LEARNING STRATEGIES OF GRADE SEVEN SCIENCE LEARNERS

By

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DEDICATION

This dissertation is dedicated to:

God the almighty and to

My family

My colleagues

My friends

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I wish to extend my sincere thanks to all people who made it possible for me to complete this study. I owe special thanks to:

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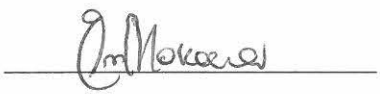
DECLARATION

I hereby declare that :

LEARNING STRATEGIES OF GRADE SEVEN SCIENCE LEARNERS is my own research work, that all sources used or quoted have been indicated and acknowledged by means of complete reference, and that this dissertation was not previously submitted by me for a degree at any other university.



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SUMMARY

The main aim of this study was to investigate whether grade seven learners who have just been introduced to the new South African outcomes-based education, use learning strategies effectively to learn science. This research is based on literature study related to previous research about learning strategies. Definitions of cognitive and meta-cognitive learning strategies were given. Cognitive strategies are divided into eight categories, representing strategies for both basic and complex learning tasks. For this study, therefore, focus was on elaboration study for complex learning tasks with special reference given to summarising, paraphrasing and self-questioning.

Meta-cognitive strategies consisting of planning, monitoring and regulating also seemed important in ensuring effective control of the learning process. Through observations conducted, it became evident that learners only become able to use learning strategies effectively if they are given proper guidance and instruction on how, when and where to apply learning strategies. This results in learners having a better understanding and improving their quality of learning. Cognisance also needs to be taken of the influence of support strategies such as learner beliefs, attention, self efficacy, motivation and interest during the learning process.

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CHAPTER ONE

THE PROBLEM

1.1 INTRODUCTION

The educational process demonstrates how a learner uses his thinking mind, learn from others and how he is affected by the environment (Costa & Liebmann 1997:10). In natural science learners are expected to observe, describe, explain and record their present experiences, and make personal creative contributions in generating, extending and organizing knowledge (Moreno 1999:339). Seeing that learners' perceptions influence how they tackle learning activities, it is important that they should be encouraged to develop skills and attitudes that will be useful throughout their lives regardless of their career choices.

Verduin (1996:6) states that learners need to realise that in order to be able to generate new knowledge, they should not be passive receptors of knowledge, but have to be involved in higher order thinking which goes beyond factual consumption and memorization. Current science education approaches stress active learning. Learners are expected to ask questions, acquire knowledge, construct and test explanations, and communicate their ideas with others.

With science highlighted as a priority for national development in South Africa, an investigation into the ways in which learners effectively use learning strategies forms the basis of this study. According to Piaget (Pressley & McCormick 1995:299), the conceptual understandings a child

brings to a situation, play an important role in determining the understandings of the situation. If new information is inconsistent with views already held by the child, there is a possibility for cognitive conflict, which motivates efforts by the child to comprehend new input. Learners therefore need to acquire relevant techniques relating new information to existing knowledge. It is evident that the outcomes of learning depend to a large extent on how learners process information.

1.2 STATEMENT OF THE PROBLEM

In science, particularly, teachers are challenged to approach the learning content in a manner that will reflect conceptions intended by curriculum writers. As stated by Meyers (1991:1) and Somuncouglu and Yildirim (1999:35), educators need to rethink their roles and concentrate on teaching learners skills and attitudes needed for self-directed inquiry. Promoting learners' independence by equipping them with the skills for learning is supposed to enable them to orchestrate their life-long learning act more effectively. The most appealing technique to enable teachers regarding the latter skills and attitudes, is the pursuance of the constructivist paradigm when teaching science. In a constructivist classroom, the focus is on the learner, with the teacher inviting learners to experience the world's richness, empowering them to ask their own questions and to seek their own answers, and challenging them to understand the world's complexities (Nagel 1996:40). With this approach in teaching and learning, teachers will be seen to assist learners to make connections between new knowledge and prior knowledge to create personal meaning.

For the purpose of this study, the researcher intends to follow the constructivist model in order to determine whether grade seven learners emerging from Piaget's concrete operational stage (seven to eleven years) and having just been introduced to the new outcomes-based curriculum, will cope in providing meaning to what they learn. It is thus important to ask the following question in this regard:

Do grade seven science learners utilise learning strategies that enable them to give meaning to what they learn?

1.3 AIMS OF THE STUDY

The problem identified, gives rise to the formulation of the following specific aims:

-To establish what a learning strategy is;

-To describe learning strategies for knowledge integration; and

-To establish whether grade seven science learners possess effective learning strategies.

1.4 RESEARCH METHODOLOGY

In this study a qualitative approach is used. The population is all grade seven science learners from Mmantshebo Public Primary School and a sample of 20 learners are observed.

1.5 SIGNIFICANCE OF THE STUDY

Grade seven science learners have just been introduced to the new outcomes-based curriculum. Unlike the previous South African education set-up, learners are required to be actively involved and to direct their own learning. In science, particularly, learners tend to perform poorly and this is usually related to lack of understanding scientific knowledge. Weinstein and Mayer (1986:316) contend that learning strategies affect the learners' motivational state and the way in which the learner selects, acquires and integrates new information. Educators need to facilitate the development of appropriate learning skills and a positive attitude. This study therefore, provides a detailed description of how cognitive learning strategies such as questioning skills, generative-note-taking, paraphrasing, summarizing, as well as comprehension monitoring strategies, contribute towards the learning of science. Grade seven educators are encouraged to motivate learners to employ these learning strategies in order to have a better understanding and more insight in learning about science.

1.6 DEFINITION OF CONCEPTS

The following concepts will be used in the study and therefore need to defined:

Learning strategies: Weinstein and Mayer (1986:315-316) define learning strategies as behaviours and thoughts that a learner engages in during learning and that are intended to influence the learner's encoding process.

Cognitive psychologists have divided learning strategies into two domains, namely cognitive and meta-cognitive strategies. Cognitive strategies relate to how an individual processes information. Meta-cognitive strategies relate to how an individual selects, monitors and uses cognitive strategies that he or she possesses (Lenz 1992:3).

Motivation: Slavin (1997:345) defines motivation as an internal process that activates, guides, and maintains behaviour over time. According to Pintrich (1995b:76), motivation is a function of the extent to which learners believe they are capable of attaining their goals (that is self-efficacious) and the degree to which the setting promotes behaviour-outcome contingencies.

Constructivism: Constructivism includes the theories of cognitive development that emphasize the active role of learners in building their own understanding of reality (Slavin 1997:34).

Reflection in learning: Reflection in the context of learning is a generic term for those intellectual and affective activities in which individuals engage to explore their experiences in order to lead to new understandings and appreciations (Morgan 1995:509).

1.7 DELIMITATION

The population for this study is all grade seven science learners in Mmantshebo public primary school from which a sample of twenty learners were observed. The results of this study cannot be generalized beyond the specific local public primary school. Secondary schools, high schools, colleges and technikon learners are not subjected to the study.

CHAPTER TWO

LEARNER COGNITION AND LEARNING STRATEGIES

2.1 INTRODUCTION

In chapter two attention is mainly given to the learning process, learners' beliefs about the influence of learning strategies on the learning of science and to the fact that instruction in learning strategies develop skills and strategies for further learning.

The current approach to science education requires learners to regulate and monitor their own learning process. Many learners find it difficult to cope with learning scientific vocabulary, solving scientific problems and to apply science to their daily lives (Hynd, Holschuh & Nist 2000:2). Learners, therefore, become frustrated and develop a negative attitude towards the learning of science. Educators need to teach and encourage learners to employ relevant and effective learning strategies in order to have a better understanding of the learning content. Attention must also be given to the learner's developmental needs. In other words, instruction should be appropriate to the learner's age.

Educators need to foster learners' effective use of learning strategies, facilitate understanding and consolidation of the subject and thus lead to superior learning outcomes. According to Weinstein and Mayer (1986:315) and Wittrock (1986:310), learning strategies refer to behaviours and

thoughts the learner engages in during learning that are intended to influence motivation, encoding, acquisition, retention and transfer of knowledge. Learning strategies are divided into two domains, namely cognitive learning strategies and meta-cognitive learning strategies. Cognitive psychologists have proposed that these cognitive and meta-cognitive strategies make up the strategies in the information system that an individual learns and controls (Lenz 1992:3). If learners manage to use these learning strategies effectively, they will develop a positive attitude towards the learning of science which will assist them in understanding science.

In paragraph 2.2 cognitive learning strategies are discussed.

2.2 COGNITIVE LEARNING STRATEGIES

Cognitive learning strategies basically consist of rehearsal, elaboration (establishing links between concepts) and organization. These strategies relate to how learners process information required by instructional tasks (Lenz 1992:3; Somuncouglu and Yildirim, 1999:35; Moeketsi 1996:28 and Pintrich 1995b:74).

Cognitive learning strategies are comprised of eight categories that learners can employ to study a given text. These are:

(a) Basic rehearsal strategies:

Basic rehearsal strategies involve repeating the names of items in an ordered list (Weinstein & Mayer 1986:316). Rehearsal is important in learning

because the longer an item remains in the working memory, the greater the chance that it will be transferred to the long-term memory. Without rehearsal, items will probably not stay in the working memory for more than thirty seconds (Slavin 1997:189).

(b) **Complex rehearsal strategies:**

In the case of a lesson from a science textbook, the act of rehearsal involves the learner actively saying, writing or pointing to parts of material. Rehearsal or merely repeating items over and over is not a particularly effective strategy. There is little evidence that this technique helps learners to contract internal connections or integrate the information with prior learning (Martlin 1989:475). Nonetheless, rehearsal is useful in maintaining items in the short-term memory.

(c) **Basic elaboration strategies:**

Elaboration strategies that have been used for basic learning tasks include forming a mental image or generating a sentence that connects two or more items (Moeketsi 1996:30).

(d) Complex elaboration strategies:

Paraphrasing, summarising, creating analogies, generative note-taking and question generating are techniques that help learners connect the new text information to their existing knowledge (Pressley & McCormick 1995:26).

(e) Basic organizational strategies:

Organizational strategies for basic learning tasks involve grouping or ordering to be learned items from a list or section of a prose. The learner

organizes the items into groups on the basis of shared characteristics or attributes (Weinstein & Mayer 1986:321).

(f) Complex organizational strategies:

These strategies imply the outlining of the passage or creating a hierarchy. A hierarchy is a system in which items are arranged in the series of classes, from the most general classes to the most specific (Martlin 1989:138). Through organization learners attempt to bring order, identify main ideas and supporting details and relate these to one another in a manner that will facilitate encoding and recall.

(g) Comprehension monitoring strategies:

Learners ask themselves questions to check their understanding of material presented in class. Sometimes learners use the question at the beginning of each section to guide their reading (Kruger & Adams 1998:99).

(h) Affective strategies:

According to Moeketsi (1996:35) affective strategies refer to strategies learners use to focus, maintain concentration, become alert and relaxed to overcome anxiety or reduce external distractions by studying in a quiet place. Learners use basic strategies such as rehearsal and memorization to remember facts and details whilst complex learning strategies such as elaboration facilitate the acquisition of conceptual understanding. Learners often require a combination of cognitive and meta-cognitive strategies to complete their task successfully.

Learning strategies that relate to how learners select, monitor and use cognitive strategies that they possess, are referred to as meta-cognitive strategies (Lenz 1992:3). Learners' ability to regulate cognitive strategies depends on their use of meta-cognitive strategies that include planning and monitoring (Pintrich 1995b:74).

2.3 META-COGNITIVE STRATEGIES

Meta-cognitive strategies, basically consisting of planning, monitoring and regulating, help learners to control and execute their learning processes (Somuncouglu & Yildirim 1999:35).

(a) Planning

Planning as a meta-cognitive learning strategy requires setting goals and generating questions about the learning content. This strategy constitutes a prelude to the organization and comprehension of learning material.

(b) Monitoring

It is not enough to plan and hope that the learning process will take place smoothly if learning is not monitored. Monitoring involves checking thinking, comprehension and academic behaviour which helps discover any weaknesses or failures in the learning process. Monitoring also goes beyond checking new information and knowledge gained to checking the relationship between newly gained information and knowledge to existing knowledge stored in the long-term memory (Stevenson & Palmer 1994:67).

(c) Regulating

Regulating as the third meta-cognitive learning strategy, links clearly with planning and monitoring strategies. Regulating means directing the learning process towards the learning goals. The regulating strategy helps to adjust and remedy weaknesses and failures discovered during the learning process. Therefore, the regulating strategy requires rereading and reviewing which helps adjust or modify cognition where necessary.

2.4 BELIEFS AND LEARNING

Learners' beliefs shape how they act. Preconceived beliefs can hinder learning if they contradict the learner's experiences. It is often difficult to change deeply rooted beliefs and habits.

Learners, who believe that their knowledge is fixed and cannot be improved no matter how much effort is made, often develop negative views of the task on hand if they cannot cope with what they learn. Such learners tend to resort to ineffective strategies and exhibit maladaptive behaviours in the face of difficulties and changes (Qian & Alvermann 2000:183). In contrast, there are learners who believe that their knowledge is malleable and can be improved. Such learners are able to set themselves learning goals that involve challenge and require effort in attempts to improve their learning. When faced with failure, these learners try new learning strategies to overcome their difficulties. Learners with high self-efficacy have been shown to actively participate in learning activities, show greater effort and persistence, and achieve higher levels of academic performance than

learners with low self-efficacy (Pintrich 1995b:45). The goal of any particular learning strategy may be to affect the way in which the learner selects, organizes or integrates new knowledge.

2.5 COGNITIVE GOALS OF LEARNING STRATEGIES

According to Weinstein & Mayer (1986:317), the encoding process can be analyzed into four main components:

-**Selection:** The learner actively pays attention to important information that is impinging on the sense receptors, and transfers this information into working memory.
-**Acquisition:** The learner actively transfers the information from working memory into long-term memory for permanent storage.
-**Construction:** The learner actively builds connections between ideas in the information that have reached working memory.
-**Integration:** The learner actively searches for prior knowledge in the long-term memory and transfers this knowledge to working memory.

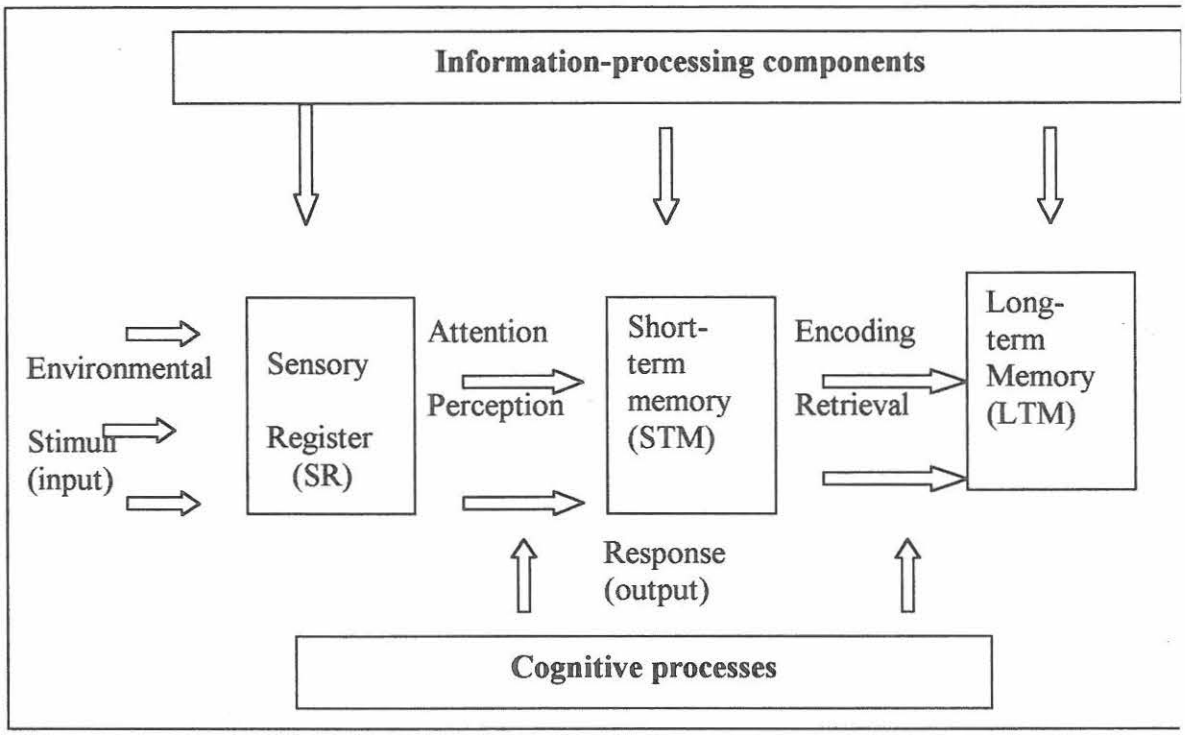
The learner may build external connection between incoming information and prior knowledge. Information is stored and retrieved from memory for later use.

2.6 THE ROLE OF MEMORY IN LEARNING

All learning implies memory. If nothing is remembered from experiences, nothing would be learned. The three stages of memory are encoding, storage and retrieval. With encoding, new information is placed into memory. The first stage of encoding is perceiving and comprehending new input. Information is stored in the long-term memory. In order to remember information that is stored in the long-term memory, we have to be able to retrieve it. Retrieval is the process of accessing information in the long-term memory and placing it in the short-term memory (Atkinson, Atkinson & Hilgard 1983:253).

These stages of memory do not operate in the same way in all memory situations. Memory depends upon what learners do as they interact with new information. If learners are engaged in activities that require them to focus on meaning of the new information, then memory will be better than when learners engage on activities that focus on the superficial, surface aspects of the material.

Fig. 2.1 An information-processing model of learning.



Source: Kruger and Adams 1998:62

The first component of the memory system that incoming information meets, is the sensory register. The sensory register receives large amounts of information from the senses (sight, hearing, touch, smell, taste) and holds it for a very short time. If learners are bombarded with too much information at once and not told which aspects of the information they should pay attention to, they may have difficulty learning any of the information at all (Slavin 1997:186; Hamilton & Ghatala 1994:92).

Information in the short-term memory is stored for a short time and is kept active by regulatory processes like rehearsal, that is, by repeating it over and over in our minds. When we stop thinking about something, it disappears

from our short-memory. Another term for the short-term memory is working memory. Working memory is predominantly mental workspaces where thinking occurs and has a very limited capacity as it allows one thought to be processed at a time (Stevenson & Palmer 1994:6; Moeketsi 1996:18; Atkinson *et al* 1983:223). Information may enter memory from sensory registers or from long-term memory.

Long-term memory involves information learners have gained about the world such as concepts, facts and episodes that have been retained for intervals as brief as few minutes or as long as a life time. Long term memory is based on meanings people attach to items to be remembered, thus, if you have to remember a point made in a text book, you will recall it better if you concentrate on its meaning rather than on the exact words involved. The more deeply or elaborately one encodes a meaning, the better memory will be (Atkinson *et al* 1983:231). Many theorists believe that we may never forget information in the long-term memory; rather we may just lose the ability to find the information within our memory (Slavin 1997:191).

One must know and understand learners' beliefs, perceptions and previously learned strategies in order to teach a new strategy and to understand how learners will respond to it. It is important for learners to have adequate knowledge of learning strategies for general learning tasks and for learning specific content areas. To help learners develop and deepen their use of learning strategies appropriate instruction methods should be applied (Pintrich 1995b:34).

2.7 THE TEACHING OF LEARNING STRATEGIES

In a constructivist classroom, focus is on the learner, with the teacher inviting learners to experience and understand the world's complexities. The teacher can facilitate this process by teaching in ways that make information meaningful and relevant to learners by giving them opportunities to discover or apply ideas themselves, and by teaching learners to be aware of and consciously use their own strategies for learning (Nagel 1996:40; Slavin 1997:269). Many constructivists believe that understanding develops through hands on activities that require learners to develop, explain, elaborate or defend their beliefs to other learners. The more learners can take responsibility for their own learning, the more likely they are to attribute success to their own efforts (Pintrich 1995b:53). Teachers, therefore, need to assist and train learners on the correct usage of learning strategies. Failure to employ relevant learning strategies lead to learners' frustrations and option for rote learning, which does not help learners to show an understanding of the learning content.

Grossen and Romance (1994:147) assert that learners must actively construct their own meaning by linking new learning to prior learning for themselves in order to make knowledge come alive for them. Learning science from this constructivist philosophy, implies direct experience with science as a process of knowledge generation in which prior knowledge is elaborated and changed on the basis of fresh meanings negotiated with peers and the teacher (Addey, Bliss, Head & Shayer 1989:90; Tobin, Kahle & Fraser 1990:7).

Learners, who can formulate mental images of what they actually experience, observe and create analogies, find it easier to integrate new information to existing knowledge in the long-term memory. Making analogies involves finding similarities between a new concept and a familiar one to make the new concept more understandable. For example, water as an analogy for electricity. The river (electricity) flows through the narrow and wide part of the river. However, where the river is narrow the amount of flowing (the current) is smaller, but the resistance or power is greater, while the voltage stays the same (Byers, Childs & Laine 1994:79).

A teacher who intends to train learners on summarizing, guides them on how to select main ideas from the text. According to Slavin (1988:192, 1997:216) summarization involves writing a brief statement that represents the main idea of the information being read. Learners prepare summaries to help them learn the material, taking into consideration what is important and what is not. Summary skills strategies were developed to assist learners who were less able to identify main ideas and could not use comprehension strategies spontaneously. Nelson (1992:202) suggested general rules that could help retain important information from the text, amongst which he included deletion of unnecessary information, substitution of super-ordinate term for a list of items or actions and selecting a topic sentence.

The paraphrasing strategy was developed to teach learners how to read a limited section, ask themselves about the main ideas and details in the section and then to put that information into their own words. Paraphrasing was found to be an effective strategy because it required a high degree of mental processing of the information (Slavin 1997:215; Slavin 1988:191).

Self-questioning strategies involve teaching learners to look for common elements in a given type of task and to ask themselves questions about these elements. Paris, Cross and Lipson (1984) and King (1992a) found that learners comprehended better if they were taught to ask themselves Who, What, Where and How questions as they read (Slavin 1997:214). The self-questioning strategy was developed to teach learners how to ask questions about chunks of the text and then how to read to find answers to these questions (Lenz 1992:7).

According to Pintrich (1995b:53), two best instructional methods for cognitive skills are modelling and guided practice with feedback. This involves the teacher taking a few minutes talking about how to read a text, pointing out special aids provided by the author such as underlining, italics and modelling how to pick out important information in the text.

Pressley and McCormick (1995:32) states that primary grade learners must be given explicit instruction to attend to their performance differences, interpret these differences as indicators of relative strategy effectiveness and use this information for future decision making. However, the fact that learning strategies work well with only certain tasks under specific conditions require learners to have more than meta-cognitive skill in monitoring strategy outcomes and making alternative choices. Learners need specific information about the contextual conditions and a sense of self-regulatory efficacy to sustain motivation in the face of extended periods of ambiguous or unfavourable feedback (Pintrich 1995:220).

Academic behaviour including attention and interest also need to be monitored. In the contemporary information processing theory, attention is viewed as a person's allocation of cognitive resources to the tasks at hand. When we devote attention to a task, we put mental effort into it. There are limits on how much mental effort we have available to perform tasks simultaneously. Some people can do more things at the same time than others. Most people can perform only a limited number of tasks at the same time (Hamilton & Ghatala 1994:99).

According to Slavin (1997:188), teachers can use several ways to focus learners' attention on the most important aspects of what is being taught. Amongst others but not limited to these cognitive strategies, Slavin (1997:188) suggests the use of cues that indicate what is important. For example, some teachers raise or lower their voices to signal that they are about to impart critical information, while others use gestures, repetition or position to communicate the same message. Another strategy to focus children's attention, is the introduction of science lessons with a demonstration or magic trick to engage learners' curiosity. These are unusual, inconsistent or surprising stimuli to attract attention.

Pressley and McCormick (1991:29) contends that teaching learners how to carry out a strategy, does not guarantee that they will use the strategy on occasions when it would be appropriate to do so. Sometimes learners do not use a strategy because they do not enjoy carrying it out or do not think that the gains produced by the strategy are worth the effort.

Training programmes, therefore, need to be modified to cater for learner involvement in the instructional process as well as to discover ways in which strategies can become personally empowering. According to Lenz (1992:17), the following ten key principles cast the overall tone for this kind of instructional process:

-Learners are invited rather than required to learn the strategy and must be committed to the learning strategy with an understanding of its purpose and benefits.

-The teacher must fully describe the physical and mental actions associated with the steps of the strategy.

-Learners should be taught how to use the remembering system used to capture the content of the strategy so that they can guide self-instruction in the strategy and self-management of learning.

-Learners are involved in goal-setting activities related to how quickly the strategy will be learned so that learners can learn to anticipate and monitor learning and the use of the strategy.

-Multiple models rather than a few models of the strategy should be provided.

-The learner should be enlisted in helping construct the models as they become more aware of the processes and become fully responsible for managing the use of the strategy.

-The strategy should be fully understood and memorized before practice in the strategy is initiated.

-Practice should begin with controlled guided practice and ultimately conclude with advanced independent practice. Initially, however, the goal of instruction should be for the learner to understand the strategy, as soon as

the learner understands the basic processes involved, very quickly switch to using the strategy to enhance learning.

-A measurement system should be used to demonstrate to the learner and the teacher that the strategy is being learned and used, and the academic demands of the classroom setting are being met.

-While teaching the strategy, the mechanics of using a strategy need to be addressed throughout the instructional process.

It is therefore important for the teacher to provide a clear instruction about learning strategies that could be grasped by all learners. Opportunities should also be created for learners to positively interact with their peers during learning. Vygostsky's theory supplements the belief that interactions between experienced and less experienced individuals facilitate learning. Learners also believe that social interaction with their peers impact on their learning, especially for solving science related problems (Pressley & McCormick 1995:187). It therefore becomes imperative to consider previously developed learning models to facilitate the learning of the learning strategies.

2.8 LEARNING MODELS

Many researchers often use theories and concepts they have in mind to determine the model they use for the relations between the classes of variables they see as important in the study of teaching and learning. Lenz (1992:38) developed a model proposed by Pintrich and Garcia (1991) which examined in detail the learning strategies that college students may use when

confronted with academic tasks. The Motivated Strategies for Learning Questionnaire (MSLQ) used in this study, builds on cognitive strategies such as rehearsal, elaboration and organization developed by Weinstein and Mayer (1986).

In Pintrich and Garcia's model, the self-regulation aspect of meta-cognition falls into three dimensions: planning, monitoring and regulating behaviours. The 10 MSLQ scales include: intrinsic goal orientation, extrinsic goal orientation, task value, self-efficacy, test anxiety, rehearsal, elaboration-organization, meta cognition, resource management and help seeking.

The finding of Pintrich and Garcia (1991) that relate to the theoretical framework, show that intrinsic goal orientation to learning is clearly linked to the use of cognitive strategies like elaboration organization which results in deeper processing of the course material, as well as self-regulatory strategies. However, there are some factors that could hamper the learning process.

2.9 FACTORS THAT PROMPT OR INHIBIT LEARNERS' ENGAGEMENT IN AUTONOMOUS LEARNING

Rabinowitz (1993:13) and Slavin (1997:199) clearly point out that the learning process is not always smooth, there are some factors which can either help or restrict learning from taking place. According to these authors, demands and standards that are set may prompt learners to modify or to describe habitual strategies or to develop new ones, which in the final

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analysis can hamper learning. On the other hand, proactive inhibition and retroactive inhibition could lead to memory loss whereby previously learned material gets in the way of new learning and thus result in negative learning. In the case of retroactive inhibition, memory loss is caused by newly gained learning material interfering with previously learned material. The last factor identified by the two authors is the language barrier. Unique terminology in science in more instances than one, poses a problem in the learning process.

The paragraph above referred to inhibiting factors to learner engagement in autonomous learning. On a more positive note, the next paragraph will focus on factors, which can promote and accelerate learner engagement in independent learning.

2.10 COGNITION AND MOTIVATION

Motivation is also a useful thought process involved in learning. The motivation to carry out an action depends on the interest the learner has in the task he has to carry out. Learners, who show interest in the material to be learned, are more likely to adopt to learning goals and use of higher-level strategies (For example, elaboration of ideas, connection among ideas) to link new information to their prior knowledge than learners who are not interested in the material to be learned (Alao & Guthrie 1999:67).

According to the approach taken by Mckeachie and his colleagues (Pintrich 1995b:76), learner motivation is determined by learners' expectation of success including self-efficacy (Bandura 1982) and the value placed on achievement outcomes. Learners who experience success are more likely to

maintain their motivation than learners who consistently experience failure. In order to be successful in classroom learning, learners must have both the motivation to learn and the capability for task completion (Hynd *et al*.2000:6). Motivated learners instruct themselves to exert more effort, concentrate or engage themselves in extensive self-instruction or self-monitoring to meet the challenges they face (Stevenson & Palmer 1994:135). If learners have control over the learning situation, they become more motivated even if that control is volitional control over the learning strategies they choose.

There is a crucial disagreement between behaviourists and Piagetians as to the type of motivation involved in learning. According to some behaviourists, children will only learn if they are rewarded extrinsically for doing so. Piagetians believe that children do not need extrinsic rewards from the teacher as they find learning to be intrinsically exciting and compelling (Sutherland 1992:53).

Self-attribution, concerning ability and general feelings of self-worth, influence motivation. Learners who believe they cannot improve their performance, lack motivation in that they are unlikely to expend effort required to engage in learning. Motivated learners instruct themselves to exert more effort, concentrate or engage themselves in extensive self-instruction or self-monitoring to meet the challenges they face (Stevenson & Palmer 1994: 135).

2.11 SUMMARY

Journals and books consulted indicated that learning and memory increased when learners related information to their knowledge store and their experience. Factors such as learners' beliefs, motivation, interest and task demands affect the way in which the learners approach the learning content. Even if learners are expected to regulate and monitor their own learning process, educators still have to provide guidance and train learners to use learning strategies effectively. For this study, therefore, grade seven science learners were required to be conversant with both cognitive strategies (learning strategies that relate to how learners process information) and meta-cognitive strategies (learning strategies that help them control and execute their learning) that they should employ when learning about electricity in science.

2.12 CONCLUSION

Learners' active involvement in learning is influenced by the effective use of both cognitive and meta-cognitive learning strategies. This can only be accomplished if educators provide clear instruction about how learners should employ these strategies during learning. It is also imperative to consider the contribution made by support learning strategies such as motivation, beliefs and interests. Chapter three will focus on research methodology used in this study to investigate the effect these learning strategies have on learning science.

science learners use learning strategies such as summarizing, paraphrasing and self-questioning in learning science.

3.2.2 Selection of subjects

The population of this study consists of grade seven learners. A sample of twenty grade seven science learners was drawn through cluster sampling at a local primary school. Cluster sampling was chosen because the population of grade seven science learners was large and thus, made it impossible to list all members for the purpose of drawing a sample (Ary, Jascobs & Razavieh 1990:175). In addition, it would be a very expensive undertaking to study a sample that is scattered all around the Goldfields. The sample included both boys and girls aged between seven and eleven years.

3.2.3 Research instrument

Learners were observed to examine their behaviour, and their use of learning strategies in learning science. Observation is usually used to refer to methods of generating data which involve the researcher immersing herself or himself in a research setting and systematically observing dimensions of that setting. In order to have a better understanding of and to gain more insight into the learning process, it is needed to observe the process in its natural context. Mason (1996:61) contends that observing or participating in or experiencing natural or "real-life" settings and interactive situations can generate knowledge or evidence of the social world. It was decided then, for this study to have a blend of participation and non-participation observation. The researcher began as a participant and gradually withdrew participation

over the period of the study. The rationale for participants' observation is that in many cases the view from inside is somewhat different from the view from the outside looking in, which provides the opportunity for the researcher to even see the unexpected (Gay 1990:208). The researcher, as participant observer to a certain extent, experienced the situation in the same way as the researched and thus, became able to interpret the meaning and experiences entailed in the learning situation. Participants were persuaded not to feel threatened by the presence of observers. However, in other situations, the researcher needed to minimize interactions with learners in an attempt to obtain a more comprehensive view of what was being observed (Scott & Usher 1999:100).

The following advantages were derived from implementing both participant and non-participant observation:

-Through participation, the researcher was able to study and understand the learners' perceptions and attitudes related to learning of science which could possibly not have been obtained by non- participant observers (Borg & Gall 1989:396);

-Unlike participant-observation, non-participation was in no way obtrusive for it was not possible for the observers to be influenced by emotional involvement which could have modified the phenomena being studied resulting in collected data being dubious (Borg & Gall 1989: 391-392); and

-In non-participant observation, the observers had a chance of recording what was happening as compared to participant observation, which required observers to either rely on their memory or on hidden recording equipment.

Concurrent with advantages the observation process placed on the study, the observers were also faced with following disadvantages:

-In doing participant observation in the learning situation, the observers could not regard themselves as learners but rather had a better understanding of what educators experienced as they provided guidance concerning how learners were supposed to employ learning strategies;

-To be successful in implementing observation, the researcher was required to devote more time than it was budgeted for;

-Observing and recording simultaneously put more pressure on observers, especially with the knowledge that their findings were to be compared at the end of the observation session; and

-Feelings, thoughts and intensions could not be observed.

3.2.4 Data collection and recording

Before data could be collected, appropriate procedure had to be followed in order to gain permission from those in power of the school (Mertens 1998:177). A letter was written to the school management team to seek for such permission. A special arrangement was made to avail twenty learners for the research which was to be conducted after normal teaching hours in order to avoid disrupting the classes. Learners' consent also had to be obtained so that they would willingly participate in the research itself as sample members. Learners were informed that they were not evaluated and were also encouraged not to make special arrangements for the to be learned lesson because people normally tend to behave quite differently when they know that they are being studied. Arrangements for the observation were

adapted to the feelings and needs of the learners being observed and not to the convenience of the researcher. A data collection procedure was planned.

Educators had to be trained in order that they could interprete the phenomena observed in the same way even if everyone was motivated by his own interest, biases and background. Patton (1990:200) contends that our culture tells us what to see, our early childhood socialization instructs us in how to look at the world, and our value systems tell us how to interpret what passes before our eyes. In order to ensure reliability, there was a need for all observers to be thoroughly trained. Emphasis was laid on being focused on what was being observed and how to keep descriptive records.

Borg and Gall (1989:489-490) suggested groundrules which serve as a basis for training observers. The first step in training observers was to discuss the observation form with them, describing each item sufficiently to develop a thorough understanding of what was to be observed and how it should be recorded. A videotape recording of a similar situation to what was to be observed was made in order to have it as an example from which observers could refer during the training sessions. Observers were encouraged to record what they observed independently so that their interpretations could be compared in order to establish whether they had the same understanding of the behaviour that was observed and to eliminate inaccurate interpretations.

The training session lasted for three weeks after which the observation process took place. It was decided to schedule one hour per observation session in order to keep observers attention' and concentration intact. Le

CHAPTER FOUR

DATA ANALYSIS

4.1 INTRODUCTION

Chapter four carries a detailed discussion of the extent to which grade seven science learners employ learning strategies such as summarizing, paraphrasing and self-questioning in learning science. The findings of the research will be presented and discussed in this chapter.

4.2 THE CONTEXT OF THE STUDY

The researcher made use of scripts on which the learners had written their summaries. Reports from educators who assisted with the observation (see appendix 1), as well as transcriptions made from the tape recorder, were also utilized. After making sure that all information had been collected, the researcher proceeded to coding. The information was organized according to strategy categories and sub-skills as given in table 4.1 below:

Table 4.1 Strategy Categories and sub-skills

STRATEGY	LEVEL	SUB-SKILL
Summary writing	1	Selection of main idea
	2	Grouping ideas
	3	Deletion of unnecessary information
	4	Summary writing
Paraphrasing	5	Put information in own words
Self-questioning	6	Asking questions
	7	Giving answers to questions

Source: Nelson (1999:202)

According to information given in table 4.1, for the summary skill strategy, learners were required to go through the following four levels:

Level 1: Selection of main ideas;
Level 2: Grouping ideas;
Level 3: Deleting unnecessary information; and
Level 4: Summary writing.

For paraphrasing, learners had to put information into their own words.

The self-questioning strategy required learners to generate questions based on the learning content and to also find answers to those questions. After the sub-skills had been identified, the researcher started with open coding of

each statement which is part of analysis that pertains specifically to the naming and categorizing of phenomena through close examination of data (Strauss & Corbin 1990:62). At the same time use was made of axial coding, which, according to Strauss and Corbin (1990:97), refers to the process whereby data is put back together after open coding by making connections between categories. This is done by utilizing a coding paradigm involving condition, context, action and consequences.

4.3 LEARNER RESPONDENT

Table 4.2 indicates learners who participated in the research project. Eleven boys and nine girls aged between eleven and sixteen took part. Four learners were twelve years old, eight were thirteen years, six were fourteen years and only two were fifteen years of age. All participants were grade seven science learners.

TABLE 4.2 BACKGROUND OF LEARNERS

LEARNER	GENDER	AGE	GRADE
SEKESE SEIPATI	F	13	7a
HLABAHLABA NONDLELA	F	12	7a
MALETE MATSILISO	F	14	7f
MABUNYANE MOHOJE	M	14	7d
MAHLATSANE SALOME	F	14	7d
MAINE MAPHISA	M	14	7e
MAJELA JAMES	M	15	7c
MATLAKENG MOLEFI	M	13	7a
MELI PAULINA	F	12	7d
MOLEKO MOJALEFA	M	13	7c
MOLEFI PUSELETSO	F	13	7f
MOTETE MOHAU	M	15	7c
SEBELA KENEILOE	F	12	7b
PESA KOLISANG	M	12	7g
RALEKAOTA THABANG	M	14	7e
SITHOLE THEMBA	M	14	7b
THEKISO THUNTSI	M	13	7a
TLHOTLHALEMAJOE DAVID	M	13	7a
MOKATSANE MARTHA	F	13	7a
JWELI THEMBISA	F	13	7b

The three educators who were involved in the observation process were male teachers with senior primary teachers diploma qualifications. These teachers have been allocated to teach science in grade seven for the past three years. Since the new approach to learning and teaching has been introduced, they learned along with the learners to adapt to the new ways of doing things.

4.4 FINDINGS

In all responses (see appendix 1) from the observation sessions in grade seven, it becomes obvious that learners require constant practice in the employment of learning strategies.

4.4.1 Selection of main idea

In terms of selecting the main ideas, learners looked for underlined, italics, first sentence and large type words. The learners made use of the sense of sight. They tend to focus their attention on words written in a different way in all the statements. In this way, they were not being bombarded with too much information that could make it difficult for them to learn any information at all (Slavin 1997:186). 30 % of the learners said that they needed to think about what they wanted to choose as the main idea. The remaining group of learners selected all the statements as they appeared in the text.

It seems that learners are able to select the main ideas if conspicuous cues are given in the text. The researcher feels that learners will experience problems if they have to identify the main ideas from an ordinary text

without any cues. However, if learners engage themselves in thinking critically about the learning content, there is a possibility that they will understand what they are learning about. This will help them organize the information in order of importance.

4.4.2 Grouping ideas

When requested to group ideas, learners tended to give them in the same sequence as they appear in the learning material. Statements only make sense to them if they are considered individually, but as soon as these statements are rearranged in a different order from what learners had learned before, they become confused. Almost half of the learners realized that when they are given the opportunity to group ideas in order of their own preference, they are challenged not to rely on the educators and their peers' arrangements, but to show their own understanding. This realization prompted learners to be more actively involved and to think more deeply about what they were doing. Learners started to rearrange statements related to the main ideas in order of importance. For the statement they started with or regarded as the most important, they allocated the number 1. Next to the statement they regarded to be the second best they put the number 2, and so on.

Although learners seem to be aware of how to group ideas, there are still some learners who overlook relevant statements due to the absence of the key word such as "Electricity".

4.4.3 Deletion of unimportant information

Learners were expected to pay attention to important information and to try by all means to ignore or eliminate unimportant information. Many of them seemed not to be certain about the kind of information they were supposed to leave out. Even learners who had concentrated on the main ideas eliminated words such as " a" or "that" from sentences unnecessarily. For example, "Electricity (that) is generated by water is called hydro-electricity". Others regarded statements such as " Therefore it should always be used with care" to be irrelevant.

4.4.4 Summary writing

Learners who were less able to identify main ideas had more difficulty in summarizing the text and appeared not be focused and their attention was continuously distracted. They ended up choosing statements haphazardly from the passage without considering whether those statements provided the gist of the learning content or not. Despite the fact that some learners' summaries included personal and unnecessary information, others still managed to add information that made the summary to be more understandable.

Since summarizing is difficult for learners to learn, lessons are more effective if they are kept short and focused with emphasis on meaning construction. The most important thing is to respond and understand the text. Learners learn to use the strategy best through repeated meaningful

experiences with the text along with modelling support from the teacher (Cooper 1993:491).

4.4.5 Paraphrasing

It was difficult for learners to use their own words to give an outline of what the entire text was all about. In instances where they did not reproduce the information as given in text, they would talk about their experiences with regard to the same topic. For example, " With electricity we are able to warm ourselves, light where it is dark and also cook". In order to refocus the learners' attention to the relevant learning content, the educator asked them to formulate questions based on the same text.

4.4.6 Self questioning strategy

Learners' questioning strategy indicated that they lack the ability to phrase questions correctly and this was below what is expected of their chronological age. Questions posed required answers to be given in exactly the same way as they are appeared in the statements. Questions that required a one word response seemed not to be effective enough to develop learners' level of understanding. Learners were expected to ask their questions in a manner that would be thought provoking. For example, a question such as " what happens if electricity is used near water or with wet hands?" demanded a little bit of thinking from the learners as compared to questions like "never use electricity near what?" which were often asked by learners. Attention needs to be paid to the role of pupils' questions and improving their skills in

framing them. Eventhough learners structured questions incorrectly, they responded very well.

With the use of learning strategies, learners seem to have a better understanding of science than learners who are not exposed to learning strategies in science. Learning strategies help learners achieve better results in science. Learners tend to assume much responsibility for managing their own learning if they employ learning strategies effectively.

4.5 PROBLEMS

Learners encountered some problems when they were employing learning strategies. Lack of adequate language made it difficult for learners to be able to formulate constructive questions and give information in their own words correctly. The educator was forced to translate some of the information into learners' own language to ensure that they understood what was required of them.

It was also difficult for learners to differentiate paraphrasing and summarising as they tend to list important ideas from the passage when asked to employ these learning skills. In some cases they would either use their own words or refer to own experiences.

Learners still believe in receiving information from the educators and become reluctant to take an active part in their own learning and thus find it difficult to cope with a situation that demands them to manage their own learning.

Learners took more time than it had been budgeted for to complete what was required of them. They even had to exert much more effort than they would need when just reading a book.

4.6 LEARNERS' CONCEPTION OF LEARNING STRATEGY USE

At first, learners seemed uncomfortable with the strategies, but this uncertainty faded away as they became conversant with the strategy. Most of them appeared relaxed and participated actively in deliberations. They began to be more attentive and interested in what they were doing. Because of the interest they showed in the learning content, they were able to use learning strategies effectively and could easily link new information to their existing knowledge. Their comments indicated that they were very happy. For example, Magdeline remarked as follows " Now I know more about electricity, where it comes from and how it should be used". Many of them indicated that they would employ the learning strategies in other learning areas as well as during their leisure time when they read magazines and newspapers. They were very excited and wished that the session could be prolonged.

4.7 SUMMARY

Learners select statements representing main ideas for both paraphrasing and summarizing. As learners write, they reflect on what they already know, thus

making connection between prior knowledge and new information. Information stored in the long-term memory is transferred to the working memory.

Learners manage to ask thought provoking questions if they give themselves enough time to think about the learning text. Learners need continuous training in order that they should be able to employ learning strategies effectively. Once they become conversant with how to they employ relevant learning strategies, they become interested in the learning content and thus become motivated to learn. This again, results in them gaining more knowledge in science.

4.8 CONCLUSION

Data has been analysed and interpreted. Chapter five is devoted to conclusions and recommendations.

CHAPTER FIVE

SUMMARY, CONCLUSIONS, RECOMMENDATIONS

5.1 INTRODUCTION

The aim of chapter five is to provide a summary of what was discussed in the previous chapters and to make recommendations with regard to the findings.

5.2 AIM OF THE RESEARCH

The aim of this study was to establish whether grade seven learners posses effective learning strategies (cf 1.3).

5.3 OVERVIEW OF THE LITERATURE STUDY

According to literature, learning strategies refer to behaviours and thoughts the learner engages in that are intended to influence motivation, encoding acquisition, retention and transfer of knowledge. Learning strategies are divided into two domains: Cognitive learning strategies and meta-cognitive learning strategies (cf 2.1).

Cognitive learning strategies relate to how learners process information. These strategies comprise of the following eight categories:

-Basic Rehearsal strategies;

5.4 METHOD OF RESEARCH

In this study a qualitative approach was used (cf 3.2.1). A sample of twenty grade seven learners was drawn from a primary school through cluster sampling (cf 3.2.2). It was decided for this study to have a blend of participation and non-participation observation (cf 3.2.3). An observation form was designed to keep a record of the observation (cf 3.2.4).

5.5 FINDINGS

In reference to selection of main ideas, the results of this study indicate that learners do not experience problems if the given text clearly shows clues that guide learners to select main ideas. The responses all referred to bold type, italics, underlined words, as well as the first sentence. Learners, who are less able to identify main ideas, have difficulty in summarizing the text and appear not to be focused (cf 4.5.1).

Learners did not encounter much difficulty in grouping ideas for they were given the latitude to arrange these ideas in order of their own preferences of importance. Almost half of the learners included the first statement amongst the choices they made (cf 4.5.2). In both paraphrasing and summarizing, learners fared very well because of their experiences in working with electricity. They managed to provide a lot of relevant examples (cf 4.5.3).

However, learners tend to lack ability in phrasing questions. It was not easy for most of the learners to formulate thought-provoking questions, instead, they asked questions, which required a single word or very short answers. Some questions were even asked in the same manner as they appeared in statements.

As soon as the learners became conversant with the learning strategies, they started to show much interest. Evidence suggests that learners who have high interest in learning about the learning strategies have a better chance of understanding the learning content. As soon as learners become aware of their success, they do not hesitate to apply their knowledge to other learning areas and thus become actively involved in their learning.

Eventhough learners and educators seemed excited and hopeful that the learning strategies would have a positive impact on the children's learning and understanding, unforeseen obstacles hampered such effectiveness. Grade seven learners appear not to be competent enough to write their own summaries without the educators' guidance and assistance. Learners still need extensive training to be able to write summaries without even referring to summary writing guide.

Not all science lessons can be summarized as learners are mostly expected to come up with what they have observed during the science lesson. Lack of language proficiency sometimes lead to misinterpretation of some information.

It is not easy for learners to master the learning strategies simultaneously and at record time. Learners who experience difficulties with the employment of learning strategies usually take more time than had been budgeted for to complete what is required of them (cf 4.5.7). Ordinary science textbooks are printed in such a way that is not possible for learners to identify clues they can use to select the main idea.

Learners can only manage to group ideas together if statements include a word or two that is common. Since summarizing is difficult for learners to learn, lessons will only become effective if they are kept short and focused. Emphasis should be placed on meaning construction, in other words, the most important thing is to respond and understand the text (cf 4.5.4).

5.6 IMPLICATIONS

The present South African education set-up require learners to monitor their learning process. Learning area such as natural science is still difficult for learners even when it is taught by expert educators. For learners to cope with such complex task, they need to be taught strategies that will assist them in understanding and improving performance. Educators need to ensure that learners have information that permits them to determine when cognitive strategies can be appropriately used to make progress in a task. Such information will motivate learners to employ strategies to other areas. For this study, therefore, learners are required to summarize and ask questions on the science text them to be able to summarize, they have to focus their attention on important information which results in them having better understanding and storing useful information in their memory. Asking

questions prior, during and after reading the learning content help learners remember and reflect on areas they have not given attention and did not understand well, this will result in constructing meaning and improvement of the performance.

5.7 RECOMMENDATIONS

Science texts need to be structured in such a way that learners can be able to apply cues identified for determining the main ideas. For example, texts which need to be summarised should include the following:

(a) At least one major point that could be indicated in a topic sentence;

e.g Electricity is one of the most important energy sources of our time.

(b) Unnecessary information that has to be deleted;

e.g Electricity that (it) is generated by water is called (a) hydroelectric.

(c) A list of items or actions that have to be incorporated into a super-ordinate term; and

e.g Electric appliances like stoves, lamps, heaters cannot operate effectively without electricity.

(c) Italics, large type words, and\or underlined words.

e.g ELECTRICITY can be very *dangerous* if it is <u>not handled correctly</u>.

The format is important because the widespread use of the summary skills strategy (or any other learning strategy) will occur only if texts are structured to meet the variable nature of most classroom texts and contexts. Seeing that there are learners who experience problems in writing summaries, there is a need for holding discussions which will benefit such learners and also give assurance to learners who have little confidence in

their abilities to summarize (Moreno 1999:324). Learners also need to be given constant practice in writing their own summaries independently with and ultimately without the use of the summary skills strategy guide. Educators who provide training in learning strategies must be competent and also ensure that the learning material is relevant to the learners' background and age. The teaching of learning strategies should form part of the learners' learning task and should be allocated enough time in the time table. Learners should be encouraged to employ learning strategies effectively and appropriately. It would be useful to replicate this study with a large sample of grade seven learners in different knowledge domains and to also examine the impact of other cognitive strategies on learning. Science educators should also take learners' prior knowledge, interest, motivation, self-control or social interactions with peers and strategy use into account when designing instructional contexts for improving learners' comprehension of science.

5.8 LIMITATION

This study has the following limitations:

-The results of this study cannot be generalized beyond local public primary school

-Secondary schools, high schools, colleges and technicon learners are not subjected to the study

5.9 CONCLUSION

If learners do not perform well in a specific learning area, people often attach this failure to learners' lack of understanding without thinking deeply about what could have caused such poor outcomes. This study revealed that if learners are well trained in using learning strategies, they become confident and involve themselves actively in the learning process.

This involvement leads to fewer learning problems and improvement in the quality of learning.

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APPENDIX 1

OBSERVER REPORTS

SUMMARY WRITING

Seipati: Instead of summarizing the content. She mentioned her experiences with "Electricity" i.e. helps with heat, light and only includes on statement from the text it causes electric shock.

Nondlela: Relates content to own experiences. "Electricity is important to our live because it gives us heat and we can cook with electricity. Includes one statement from the text. If we don't use electricity correctly, it can be dangerous.

Matseliso: Managed to combine sentences that provides the gist of the content.

Mohoje: Managed to select relevant sentences which led to understanding what the gist of the content was.

Salome: Selected few statements from the text.

Maine: Rewrote the entire passage.

Majela: He was able to select sentences which represented the gist of the content.

Puseletso: She was able to use relevant statements that related to the gist of the content.

Paulina: Good attempt "The first and second paragraph talk about electricity, where comes from and how it can help us. Electricity must be used correctly in order to avoid electric shock.

Mohau: Rewrote the entire passage.

Matlakeng: Uses words as put in paragraph but showing that he has an understanding of the content. The only problem he has is related to incorrect spelling.

Pesa: He generalizes "Many people use electricity".

Thabang: Make use of same sentences given in the text.

Keneiloe: "Electricity is most important in our lives but can sometimes become very dangerous.

Martha: She noted the sentences as given in the paragraph.

Themba: Made use of relevant sections from the text.

Thekiso: Used statements from the text, which made sense and could lead one to an idea of what the passage is all about.

David: Managed to write a summary using sentences from the text.

Thembisa: Tried to choose sentences from the text but put them in a haphazard way.

Mojalefa: Use was made of relevant statements from the text.

PARAPHRASING

Seipati: Managed to put information in own words. "It is always best if you avoid things that will make electricity become dangerous or choke you".

Nondlela: She tried although most of her statements reflect what she experiences about electricity.

Matseliso: Uses words from text but only adds that electricity has both advantages and disadvantages.

Mohoje: (read about electricity. Electricity is very important and dangerous. So , you have to use it with wet hands or near water it can cause electric shock.

Puseletso: Could not use own words.

Paulina: Managed to arrange statements in sequential order from the most practical to what is more abstract

Mohau: Able to use selected words in building her own sentences.

Keneiloe: Even though she made use of information from the text, she wrote them in a manner that reflected that she understood the meaning of the content.

Matlakeng: Managed to put information in own words.

Pesa: Able to combine information found in text with what he thinks is true about electricity.

Thabang: Managed to put information in own words.

Martha: Provided information about what he knows about electricity. "With electricity weare able to warm ourselves, light where it is dark and also cook.

Themba: Did not use own words. Copied summary.

Thekiso: "I think parents must give their children education about the danger of electricity and caution then never to apply electricity wrongly.

David: Electricity can cause damage if used incorrectly. Shows understanding of the learning content.

Thembisa: Managed to use own words.

Mojalefa: Instead of writing about the given content, she decides to write what she knows about electricity Prior knowledge preoccupies her mind and cannot be focused.

Salome: Rewrites statements as given in paragraph.

Pesa: Incorrect phrasing
"Where are places where need electricity to do work?"

Thabang: Difficult
"How can the wires of electricity appliance be?"

Keneiloe: Good attempt
"Is electricity one of the most important energy sources of our time?

Martha:"What is electricity that is generated by water is called?" repeated words.

Themba: Good attempt.
"Does electricity cause electric shock?"

Thekiso: Well tried
"Why is electricity so important?"

David: Changes the wording order.
"Electricity that is generated by water is called what?

Thembisa: Had it difficult.
"Sometimes dams are build to provide water from what?

Mojalefa: Good attempt.
"What do we call electricity that is generated by water?

APPENDIX 2

SUMMARY WRITING GUIDE

Identify and Organize the Main Idea and Important Information

Step 1

Think to yourself- "What was the main idea?"

Write it down.---

Step 2

Think to yourself- "What important things did the writer say about the main idea?"

Write down the important things the writer said.

1. ---
2. ---
3. ---

Step 3

Go back and check to make sure you understood what the main idea was and the important things the writer said about this.

Step 4

Think to yourself- What is the main idea or topic that I am going to write about?

Write a topic sentence for your summary.

Step 5

Think to yourself- "How should I group my ideas?" Put a 1 next to the idea you want to be first, put a 2 next to the idea you want to be second, and so on.

Step 6

Think to yourself- "(1) Is there any important information that I left out or (2) is there any unimportant information that I can take out."

Step 7

Write a summary about what you read.

Step 8

Read your summary and think to yourself- "Is there anything that is not clear?"

Rewrite your summary (if necessary)

Clarifying and Revising and Summary

Step 9

Ask your classmates to read your summary and ask him to tell you if there is anything that is not clear.

Source: Nelson (1992:214)

APPENDIX 3
OBSERVATION FORM

NAME : .....

TIME : .....

PLACE : .....

DATE : .....

STRATEGY	MEANING	STRATEGY USE	PROBLEMS
> Summary skill	> Selection of main idea	.....	.....
		.....	.....
		.....	.....
		.....	.....
	> Grouping ideas	.....	.....
		.....	.....
		.....	.....
	> Deletion of unnecessary information	.....	.....
		.....	.....
		.....	.....
		.....	.....
	> Summary writing	.....	.....
		.....	.....
		.....	.....
		.....	.....
> Paraphrasing	> Put information in own words	.....	.....
		.....	.....
		.....	.....
		.....	.....
> Self questioning	> Asking questions	.....	.....
		.....	.....
		.....	.....
		.....	.....
	Providing answers to questions	.....	.....
		.....	.....
		.....	.....
		.....	.....

General remarks : (if any) .....

.....

OBSERVER :

APPENDIX 4

ELECTRICAL ENERGY

Read the passage provided then follows instructions given below.

Electricity is one of the most important energy sources of our time. It is made from other sources of energy such as Coal, flowing water and nuclear energy. The big **POWER-STATION** generates millions of electrons that produce electricity from Coal and the turbine machine generate electricity from the water. Electricity that is generated by water is called **HYDROELECTRIC.** Sometimes dams are building to provide water for **HYDRO-ELECTRIC POWER**.

Many things in our homes, schools, shops and factories need electricity to do work.

Most appliances like stoves heaters, lamps etc need electricity to be able to work.

Electricity can be very ***dangerous*** if it is not handled or used correctly. It can cause ***electric shock***. Therefore it should always be used with care. Never use electricity near water or with wet hands. The wires of electricity appliances should be ***insulated***. Never touch electricity cables in the roads or pavements.

Source: Ayerst, Clark, Khumalo and Ndwandwe. (1999:30)

1. Indicate how you would select the main idea.
2. Give three main ideas in order of importance.
3. What do you have to do with unimportant information.

4. Write a brief summary about what you have read.
5. Write the information you have read using your own words.
6. Construct three questions on what you have read.

APPENDIX 5
APPLICATION LETTER

13684 JERUSALEM PARK
P.O. MOTSE THABONG
THABONG
9463
03\05\2000

SMT
MMANTSHEBO PUBLIC SCHOOL
P.O. BOX 3791
WELKOM
9460

Dear Sir\Madam

I hereby request Grade seven learners at your school to participate on my MED research. The nature of their participation would be for me and three nominated educators to observe them during a science lesson. I am researching the effectiveness of learning strategies in Grade seven science learning.

Your co-operation in this regard will be appreciated

Yours faithfully

……MRS M.E. MOKOENA (HLALELE)
VISTA

APPENDIX 6

LEARNER CONSENT LETTER

I……..in Grade seven at Mmantshebo primary school hereby confirm that the purpose of research has been clarified to me. I therefore agree to participate in the research as a sample member.

Signature: ……..

Date: ……