such knowledge (Flavell, 1979:906-911; Flavell and Wellman, 1977:10; Paris, Lipson and Wixon, 1983:293; Paris and Winograd, 1990:8; Osman, 1992:83). According to Jacobs and Paris (1987:258) and Cross and Paris (1988:131), metacognition includes two classes of activities, namely, self-appraisal and self-management.

3.5.1 SELF-APPRAISAL

Self-appraisal refers to the assesment of what a student knows about a given task (Jacobs and Paris, 1987:258). Self-appraisal involves three subcategories of knowledge: i.e., declarative knowledge (knowing what and that), procedural knowledge (knowing how), as well as conditional knowledge (knowing when and why) (Paris, Lipson and Wixon, 1983:294; Jacobs and Paris, 1987:259; Paris and Winograd, 1990:17).

for example, learners actively connect the new text information with their prior kowledge (Pintrich, 1989:131; McKeachie *et al.*, 1994:36).

In a study examining the use of summarization, sixth graders studied reading materials (Weinstein and Mayer, 1986:32). For half of the students, these materials contained paragraph headings and instructions to generate summary sentences, while the other half was presented with material without headings and instructions. An analysis of the scores from a post-reading comprehension test indicated that the students who received the passage with headings and instructions outperformed those students who received passages without headings and instructions.

3.4.3.1.3 Organizational strategies

Organizational strategies refer to strategies which organize information according to one or more characteristics (Weinstein and Mayer, 1986:321) and result in deep processing and meaningful learning, in comparison to rehearsal strategies which lead to surface processing and rote learning.

*   ORGANIZATIONAL STRATEGIES FOR BASIC TASKS

According to Weinstein and Mayer (1986:321), organizational strategies involve the grouping of the to-be-learned information into different organizational frameworks. The cognitive goal of this strategy is to group items into taxonomic categories. Items such as "granite, knife, dolomite, fork, dolerite, pen, pencil, spoon, crayon" can be sorted into qualifying categories. E.g., larger organizational frameworks or categories such as rocks ("granite, dolomite, dolerite"), cutlery ("knife, fork, spoon") and writing materials ("pen, pencil, crayon"). The use of this kind of organizing strategy improves the students' learning as it requires that the learner actively involves himself/herself in the academic task (Weinstein and Mayer, 1986:321).

In a study of free recall lists, Weinstein and Mayer (1986:321) examined some children's free recall of twelve-word lists. They found that two-year-old children organized words most frequently on the basis of their sound, e.g., sun-fun, while three and four year-olds used taxonomic categories such as leg-hand and that serial ordering reached its peak at the age of five. According to Weinstein and Mayer (1986:321), although serial ordering seems to be a more elementary type of interstimulus organization than clustering by taxonomic category, its peak level at the age of five may be that the ability to memorize 12 words has been sufficiently developed. Thus, grouping twelve-word lists according to their common membership in one class requires more effort than memorizing them in

3.5.1.1 *Declarative knowledge*

According to Derry (1990:20); Royer, Cisero and Carlo (1993:204) and Mastropieri and Bakken (1990:32), declarative knowledge which can be called "knowledge of what and knowledge that", is exemplified by the organized collection of facts and concepts that a person possesses. Knowing that a noun is a person, place, or thing or knowledge of different types of learning strategies (see paragraph 2.4.1.1) and other variables influencing learning are examples of declarative knowledge (Weinstein and Mayer, 1986:319; Paris and Jacobs 1984:2085; Bransord and Johnson, 1992:19; Gagne, 1985:50).

Flavell (1979:906; 1981:109) distinguishes three main categories in declarative knowledge: namely, knowledge of the self or other persons as learners, knowledge about the task and knowledge about strategies.

3.5.1.1.1 *Knowledge about the self or other persons as learners*

Knowledge about the self or other persons as learners refers to everything that one could believe about oneself and others as learners or cognitive processors (Wenden, 1987b:574; Genshaft and Hirt, 1980:92). Flavell (1979:907) lists two main dimensions of knowledge about the person as a learner: viz., intra- and inter-individual differences and universals of cognition.

* INTRA-INDIVIDUAL AND INTER-INDIVIDUAL DIFFERENCES

Intra-individual differences refer to one's self-concept as learner and one's beliefs about one's personal attributes and states, temporary or permanent, which are relevant to learning (Flavell and Wellman, 1977:102; Flavell, 1978:120; 1979:907; Wenden, 1987b:575). Learners may know what and how they learn best (Wenden, 1987a:187; Fish and Pervan, 1985:84). Some students learn most things better by listening than by reading. In other words, some students grasp information better by listening to a lesson given in class than by reading the same information (Wenden, 1987b:575; Hernandez, 1993:352).

Inter-individual differences refer to the way different students react to the same social situation, i.e., some students are very shy to answer some questions in class while others are not shy (Flavel, 1979:907). The student's shyness for example, may have an adverse effect on studying or learning. Studying in a library or having to perform a task in class in the presence of fellow students, may inhibit a student from performing well.

The universals of cognition form a subcategory of the personal variable which refers to what learners know about the permanent attributes of humans as learners (Wenden, 1987b:576). Flavell (1979:909) advocates that learners vary in degree and in kinds of understanding, have different reasons for not understanding tasks, and that a learner's present degree of understanding may not be an accurate predictor of how well he/she may understand later. For example, some students may not understand a teacher because he does not spend enough time in explaining the subject matter, while others may quickly understand him. Some students may also think they understand the teacher's explanations but, at a later stage, may fail to explain what they have learned.

3.5.1.1.2 Knowledge about the learning task

Gambrella and Heathington (1981:217) and Blumenfeld, Mergendoller and Swarthout (1987:136) suggest three aspects of a learning task of which learners must have knowledge. Firstly, learners must know whether or not a task calls for deliberate learning and when a situation will require special effort on their part. Secondly, learners must have knowledge of task demands. They must know that some cognitive enterprises can be more demanding and difficult than others (Flavell and Wellman, 1977:13). Learners must also know the purpose for which a task is to be accomplished (Flavell, 1981a:90). The third aspect of the task variable has to do with knowledge about the information involved in a cognitive enterprise and how successful one may be at the task (Wenden, 1987b:578; Blumenfeld et al., 1987:136).

The third aspect of task knowledge may also be considered as knowledge of task content (O'Malley, Chamot, Stewner-Manzanares, Kupper and Russo, 1985:23). A learner for example, who says that there are words in English with many meanings, shows some knowledge about how words work. Such knowledge should cause the learner to be careful about using the translations he encounters in his dictionary (Wenden, 1987b:578; Flavell, 1979:907). At the same time, it also demonstrates the learner's growing knowledge of task content and should also affect his approach to learning by using different strategies.

3.5.1.1.3 Knowledge about strategies

According to Flavell (1979:907), Wenden (1987b:579) and Corno (1986:11), there is a great deal to be known about the nature and utility of strategies that can be used most effectively for the accomplishment of certain cognitive tasks. With relation to

knowledge about strategies, a child may come to believe, for example, that one good way to learn and retain many bodies of information is to pay particular attention to the main points and try to repeat them to himself in his own words (Flavell, 1979:907). Such a learning strategy though may not always be effective.

3.5.1.2 Procedural knowledge

Procedural knowledge refers to an awareness of the processes of thinking and learning (Paris and Oka, 1986:30). An important aspect with relation to procedural knowledge is the knowledge of how each learning strategy works. Without such knowledge, a student cannot select a learning strategy to ensure effective learning. For example, a student may know how to skim, how to underline, how to summarize, how to use context and also how to find the main ideas in a passage while studying or learning (Paris and Oka, 1986:30; Cross and Paris, 1988:131). In order to know how to skim, summarize, and underline etc., the student has to observe how he acquired the knowledge of a subject in such a way that he can say this is "how" he arrived at this knowledge or this is "how" he solved the maths problem. According to Jacobs and Paris (1987:259), procedural knowledge can also be illustrated as a means whereby essential information in a textbook chapter can be identified. Procedural knowledge also enables the learner to check for understanding by going through the steps that lead to the correct response (Paris and Oka, 1986:30). If the learner, for example, knows how to use the various steps or procedures, he aids comprehension which leads to effective learning.

3.5.1.3 Conditional knowledge

Conditional knowledge refers to knowledge of when and why certain cognitive strategies will be more effective than others (Zimmerman, 1989:332; Paris, Cross and Lipson, 1984:1240). Conditional knowledge would also include an awareness of the conditions that influence learning such as "why" certain strategies are effective and "when" they should be applied and "when" they are appropriate (Jacobs and Paris, 1987:259).

Schunk (1992:182) and Paris and Byrnes (1989:170) assert that conditional knowledge is linked with the declarative and procedural knowledge to which it applies, and that it is an integral part of self-regulated learning (Zimmerman, 1989:332). For example, while students are engaged in a task, they may assess their task progress and level of comprehension and decide to alter their strategy based on their conditional knowledge that the strategy being used is not as effective as another one may be.

37

3.5.2 SELF-MANAGEMENT

Self-management refers to the dynamic aspects of translating declarative, procedural and conditional knowledge into action (Jacobs and Paris, 1987:259). A student who manages his learning behaviour, knows how to control and direct his behaviour towards better academic achievement (Jacobs and Paris, 1987:259). A student, for example, who monitors his work without the supervision from the parent, teacher or any agent, is self-managing his learning and is learning effectively.

There are three general processes that constitute self-management strategies: namely; planning, monitoring and self-regulation (Pintrich, 1989:132; Jacobs and Paris, 1987:259).

3.5.2.1 Planning strategies

According to Pintrich (1989:132), planning strategies include setting goals for studying, skimming, generating questions before reading the text, and doing a task analysis of the learning task. All these activities help the learner plan the use of strategies and the processing of information. In addition, they help to activate relevant aspects of prior knowledge that make the organization and comprehension of the material easier. Much of the research on planning suggests that effective learners engage in more planning activities than poor learners (Paris and Winograd, 1990:29; Pintrich, 1989:132).

3.5.2.2 Monitoring strategies

Monitoring strategies include the tracking of attention as one reads, self-testing while reading a comprehension text and the use of certain kinds of testing strategies (Pintrich, 1989:133; Weinstein and Mayer, 1986:317). While a learner reads, for example, he/she can monitor his/her speed and adjust his/her speed to the time available. Monitoring strategies assist the learner in understanding the material when he/she rereads, by paying particular attention and making sure that the self-testing is thoroughly done (Pintrich, 1989:133; Shuell, 1988:292; Weinstein, 1987:592).

3.5.2.3 Self-regulated strategies

Self-regulated strategies are related to monitoring strategies (Brown, Bransford, Ferrara and Campione, 1983:78). For example, as learners monitor their comprehension, they can regulate their reading speed to adjust to the difficulty of the material. Other forms of self-regulating strategies include rereading portions of a text to increase

38

comprehension, reviewing material, and using test-taking strategies, i.e. skipping questions and coming back to them later in the examination. These self-regulating strategies are assumed to improve learning by assisting learners in checking and correcting their behaviour as they proceed with a task (Pintrich, 1989:133; Carr *et al.*, 1989:765).

3.6 AFFECTIVE STRATEGIES

Affective strategies include those methods students use to help create and maintain climates conducive to learning (Dansereau, Collins, Mcdonald, Holley, Garland, Diekoff and Evans, 1979:103). Examples of affective strategies include using positive self-talk to reduce performance anxiety, using rewards, and setting goals. The use of these strategies helps to focus attention and eliminate internal and external distractions that can adversely affect concentration (Weinstein, 1987:592; Weinstein and Mayer, 1986:317). For example, the student may perform poorly by directing attention towards his/her fear of failure and thus, away from the test or exam.

3.7 RESOURCE MANAGEMENT STRATEGIES

According to Pintrich (1989:133), resource management strategies include a variety of strategies that assist students in managing their environment and the resources available. These resources include managing the time available for studying, the actual study environment (i.e., place for studying), seeking help from teachers and peers, effort management and persistence. All these strategies help students to adapt to the environment as well as change the environment to suit their needs (Sternberg, 1985:123).

3.7.1 TIME MANAGEMENT

According to Thomas and Rohwer (1986:27) and Pintrich (1989:133), time management is an important self-management activity in studying (Pintrich, 1989:133). There are different levels of time management varying from monthly and weekly scheduling to managing an evening of studying (Pintrich, 1989:134). Students have to have a weekly schedule for studying that helps to organize their time. Scheduling needs to be flexible enough to allow for adaptations in the light of course demands (Thomas and Rohwer, 1986:27). For example, if a student has set aside three hours one evening for studying, he or she must be able to schedule the use of these three hours efficiently, and if three

hours are not possible, then he/she must reduce them to two hours or, if necessary, to increase them.

3.7.2 THE PLACE FOR STUDYING OR THE STUDY ENVIRONMENT

The place for studying or the study environment involves a student's area for studying (Pintrich, 1989:1340). A student's place of studying is an important aspect of his/her studying. One can state that it is useful for students to have a defined area for studying. The area can be in a variety of settings, for example, a library, a study hall, a bedroom, or a sitting room. The study place should be relatively free from distractions, both visual and auditory (Deese and Deese, 1979:117). The study environment should be organized and quiet. The possibilities of having quality time for studying when there are many distractions are slim, for example, when other students are talking; loud music is played or television is watched, and there are children in the room. The student needs to organize the study environment in such a way as to improve attention (Pintrich, 1989;134). Once a student gets settled in an environment for study purposes, he/she should be able to pay particular attention to his academic tasks, so that he/she may probably prolong his/her time frame of study as he/she adapts to that particular environment.

3.7.3 HELP SEEKING

Help seeking involves seeking the support of others such as peers, teachers or any other person when insufficient progress is being made (Pintrich, 1989:134). The student needs to know when and how to seek and obtain help. Sternberg (1985:102) contends that good students know when they do not know something and are able to identify someone to provide some assistance. For example, a good teacher may also be willing to help his or her student if such need arises.

3.7.4 EFFORT MANAGEMENT

According to Pintrich (1989:135), effort management includes the interaction between motivation and cognition. This strategy concerns students' general self-management in terms of effort and persistence. A good student for example, knows when to increase effort and persist with a task by means of prolonging the study period and allocating breaks between the times scheduled. In a nutshell, it can be added that a good student knows that increasing the quantity of effort may not result in success, but that different

learning strategies may be needed to address the task (Corno and Rohrkemper, 1985:55; Pressley, 1986:145).

3.8 THE RELATIONSHIP BETWEEN LEARNING STRATEGIES AND SELF-REGULATED LEARNING

There is a relationship between learning strategies and self-regulated learning. Palincsar and Brown (1984:119) assert that strategies such as planning, monitoring, time management etc., are important instruments for a student's academic achievement and are related to the regulation of cognitive activity. The self-regulated learner, for example, possesses knowledge of strategies and knowledge of the task demands that enable him to accomplish learning tasks efficiently (Brown, Campion and Day, 1981:16). Knowledge of oneself and the demands of the learning task in which one is engaged, facilitates the selection, employment, monitoring, and regulation of learning strategies (Palincsar and Brown, 1984:120).

According to Zimmerman and Martinez-Pons (1992:187), self-regulated learners view the acquisition of proficiency as a strategically controllable process and accept greater responsibility for their achievement outcomes. Although much research has focused on how strategies provide learners with a powerful means to improve their acquisition, performance, and memory, little attention has been given to the impact of strategy use on the self-perceptions of proficiency by learners (Zimmerman and Martinez-Pons, 1992:187). The research has revealed that when the use of learning strategies becomes associated with self-perceptions of agency, purpose, and instrumentality, academic self-regulation will occur (Zimmerman, 1986:616). Although all learners use regulatory processes to some degree, self-regulated learners are distinguished metacognitively by their awareness of the strategic relations between regulatory processes and learning outcomes and their use of specific strategies to achieve their academic goals. Thus, self-regulated learning involves the awareness and use of learning strategies, perceptions of self-efficacy, and a commitment to academic goals (Schunk and Zimmerman, 1992:187).

3.9 THE RELATIONSHIP BETWEEN LEARNING STRATEGIES, METACOGNITION, LEVEL OF PROCESSING AND MEANINGFUL LEARNING

There is a relationship between learning strategies, metacognition, levels of processing and meaningful learning. Schmeck (1988:320) asserts that learning represents the deployment of learning strategies based upon metacognitive knowledge. A self-

conscious and well planned process of learning, for example, requires firstly that students should be aware of their motives and intentions, their own cognitive resources, and their demands with regard to academic tasks. Secondly, that they are able to control those resources and monitor their subsequent performance (Schmeck, 1988:321; Marton, 1988:47).

Schmeck (1988:321) agrees that the basic processes to meaningful learning are the deep process, and the surface process. According to Meece (1992:29), learning-oriented students tend to use deep processing strategies that enhance conceptual understanding and require cognitive effort, such as integrating information or monitoring comprehension (also see paragraph 3.2.1).

In contrast, ego-oriented students have been associated with surface-level processing strategies, such as memorizing and rehearsing strategies (Meece, 1992:29). Students operating under ego-involved/oriented conditions show a poor recall of information when meaningful learning requires deeper levels of information processing (Meece, 1992:29; see also paragraph 3.2.2).

3.10 CONCLUSION

This chapter has focused on the importance of learning strategies on academic achievement, and the relationship between learning strategies and self-regulated learning. The literature review has revealed that learning strategies facilitate as a goal on the part of the learner (Weinstein and Mayer, 1986:315). The goal of learning strategies is to affect the way in which the learner selects, acquires, organizes, or integrates new knowledge. Learning strategies may include selecting new information, analyzing and monitoring information during acquisition, organizing, elaborating on new information during the encoding process and evaluating the effectiveness of learning when it is completed.