CHAPTER 2
THEORETICAL OVERVIEW

2.1 READING COMPETENCY - A CONCEPTUAL ANALYSIS
2.2 MENTAL MODELLING - A THEORETICAL OUTLINE
2.3 MULTIPLE STRATEGY INSTRUCTION - A THEORETICAL SKETCH
INTRODUCTION

This chapter presents a theoretical overview that is expected to aid in developing and enriching the theoretical framework of the study. To many people, theory suggests an ivory tower, sometimes unreal and of little practical value. On the contrary, a theory establishes a cause and effect relationship between variables with the purpose of explaining and predicting phenomena. Those who engage in pure research devote their potential to the formulation and reformulation of theories and may not be concerned with their practical applications. However, when a theory has been established, it may suggest many applications of practical value. A theory is an attempt to develop a general explanation for some phenomenon. It defines non observable constructs that are inferred from observable facts and events, and are thought to have an effect on the phenomenon under study. A theory describes the relationship among key variables for purposes of explaining a current state or predicting future occurrences. It is primarily concerned with explanation and therefore focuses on determining cause-effect relationships. This chapter of the research report deals with a conceptual analysis of Reading Competency, a theoretical outline of Mental Modelling, and a theoretical sketch on Multiple Strategy Instruction.

2.1 Reading Competency- A Conceptual Analysis
2.2 Mental Modelling- A Theoretical Outline
2.3 Reading Comprehension Strategy Instruction -A Theoretical Sketch

Each section is detailed below.

2.1 READING COMPETENCY - A CONCEPTUAL ANALYSIS

Learning to read develops from a person’s ability to understand and use both oral and written language in social situations; the ability to understand written language is an extension of the ability to communicate orally.
Learning to read requires an understanding of the daily social functions of oral and written language. Learning to read requires the application of thinking strategies to ideas communicated in written form. Therefore, school programmes for developing reading skills need to cultivate student’s cognitive learning processes, oral language proficiency, and use of language in social contexts.

Reading comprehension is interrelated with and supportive of the other communication processes, viz. listening, speaking, writing, and thinking. According to Hittleman (1988), a reader’s reconstruction of the ideas and information intended by an author is somewhat like a listener’s reconstruction of ideas from a speaker’s combinations of sounds. The reader, like the listener, may create meanings that are different from those intended by the author. What a reader understands from the constructed and reconstructed meanings depends on the reader’s prior knowledge, prior experience, as well as maturity and proficiency in using language in various social contents.

**The Process of Reading**

Reading is a complex and purposeful socio-cultural, cognitive, and linguistic process in which readers simultaneously use their knowledge of spoken and written language, their knowledge of the topic of the text, and their knowledge of their culture to construct meaning with text. Each of these types of knowledge impacts the sense that readers construct through print. Readers easily comprehend text with familiar language/topics but are less successful at comprehending text with unfamiliar language/topics. At the same time, their life experiences influence the interpretations constructed with texts.

The Reading process is two-fold. It is a sensory process as well as a perceptual process. As a sensory process, reading is dependent on certain visual skills, which involves identification of symbols wherein the eyes play an important
role. As a perceptual process, it refers to the interpretation of everything that we sense. Sometimes it so happens that the reader is so much engrossed in the mechanical aspects of reading that he fails to understand the need for comprehension. The reading process, thus involves identification of the sound symbols and association of meaning with these symbols.

Readers read for different purposes - sometimes for pleasure and sometimes for information. Their reason for reading impacts the way they read. They may skim or read carefully depending on why they are reading. Throughout this process, readers monitor the meaning they are constructing. When the text does not meet their purposes, they may switch to another text. Readers expect to make sense of what they are reading. They use a repertoire of strategies, such as re-thinking, re-reading or reading on to clarify ideas, to make sure they understand what they read in order to accomplish their purposes.

Writers also contribute to how well readers are able to read a text. The writer’s language and knowledge of the topic as well as the skill in using written language influence the reader’s ability to construct meaning. The degree, to which readers and writers share the same understanding of the language, and the topic of the text, influences how well they communicate with each other.

**Purposes of Reading**

**Hathaway (1929)** identified 1620 purposes of reading; which were classified under nine major headings, viz.

- (i) To gain knowledge
- (ii) To gain information
- (iii) To guide activity
- (iv) For social motives
- (v) To find values
- (vi) To organize
- (vii) To solve problems
- (viii) To remember
- (ix) To enjoy
Some of the most important purposes of reading are, to find answers to specific questions, to determine the authors aim or purpose, to find the central thought of a selection, to follow a sequence of related events, to enjoy the facts or story presented, to find the most important points and supporting details, to select facts which related to a problem, to judge the validity of statements, to find facts supporting a point of view, to draw valid conclusions from materials read, to discover problems for additional study, to remember what is read, to determine the essential conditions of a problem, and to follow directions with reasonable speed and accuracy.

Gray (1965) remarks “… first, reading is used for a surprisingly wide variety of purposes; second, the purposes of reading in one curricular field vary to a considerable extent from those in other fields; and third, the purpose changes from one’s level of scholastic advancement to another”.

Reading as a Visual and Mental Phenomenon
Reading requires seeing with eyes. In reading, the eyes do not move steadily along the line of print, but progresses in a series of alternating pauses and quick jerky movements. The pauses which are called fixation, last only about one-fourth of a second each. These fixations are made to help the eyes in seeing. The eyes are not able to see when they are moving. In fact they are fixed for approximately ninety percent of the time generally required to read a page.

According to Bloomsfield and Barnhart (1961), “Reading involves nothing more than the correlation of a sound image with its corresponding visual image”. Artley (1975) looks at reading ‘as the art of reconstructing from the printed page, the writers ideas, feelings, moods and sensory impressions’.

Reading is a group of skills which involves word recognition skills, vocabulary, reading for total meaning, reading for central thought,
comprehending specific fractural information, following directions and assimilation. Keeping in view the complexity of the reading process, it can be concluded that reading is a visual and mental phenomenon. Reading involves both the acquisition of meanings intended by the writer and the reader’s own contribution in the form of interpretation, evaluation and reflection about these meanings.

**Reading Instruction**

Reading instruction must be sensitive to the stages of a child’s cognitive development and language growth (Resnick and Weaver, 1980). First, if too great a gap exists between the reading tasks that children are required to perform at elementary school level and their cognitive or language growth, then reading comprehension will be diminished. Second, individual children in the same grade level vary markedly in their cognitive and language growth (Flavell, 1977). Therefore, teachers must be knowledgeable enough about reading development to select alternative instructional methods. The conditions for teaching reading are:

- Design and implement a classroom programme within which the average child acquires the major skills and strategies that lead to successive stages of reading development, and
- Seek out effective alternative methods that meet the needs of children whose patterns of reading growth vary from that of the average child.

In short the elementary teacher who successfully teaches reading recognizes that the continuous goal of reading instruction of every stage of development is making sense of out of printed material. This goal must be accomplished within the ordinary context of schooling yet preserve the natural, personal, social and academic uses of oral and written language.
A diagrammatic representation of effective Reading instruction at the elementary school level is shown in Figure 2.1

Figure 2.1
Effective Reading Instruction in the Elementary Classroom

Whatever approach to reading instruction is used, it must be sensitive to the cognitive and language resources available to the child for getting meaning from printed material.

Reading Components
Proficient readers experience reading as a seamless process - almost as if the text is "talking" to them. However, teachers find it helpful to deconstruct the reading process into its component parts. The components of reading can be divided into two groups: Print Skills and Meaning Skills. Both Print Skills and Meaning Skills contribute to Reading Comprehension.
The diagrammatic representation of the components of Reading is shown as Figure 2.2.

**Figure 2.2**
Components of Reading

A. Print Skills

The Print Skills include Phonemic Awareness, Word Analysis/Phonics, Word Recognition, Spelling, and Fluency. Print Skills come into play at the very start of the reading process: the reader recognizes a group of letters as a word, produces an internal phonological representation of that word, and accesses its meaning. For proficient readers all of this takes less than 250 milliseconds, i.e. one-fourth of a second. Because the Word Recognition of proficient readers is so rapid and automatic, they are able to focus all of their attention on the meaning of what they are reading. But many learners
have difficulties with Print Skills that make their reading slow, effortful, and inaccurate, all of which seriously undermine their comprehension.

**Phonemic Awareness (PA)** is the awareness that speech is made up of a sequence of sounds that can be manipulated - changed, added, or subtracted - to form different words like *sick, slick, slim, slam*. Phonemes, the smallest units making up spoken language, combine to form syllables and words. Phonemic awareness refers to the student’s ability to focus on and manipulate these phonemes in spoken words. According to the National Reading Panel, teaching phonemic awareness to children significantly improves their reading development.

**Word Analysis**, also called "phonics" or "decoding," is the process of using the relationships between spelling and pronunciation at the letter, syllable, and word levels to figure out unfamiliar words. For more proficient readers, Word Analysis also refers to knowledge of the meanings and spellings of prefixes, root words, and suffixes. Phonics is the relationship between letters or word families, short vowels, long vowels, and letter combinations and the sounds they represent. As determined by National Reading Panel, phonics instruction helps early elementary students to develop proficiency in decoding spelling, and understanding words.

**Word Recognition** is the ability of a reader to recognize written words correctly and virtually effortlessly. It is sometimes referred to as "isolated Word Recognition" because it entails a reader's ability to recognize words individually - from a list. Rapid and effortless Word Recognition is the main component of fluent reading. Words that beginning readers initially sound out through Word Analysis or phonics come to be recognized as whole units after readers encounter them repeatedly in connected text. This means that beginning readers
need to read lots of connected text at an appropriate level to solidify their Word Analysis and Word Recognition abilities - to move from sounding out words to rapid Word Recognition. Readers also begin to notice and apply known spelling patterns to decode new words by analogy, for example, using a familiar pattern such as consonant-en” as in Ben, hen, Ken to decode an unfamiliar word like fen - an archaic term for marsh. Even after readers become proficient at Word Recognition, they may still have occasion to use their Word Analysis or phonics skills when they encounter unusual words and complex multisyllabic words. Learners who are reliant on context for Word Recognition usually have difficulty with unfamiliar topics and reading to learn the new.

Good readers are able to spell at levels close to their word reading ability. This is not surprising because both abilities require the same skills: Phonemic Awareness, Word Analysis, and Visual Memory.

Spelling means writing or stating the letters and diacritics of a word. Words generally have accepted standard spellings which can vary regionally or nationally. In the sense of a standard, spelling is one of the elements of orthography and a prescriptive element of alphabetic languages. Spellings attempt to transcribe the sounds of the language into alphabetic letters, but phonetic spellings are exceptions in many languages for various reasons. Pronunciation changes over time in all languages, and spelling reforms are irregular in most languages and rare in some. In addition, words from other languages may be adopted without being adapted to the spelling system, non-standard spellings are often adopted after extensive common usage, and different meanings of a word or homophones may be deliberately spelled in different ways to differentiate them visually.
The National Reading Panel Report did not include spelling as one of the essential components of comprehensive literacy instruction. The report implied that phonemic awareness and phonics instruction had a positive effect on spelling in the primary grades and that spelling continues to develop in response to appropriate reading instruction. However, more recent research challenges at least part of the National Reading Panel's assumption. A group of researchers found that, although students' growth in passage comprehension remained close to average from first through fourth grade, their spelling scores dropped dramatically by third grade and continued to decline in fourth grade. Progress in reading does not necessarily result in progress in spelling. Spelling instruction is needed to develop students’ spelling skills.

**Fluency** is the ability to read as well as speak and to make sense of the text without having to stop and decode each word. The National Reading Panel’s research findings concluded that guided, repeated oral reading significantly improves word recognition, reading fluency, and comprehension in students of all ages.

**B. Meaning Skills**

The **Meaning Skills** include Word Meaning/Vocabulary, Background Knowledge, and Silent Reading Comprehension. In contrast to the Print Skills associated with *decoding* written language, Meaning Skills involve some of the oral language abilities that we use to *understand* written language.

**Vocabulary** development is closely connected to comprehension. According to the National Reading Panel, students need to hear, read, understand, and use new vocabulary in various contexts to build their comprehension levels. Repetition, aided by quizzes, glossaries, and crossword puzzles, is paramount to building vocabulary.
Background Knowledge directly influences comprehension. A skilled, fluent reader who knows a lot about American history, for instance, will have an easier time understanding a passage about the Civil War than a reader who does not bring such Background Knowledge to the reading. We usually gain much of our Background Knowledge when we are children and adolescents in school.

"Reading comprehension is ... the process of 'constructing meaning' from a text. Comprehension is a 'construction process' because it involves all of the elements of the reading process working together as a text is read to create a representation of the text in the reader's mind." The more prior knowledge we have of the subject presented in a passage, the richer will be our understanding. Prior knowledge of a subject forms a framework/schema into which additional ideas can be assimilated and remembered.

Silent Reading Comprehension is what we mean when we talk about a person's reading ability. It is the end result of the reading process, when all of the components interact successfully. Comprehension is the level of content understanding a student has after reading a passage. The National Reading Panel determined that young readers develop text comprehension through a variety of techniques, including answering questions and summarization.

Reading Comprehension strategies

Reading Comprehension strategies include Preparing, Selecting and Organizing, Elaborating, Rehearsing, and Monitoring. The Reading Comprehension Strategies are diagrammatically represented Figure 2.3.
Preparing/preoperational strategies are effective reading strategies (Weinstein and Mayer, 1986). They are processes the reader uses, such as surveying a text and predicting what it will be about, that prepare in constructing its meaning.

While selecting and organizing strategies, reader’s construct relationships among ideas in the text, between the main idea and supporting details. Paraphrasing, summarizing, clustering related words, noting and using the structure of a text, and creating semantic maps are also ways of organizing.

Elaborating involves building associations between information being read and prior knowledge, and integrating them through manipulating or transforming information. It includes drawing inferences, creating analogies, visualizing, and evaluating or reading critically.

Rehearsing involves taking basic steps to remember material. Saying words over and over again, copying, underlining, and rereading are
rehearsal strategies. Evaluating or organizing and rehearsing are often used in combination to learn complex materials.

*Monitoring* consists of being aware of one’s comprehension and regulating it. It includes setting goals for reading, adjusting reading speed in accordance with the difficulty of the matter, checking comprehension and taking corrective steps when comprehension fails. Affective strategies have to do with the emotional component of learning. They help readers to concentrate, manage time, and put forth effort.

The most encouraging conclusion that might be drawn about comprehension instruction is that, if executed properly and under the right set of circumstances, all the strategies are effective. Based on an extensive review of research, *Pearson and Fielding (1991)* stated, “Everything works”. They were quick to point out, however, that some strategies are more effective than others, and highly recommended the following:

- building bridges between reader’s knowledge and text knowledge
- monitoring for meaning
- summarizing
- using knowledge of text structures

One key to comprehension is prior knowledge. Comprehending involves activating schemata, which are organized packages of networks of information, and creating meaning by filing in slots with specific instances or examples.

**Reading Competency**

Competency is defined as ‘understanding and interpreting written material, including technical material, rules, regulations, instructions, reports, charts, graphs, or tables; applies what is learned from written material to specific situations’. Competence is the ability of an individual to do a job properly. A competency is a set of defined behaviors that provide a structured guide
enabling the identification, evaluation and development of the behaviors in individual employees. The term "competence" first appeared in an article authored by White in 1959 as a concept for performance motivation. Later, in 1970, Lundberg defined the concept in "Planning the Executive Development Program". The term gained traction in 1973, when McClelland wrote a seminal paper entitled, "Testing for Competence Rather than for Intelligence". It has since been popularized by McBer and Boyatzis and many others, such as Gilbert (1978) who used the concept in relationship to performance improvement. Its use varies widely, which leads to considerable misunderstanding.

Some scholars see "competence" as a combination of practical and theoretical knowledge, cognitive skills, behavior and values that are used to improve performance; or as the state or quality of being adequately or well qualified, having the ability to perform a specific role. For instance, life management competency might include systems thinking, emotional intelligence, and skills in influence and negotiation. Competency is also used as a more general description of the requirements of human beings in organizations and communities. Competency has different meanings, and continues to remain one of the most diffused terms in the management development sector, and the organizational and occupational literature.

Competency is sometimes thought of as being shown in action in a situation and context that might be different the next time a person has to act. In emergencies, competent people may react to a situation following behaviors they have previously found to succeed. To be competent a person would need to be able to interpret the situation in the context and to have a repertoire of possible actions to take and have trained in the possible actions in the repertoire, if this is relevant. Regardless of training, competency would grow through experience and the extent of an individual to learn and adapt.
Reading competencies usually fall into two broad categories, viz.

I. Literal Comprehension
II. Critical Comprehension

The literal comprehension skills are directed at the actual words written by the author. They are:

- Selecting the topic sentence of a paragraph
- Identifying the main idea of a passage
- Identifying the supporting details of a passage
- Determining the meaning of words by context

The critical comprehension skills are directed at the reasoning employed by the reader to go beyond the ideas of a passage and make certain inferences or conclusions about them. They are:

- Recognizing the author's purpose and tone
- Identifying the author's overall organizational pattern
- Recognizing explicit/implicit relationships between words, phrases, and sentences
- Distinguishing between facts and opinions
- Detecting bias
- Recognizing valid arguments
- Drawing logical inferences and conclusions

These Reading Competencies will enable the student to become adept in comprehension, analysis, interpretation and evaluation, language and style, and research. Effective reading includes experiencing, learning and thinking. Holmes (1948) who believed that improvement in reading depends on a scientific understanding of the reading process, devoted most of his professional life to answering what he considered to be the basic
questions, ‘Just how complex is this ability we call reading, what are its
dimensions, and how do they orate?’ He observed that reading is an audio-
visual verbal-processing skill of symbolic reasoning sustained by the inter
facilitations of an intricate hierarchy of substrate factors have been
mobilized as psychological aspects.

**Instructional Resources for Reading**

As the designer of three classroom environment, the teacher has three very
powerful resources. The first is being able to model reading and language
experiences. Modelling means involving children in various reading,
writing and thinking experiences, first, by highlighting the significant
aspects of the experiences that the children have to understand in order to
participate, and then by providing sufficient opportunity for the children to
interact with the print or thinking experiences modelled by the teacher.
Together these conditions enable children to acquire new knowledge and
generalize it to a variety of different text situations. Reading to students,
reading with students, questioning, predicting, analyzing word meaning in
context, reading words in phrase groups, applying phonics knowledge in
context, and so on are examples of some of the experiences with print that
can be modelled.

Modelling is quite different from giving students verbal rules to follow.
Students must experience good stories and discover the most redundant
components which signal how stories are organized. Seeing and listening
are coordinated as they try to simultaneously see and listen to a text as the
teacher reads. These cognitive activities must first be reflected upon. The
role of the Teacher must be to provide experiences. After these
experiences, it is possible to help students formulate guiding principles for
inference, for devising questions, and for answering questions.
The teacher’s second major resource is ‘time’. How teachers plan their own time in interacting with students and the way students use their time alone and with other students are critical determinants of what is taught (Guthrie, 1980). The third primary resource is the teacher’s communication skills. ‘Communication skills’ refer to knowing about how to talk, when to talk, what to say and how to say it. Because they vary in their ability to use these skills, people relate to one another in either more or less cooperative or productive ways. The teacher who uses sound communication skills is much more likely to carry out the plans set for the use of teacher and student time in the classroom.

Intermediate-grade teachers have many opportunities to extend the reading comprehension of their students. They need to take advantage of these opportunities, both during the reading period and throughout the day when reading is used to teach other subjects. Students reading above, at, or below grade-level material can benefit from most of the strategies discussed for comprehending text. The only requirement is that the strategy methods be applied to the materials the students can react without excessive effort. If at all possible, standard text book material should be tape-recorded, or the length of assigned reading should be greatly reduced, for students reading two or more years below the average difficulty of the material.

A primary method of teaching reading comprehension is using mental modeling, a technique that accelerates the improvement of reading comprehension.

### 2.2 MENTAL MODELLING - A THEORETICAL OUTLINE

The term Mental Modelling is coined by Kenneth James Williams Craik (1943). He laid the foundation for the concept of mental models: that the mind forms models of reality and uses them to predict similar future events. He was one of the earliest practitioners of cognitive science.
Beliefs, ideas, images, and verbal descriptions that one consciously or unconsciously form from one’s experiences and which guide one’s thoughts and actions within narrow channels. These representations of perceived reality explain cause and effect, and lead one to expect certain results, give meaning to events, and predispose one to behave in certain ways. Although mental models provide internal stability in a world of continuous change, they also blind a person to facts and ideas that challenge or defy the deeply held beliefs. They are, by their very nature, fuzzy and incomplete. Each one has different models (that differ in detail from another’s) of the same concept or subject, no matter how common or simple.

**Mental Modelling: an intuitive, but elusive concept**

Mental modeling is the fundamental process of natural language acquisition. Its use in formal education had been delayed until recent times due to pragmatic and theoretical problems. A proof-of-principle emerged in the form of a method for improving reading comprehension based on mental modelling. The Reciprocal Questioning (ReQuest) procedure uses a customized form of mental modeling, and is capable of improving reading comprehension. ReQuest is a relatively simple procedure that has the teacher and students take turns asking questions about the first few sentences of a reading selection. The teacher models this comprehension, problem-solving strategy in the form of questions for independently setting a purpose for reading, and in think aloud reflections in answer to student questions. Students quickly begin to imitate both the teacher’s questions and question “answering” strategies; they imitate and emulate the mental operations of models. Mental modeling appears efficient, non-sequential, and holistic, but also seems to require certain supportive conditions.
Comprehension also can be viewed as a process of constructing mental models. While processing text, the reader continually reconstructs or updates the mental model.

**Models of Reading**

Educators, Psychologists, and Linguists have defined models differently. Each model emphasizes a different component of the reading process. Most of the models can be placed in one of three classes:

A. Bottom-up models
B. Top-down models
C. Interactive models

**A. Bottom-up Models**

A bottom-up model of reading suggests that reading is basically a process of translating graphic symbols into speech during oral reading or inner speech during silent reading. The reader then uses previously acquired listening comprehension skills. A bottom-up model suggests that written language is subservient to oral language and that the only activity unique to reading is that of breaking the written code. According to this model, first the reader acquires graphic information such as letters and words from the printed page and then syntactic and semantic processing occurs. Reading comprehension is thought to be heavily dependent on rapid and accurate word recognition. Bottom-up theorists suggest that reading is controlled by textual input; the reader plays a relatively passive role in the process *(Weaver and Resnick, 1979)*. Thus the printed material provides more information than the reader does *(Strange, 1980)*. The most often used bottom-up models are those of Gough and Cosky *(1977)* and Laberge and Samuels *(1985)*.
Theoretical Overview

B. Top-down Models
In top-down models the reader’s prior knowledge as well as cognitive and linguistic abilities are important factors in constructing meaning from the printed page. Top-down theorists suggest that before or shortly after any graphic input, the reader develops predictions about the meaning of the printed page. These hypotheses are based on the reader’s prior knowledge of the subject, the specific content of the material, and the ability to interpret the words in their grammatical functions. The reader relies on graphic clues only as needed. As the information is processed, the reader confirms, rejects, or refines predictions made about meaning. Thus, according to this model, the reader plays an active role and supplies, more information regarding meaning than the printed page does.

An important contrast between bottom-up and top-down models is that top-down theorists believe that skilled readers go directly from print to meaning without first recording print into speech. However, Goodman and Goodman (1982) have suggested that beginning readers differ from skilled readers only in the lesser competence they have in the strategies needed for gaining meaning from the printed page. Two of the most widely cited top-down models are those of Goodman (1967) and Smith (1979).

C. Interactive Models
In interactive models, different processes are responsible for providing information that is shared with other processes. The information obtained from each type of processing is combined to determine the most appropriate interpretation of the printed page. The different processes do not have equal influence in all interactive models, and there is no complete agreement as to which kind of processing initiates the reading process. Some interactive theorists believe that top-down and bottom-up processes occur almost simultaneously.
Theoretical Overview

The Pedagogic aspects of Mental Modelling

Mental modelling is a teaching technique that informs the learners about the reasoning processes that lie behind strategic reading. The teacher uses this technique to show the ‘novice’ learner the ‘how’ of reading by thinking aloud as he/she negotiates for meaning through the text. Thus the learner is able to get a glimpse into the mind of a ‘superior’ reader, and is able to imitate the process. Emphasis on the strategic aspects of reading (Chamot, 1993) and the role of metacognition in reading (Schraw, 1994 and Wenden, 1995) make it imperative that the reading process be made explicit for the learner. Generally the term modelling refers to the demonstration of a physical act. But mental modelling refers to an act that is invisible. Through modelling, the mental processes while reading a text, the intention of the teacher is made explicit to the learners. As a result there is less likelihood of their misinterpreting the process. The confusion of learners about how people read is reduced, as they can see the actual process in action. This gives the learner the desired flexibility necessary to be a successful reader. In addition, by demystifying the reading process, mental modelling helps to equalize the power relations between the teacher and the learners, which is a requirement of the pedagogy of possibility (Kumaravadivelu 2001).

Van Dijk and Kintsch (1983) used the term situation model in the book Strategies of Discourse Comprehension. They showed the relevance of mental models for the production and comprehension of discourse. Scientists use the term "mental model" as a synonym for “mental representation". Mental Model is a kind of internal symbol or representation of external reality that is hypothesized to play a major role in cognition and decision-making. It is an explanation of the thought process and how it works in the real world. It is a representation of the surrounding world, the relationships between its various parts and an
intuitive perception about one’s acts and their consequences. Mental models help to shape behaviour and define the approach to solve problems and execute tasks.

According to the theory of mental models, all perceived stimulations and observations are saved to the memory in the form of models that are designed on the basis of sensory information and are combined with already existing information. Mental models have been studied by cognitive scientists as part of efforts to understand how humans know, perceive, make decisions, and construct behavior in a variety of environments. Theorizing about mental models made a comeback shortly after the “birth” of cognitive science. Mental models reappeared in the literature in 1983 in the form of two books; both named “Mental Models”, each using the term “mental model” for a different purpose. The Johnson-Laird (1983) volume proposed mental models as a way of describing the process that humans go through to solve deductive reasoning problems. This theory included the use of a set of diagrams to describe the various combinations of premises and possible conclusions.

The Gentner and Stevens’ (1983) book proposed that mental models provide humans with information on how physical systems work. This approach could be generalized to a number of situations that humans face, including the behavior of objects according to laws of physics.

All mental models have a few key characteristics:

- Mental models include what is thought as true, not necessarily what is actually true.
- Mental models are similar in structure to the thing /concept they represent.
- Mental models allow to predict the results based on actions.
- Mental models are simpler than the thing/concept they represent.
Mental models include only enough information to allow accurate predictions.

We can portray mental models using several key parts:

A. **An Image:** If the mental model is of a physical object, the model should contain a simplified image that serves as a template for that object. This type of mental model can easily be represented as a schematic sketch. It does not include every detail of what might appear on a particular object, but only the essential things that would lead someone to identify it as that particular thing.

B. **A Script:** If the mental model is of a process, it should contain some sort of description of that process. The best way to present the script will vary - it might be a series of steps expressed verbally, a flowchart, or a decision tree. Perhaps a finite state diagram works best.

C. **A Set of Related Mental Models:** Mental models are composed of other mental models. One may quickly get lost in a fractal mindscape, wondering where to begin and where to end. The art of documenting a mental model is choosing the right representation and showing how it relates to other models.

D. **A Controlled Vocabulary:** Each mental model has a set of key definitions and variants. Architects and librarians are adept at creating controlled vocabularies, and mental models should contain small controlled vocabularies. It includes any subtle variations in meaning for the alternatives which are used to depict a particular idea or concept.

E. **A Set of Assumptions:** Mental models contain assumptions that allow people to predict behavior. There are thousands of assumptions for a given model. The key is to state only those assumptions that affect the product at hand.
It is the need of the hour to develop strategies that will help teachers and learners to be co-participators in the learning process. Mental modelling is one technique suggested for this purpose. Mental modelling can be an effective pedagogic strategy in Indian classrooms in terms of motivating the learners to develop improved comprehension.

**Reading Comprehension and Mental Models**

Comprehension is the main purpose of reading. In fact, without it there is no reading, since reading is the process of constructing meaning from print. Comprehension is a constructive, interactive process involving three factors- the reader, the text and the context in which the text is read. To improve comprehension, the interaction among all three factors must be taken into consideration.

*Gunning (1996)* identifies three main theories of reading comprehension. These theories are Schema Theory, Mental Model Theory, and Proposition Theory.

**A. Schema Theory**

*Gunning (1996)* defines a schema as the organized knowledge that one already has about people, places, things, and events. *Kitao (1990)* says the schema theory involves an interaction between the reader's own knowledge and the text, which results in comprehension. This schema, as Gunning defined, can be very broad, such as a schema for natural disasters, or more narrow, such as a schema for a hurricane. Each schema is "filed" in an individual compartment and stored there. In attempting to comprehend reading materials, students can relate this new information to the existing information they have compartmentalized in their minds, adding it to these "files" for future use. Based on the Schema Theory, depending on how extensive their "files" become, their degree of reading comprehension may vary.
B. Mental Model Theory

The next model is Mental Model. This model can be thought of as a mind movie created in one's head, based on the reading content. Gunning gives a detailed description of this process, stating that a mental model is constructed most often when a student is reading fiction. The reader focuses in on the main character and creates a mental model of the circumstances in which the character finds him/herself. The mental model is re-constructed or updated to reflect the new circumstances as the situation changes, but the items important to the main character are kept in the foreground according to Gunning (1996).

Perkins (1991) identifies that sometimes misconceptions about important concepts reflect misleading mental models of the topic itself or the subject matter within which it sits. There are, however, interventions the teacher can do to help the reader to stay on track and create a more accurate picture. One suggestion is for the teachers to ask the students to disclose their mental models of the topics in question, through analogy, discussion, picturing, and other ways. This information gives the teacher insight on the student's knowledge gaps and misconceptions, therefore allowing them to help students reconstruct a more accurate picture.

C. Proposition Theory

The final explanation of comprehension is in the Propositional Theory. This involves the reader constructing a main idea or macrostructure as the text is processed. These main ideas are organized in a hierarchical fashion with the most important things given the highest priority to be memorized (Gunning, 1996). He identifies four main types of comprehension strategies, which include Preparational, Organizational, Elaboration and Monitoring strategies.
According to the Proposition theory, the student forms a mental model in the mind as the macrostructure is formed. Forming a schema is the most basic comprehension tool used by students. As they become more advanced, they can build on their base of schemas and create mental models throughout the reading. The most complex comprehension tool is forming a series of propositions, which are constantly updated throughout the text. Preparational strategies happen before the actual reading takes place, and are incorporated in the Schema theory. Organizational strategies take place during and after the text are read. These strategies are based on both the Mental Model theory and the Proposition Theory. Elaboration strategies can take place before, during and after reading, and therefore, are dependent on all three major comprehension theories. Monitoring strategies are the most complex and involve mostly the Propositional theory. These strategies should take place primarily as the reading is taking place.

The Mental Model theory relies heavily on the Spatial Intelligence area in Gardner’s Multiple Intelligences theory (Armstrong 1994). Therefore, this model may not be as effective for non-spatial learners. Teaching the process of how a mental picture is formed could develop this skill. Taking information about the main character as it comes through the readings and writing descriptive pieces on that character would be a way to improve this skill and work towards increasing comprehension.

Mental modeling is thinking aloud to demonstrate inner scripts such as a proficient reader/thinker might use to “strategize” complex cognitive operations and in ways that entice a learner to imitate and improvise such scripts for use in analogous situations. It also is known as “cognitive apprenticeship,” a term that conveys the historical origins of mental modeling in teaching crafts, though now recognized for its robust value in conveying habits of mind. Mental modeling is efficient and effective because students tend to emulate broader characteristics of the model, such
as social poise, language and demeanor, as well as more narrowly defined objectives of traditional teaching.

**Reading Strategies and Mental Modelling**

Reading strategies are the mental operations involved when readers approach a text effectively to make sense of what they read (Barnett 1988). Good readers apply more strategies more frequently (Olshavsky 1977) and more effectively than poor readers (Paris et al., 1983). Research has also shown that learners can be instructed to use appropriate reading strategies to help them improve comprehension and recall (Carrell 1985; Carrell, Pharis and Liberto, 1989). Learners therefore need to be trained to use these strategies to become more competent readers. Mental modelling is one technique suggested by Duffy, Roehler, and Herrmann (1988). They describe mental modelling as a teaching technique which teachers can use to show the learners the flexible reasoning processes that underpin strategic reading. The reader is able to display the use of certain strategies, like reading the text as a whole, using background knowledge, identifying relationship between different parts of the text, and asking questions which are visible to the listeners. This technique, therefore, has the potential to develop reading strategies.

**Conditions for Effective Mental Modeling**

Mental modeling seems to require an opposable thumb. Reciprocity appears to play this role. It permits the teacher and students to pick-up on one another’s “language of thinking” in an admittedly unnatural, but robust instructional, conversation. The procedure requires “rotation” away from the teacher’s natural tendency to control talk, and inadvertent, repressive power over student talk. It also creates a diagnostic dialogue from which the teacher can further identify particular student needs and coach students in specifically prescribed strategic scripts. Reciprocal mental modeling reveals but does not publicly expose student needs. It also offers students
scaffold opportunities to try-out thinking strategies in a low-risk environment in which they can vicariously learn by observing others until they are ready to venture out into the instructional conversation. There is a foreboding. Reciprocal modeling can mirror back a teacher’s quirks of language and thought as well as proficiencies. However, the reciprocal dialogue informs and shapes teacher question asking and answering as well as that of students. Reciprocal Mental Modeling is a paradigm that can be applied in a variety of cognitive enrichment formats such as in teaching phonics and in language development through reciprocal inquiry over pictures.

2.3 MULTIPLE STRATEGY INSTRUCTION - A THEORETICAL SKETCH

In the past, individual strategies have been introduced one at a time and children were unsure of when, where, and how to apply them to new reading situations (Pressley and Block, 2002 and Afflerbach et al., 2008). What is needed is the development of reading comprehension interventions that will enable the students to use the skills appropriately. In general terms, Strategy is defined as a planned approach to any task. Strategies are consciously initiated mental activities, like inferring, grouping, deduction, elaboration, and the like, that trigger off the process of learning. Successful learners generally use these. When applied to language, they are known as language learning strategies.

Strategies for Language Teaching

The term strategy has become a catchword in the field of education since the 1960s. It was the outcome of developments in cognitive educational psychology and marked a shift from teacher and teaching to learner and learning, from intuitivism to constructivism, from teacher-centered to learner-centered approach in learning.
Canale and Swain (1980) defined the components of second language proficiency as consisting of grammatical competence discourse competence, socio-linguistic competence and ‘strategic competence’. Strategic competence is described as mastery over verbal and non-verbal communication strategies that (a) compensate for breakdown in communication due to limiting conditions in actual communication or due to insufficient competence in one or more of the other areas of communicative competence; and (b) enhance the effectiveness of communication. With this shift, the term strategy acquired importance in second language learning.

Typology of Language Learning Strategies

Second-Language Learners are children who speak a language other than English or who speak non-standard English to learn standard English as a language. A perusal of second language learning strategy literature shows that strategies are distinguished on the basis of several criteria. Language learning strategies have been delineated on the basis of whether they are content-based strategy or process-oriented strategy. A content-based strategy looks at how content can be taught effectively. The whole language approach and the phonics approach for teaching reading is a content-based strategy. The use of discussion, brainstorming, language monitoring are process-oriented strategies.

Strategies are also distinguished as the conscious and the unconscious. For Oxford (1995), consciousness is an important aspect of language learning strategies. It is essential for learners to plan and implement the plan into action. On the contrary, according to other scholars (Nold and Schnaitmann, 1997; Wendt, 1997; and Wolff, 1997), initially strategies are conscious and later they become sub-conscious, as they get automatic and reutilized.
Strategies are distinguished along the dimension of learning as implicit and explicit teaching \textbf{(Ellis, 1994)}. Implicit learning is associated with natural learning and explicit learning with hypothesis testing and conscious learning. In language learning, implicit learning is associated with first language acquisition and explicit learning with second language learning \textbf{(Krashen, 1994)}.

Another typology of language learning strategy has taken two approaches, viz. (a) \textit{Product-oriented approach} and (b) \textit{Process-oriented approach}. In the Product-oriented approach the definition is based on the object of language learning. \textbf{Tarone (1983)}, for instance, defines strategies as steps taken to develop linguistic and socio-linguistic competence in the target language. In the Process-oriented definition, stress is on information processing. This view is echoed in the definition of language learning strategies, proposed by \textbf{O’Malley and Chamot (1990)} as ‘the special thoughts or behaviors that individuals use to help them comprehend, learn, or retain new information’.

\textbf{Oxford (1990)} has identified two main categories of strategies, viz. the \textit{direct} and \textit{indirect}. Direct strategies are cognitive strategies and are directly involved in learning the subject matter. Some of these are memory strategies that help in encoding and retrieving information into long term memory, cognitive strategies involved in construing and revising internal mental structures for use in receiving and sending messages, and compensatory strategies like guessing that are used for covering gaps in the knowledge of second language. Indirect strategies are those that are involved in the subject matter but are important for they help direct language learning strategies. Some of these are direct language learning strategies. Some of those are the communicative strategies (like the linguistic devices for foregrounding message in the target language, ways of handling errors in spoken and written communication), meta cognitive
strategies (strategies that help learners in planning, focusing and evaluating their learning), social strategies (that facilitate instructions in discourse) and affective strategies (that help learners to control feelings) motivations and attitudes related to target language. The criteria for distinguishing between these two are based on the extent to which they contribute to language learning.

**Reading Strategies that Work**

The NRP identified twelve categories of comprehension instruction that have scientific support for the conclusion that they help readers to construct meaning and thereby improve reading comprehension. They include two categories that involve the preparation of teachers in cognitive strategy instruction. These strategies stimulate both audio and visual perception, activate memory and semantic processing, enhance perception, engage syntactic knowledge and processing, teach narrative structure, and promote reasoning. The strategies of active listening, comprehension monitoring, and prior knowledge use all serve to promote listening and awareness of one's thinking or "inner speech," a process emphasized by the Russian psychologist Lev Vygotsky in the 1920s. Mental imagery, mnemonic, and graphic organizer instruction, on the other hand, make use of readers' visual imagination and memory. Vocabulary instruction increases word and semantic knowledge and problem solving. Question answering and question generation require the access of what is known or understood and the prediction of future events. Story structure and summarization instruction create awareness of the organization of ideas and what is important.
Multiple Strategy Instruction for Reading Competency

Multiple strategy instruction combines the use of several of these processes together in flexible and appropriate ways. Research conducted in the late 1990s also suggests that teachers can learn to integrate these kinds of strategy instructions in classroom settings and that peers working in cooperative learning situations can effectively tutor each other in comprehension strategies. The strategies are explained herewith.

- **Active listening:** To instruct active listening, teachers guide readers in learning to listen while others read. The listening reader follows the text as another student reads aloud. The teacher may also pose questions for the readers to answer while they listen. Active-listening training improves listening and reading comprehension. It increases a reader's participation in discussions, engenders more thoughtful responses to questions, increases memory for the text, and focuses the reader's attention and interest on material.

- **Comprehension monitoring:** One can learn to listen to one's own reading and to monitor one's own comprehension. Instruction in comprehension monitoring during reading helps readers manage their inner speech as they read. Self-listening and self-monitoring of one's own understanding during reading promote more careful reading and better comprehension. To teach comprehension monitoring, a teacher, when reading aloud to a class, demonstrates the strategy by interrupting her own reading to "think aloud." She articulates to the class her own awareness of difficulties in understanding words, phrases, clauses, or sentences in a text. When a text poses potential comprehension breakdowns, such as unfamiliar concepts or logical inconsistencies in a passage, the teacher might look back in the text to try to solve a problem, restate the text content in more familiar terms, or look forward in the text to find a solution. After observing a teacher
model the comprehension monitoring strategy, readers are encouraged
to carry out the same procedures - first with teacher scaffolding and
then on their own. Eventually the student readers take responsibility
for recognizing comprehension difficulties and for demonstrating
ways to overcome them.

- **Prior knowledge.** Prior knowledge instruction is designed to assist
readers in bringing to mind their own knowledge that is relevant to
understanding the text. A teacher can activate prior knowledge by
asking students to think about topics relevant to the passage, by
teaching the requisite relevant knowledge, by using pre-reading
activity on related but better-known topics, by having the readers
predict what will happen in the text based on personal experience, by
having readers make associations during reading, and by previewing
the story or text.

- **Mental imagery:** Mental imagery instruction teaches readers to
construct images that closely represent the content of what was read
and understood.

- **Mnemonics:** Like mental imagery instruction, mnemonic instruction
teaches readers to use an external memory aid, but unlike mental
imagery instruction, the mnemonic image can be one that does not
necessarily closely represent the text. A teacher demonstrates how to
construct a picture, keyword, or concept as a proxy for a person,
concept, sentence, or passage - such as using an image of a "tailor" to
remember the name "Taylor." These keywords and images aid later
recall.

- **Graphic organizers:** Graphic organizer instruction shows readers
how to construct displays that organize one's ideas based on a reading
of the text. Graphic organizers aim at creating awareness of text
structures, concepts and relations between concepts, and tools to
represent text relationships visually. They also assist readers in
writing well-organized summaries. Diagrams, pictorial devices, and story maps can all be used to outline the relationships among text ideas. This instruction is useful for expository texts in content areas such as science or social studies.

- **Vocabulary instruction:** In the context of comprehension strategy instruction, vocabulary instruction promotes new word meaning knowledge by teaching readers semantic processing strategies.

- **Question answering:** Question answering focuses the reader on content. *Why* or *how* questions lead the student to focus on causes and consequences. Question answering guides students and motivates them to look in the text to find answers. Instruction on question answering leads to improvement in memory for what was read, to better answering of questions after reading, or to improvement in finding answers to questions in the text during reading.

- **Question generation:** Teachers demonstrate this strategy by generating questions aloud during reading. Readers then practice generating questions and answers as they read the text. Teachers provide feedback on the quality of the questions asked or assist the student in answering the question generated. Teachers teach the students to evaluate whether their questions covered important information, whether questions related to information provided in the text, and whether they themselves could answer the questions.

- **Story structure:** Story structure instruction is designed to help readers understand the who, what, where, when, and why of stories, what happened, and what was done and to infer causal relationships between events. Readers learn to identify the main characters of the story, where and when the story took place, what the main characters did, how the story ended, and how the main characters felt. Readers learn to construct a story map recording the setting, problem, goal, action, and outcome of the story as they unfold over time.
structure instruction improves the ability of readers to answer questions, to recall what was read, and to improve standard comprehension test performance. The instruction also benefits recall, question answering, and identifying elements of story structure.

Summarization: Teaching readers to summarize makes them more aware of how ideas based on the text are related. Readers learn to identify main ideas, leave out details, generalize, create topic sentences, and remove redundancy. Through example and feedback, a reader can be taught to apply these summarization rules to single-or multiple-paragraph passages by first summarizing individual paragraphs and then constructing a summary or spatial organization of the paragraph summaries.

Multiple-strategy instruction: Readers can learn and flexibly coordinate several comprehension strategies to construct meaning from texts. Palincsar and Brown’s (1984) reciprocal teaching method, instructs readers to use four main strategies during reading, viz. generating questions, summarizing, seeking clarification, and predicting what will occur later in the text. Additional strategies may also be introduced, including question answering, making inferences, drawing conclusions, listening, comprehension monitoring, thinking aloud, and question elaborating. The teacher models strategies and, in some cases, explains them as they are modeled. Then the reader, either alone or as a leader of a group, applies the strategies. Multiple-strategy programs that do not use reciprocal teaching mainly have the student practice strategies with modeling and/or feedback from the teacher. In explicit, direct approaches, the teacher always explains a strategy before the teacher models it during reading.

Teacher preparation for text comprehension instruction: Teachers have to learn strategy instruction in order to interact with students at the right time and right place during the reading of a text. Teachers
also need to know about cognitive processes in reading and how to teach strategies through explanation, demonstration, modeling, or interactive techniques; how to allow readers to learn and use individual strategies; and how to teach a strategy in conjunction with several other strategies.

Cooperative learning by peers: Readers may learn best when they are in social situations in which they are actively engaged with other learners who are near their same level of understanding. Cooperative learning involves readers reading together with a partner or in small groups. As they read aloud and listen to others, the teacher can guide them to use any of the various strategies for effective reading comprehension. At first the teacher may model reading through her demonstrated use of a strategy. Then the student readers carry out the demonstrated activities with a partner or in small reading groups. Readers take turns reading and listening, asking questions, answering questions, summarizing, recognizing words, predicting, and clarifying. The readers are encouraged to tutor each other on strategies. Group cooperative instruction has been found to promote intellectual discussion, increase student control over their learning, increase social interaction with peers, and save teacher time.

CONCLUSION
Successful comprehenders construct mental models that incorporate elaborated text based information with their available prior knowledge. Mental models are flexible representations that are constantly updated to reflect the most recent conceptualizations of read text information. However, the ability to form adequate mental models may be largely determined by the efficiency of working memory in allocating resources effectively. The ability to coordinate and allocate limited resources is vitally important to effective reading and comprehension. Visual and
verbal instructional techniques can help overcome cognitive capacity limitations by utilising the subsystems of working memory more efficiently. Thus, reading comprehension is enhanced when visual and verbal information is utilised and linked in the working memory. When children are encouraged to visualise story content and to enter into dialogue with others, it elaborates and deepens the quality of their mental representations. It also enables the reader to make connections between verbal and visual content in a much more integrated way. Thus, the quality of a reader’s mental model will be enhanced by the quality of the linking of information within working memory.

The theoretical frameworks of Reading Competency, Mental Modelling and Multiple Strategies Instruction helped to frame the topic of research and to adopt a suitable procedure for the conduct of the study.