Chapter 3

Theoretical Perspective

This chapter discusses various theories on reading. The chapter begins with an introduction to models of reading followed by a description of various models like bottom-up, top-down, interactive, sociocognitive, transactional models etc. The chapter also gives a brief introduction to the theories of reading followed by an elaboration of traditional, cognitive and schema theoretic views on reading. A brief description of dual coding theory and cognitive load theory follows. The final section of the chapter tries to integrate elements from the aforementioned theories for arriving at explanations for using semantic mapping as a strategy to reduce the second language anxiety and second language reading anxiety of the learners.

3.1 Models of Reading: A Brief Introduction

Reading comprehension models have been deemed influential in the reading research pertaining to both L1 and L2, as they highlight the specific features of the reading process be it in the first language or second language. Models of reading depict without exception an integrated and interactive network of various components that adds to our understanding of how mind makes meaning from the text.

Reading models equip educators with an understanding of the reading process which is deeper enough to answer the questions as to where breakdowns in comprehension can happen and what strategies can be used to fruitfully improve the reading process. Models of reading successfully integrate research findings in explaining reading process taking into consideration what they currently know. Hints about the instructional approaches and intervention strategies that assist the readers at varying stages of reading development are an important advantage of a reading model as they help in explaining and predicting the reading behaviour.

3.1.1 Bottom-Up Model

Bobrow and Norman in 1975 perceived reading as a “bottom-up” or “data-driven” process where in “the primary stage letters are first identified, then strings of letters are analysed into clusters with morphophonemic significance, and from that words are recognized. Strings of words lead to phrase constituents and word meanings are retrieved from the subjective lexicon, which eventually lead to the semantic

interpretation of the sentence." The meaning of a text in turn is the sum total of the meanings of its component sentences. Developed under the influence of behaviourist psychology of the 1950s "Bottom-up models operate on the principle that the written text is hierarchically organised and that the reader first process smallest linguistic unit, gradually compiling the smallest units to decipher and comprehend the higher units" (Dechant, 1991).

According to Carrell (1988), the bottom up view of reading occurs as decoding letters leads to words and words into sentences, and through the process the reader obtains and understands the meaning of the text. So in this model, a single direction part-to-whole processing of a text occurs. "Readers begin by translating the parts of written language (letters) into speech sounds, then piece the sounds together to form individual words, then piece of words together to arrive at an understanding of the author's written message" (Gough, 1972). Flesch (1955), Gough (1972), and LaBerge and Samuels (1974) are the major proponents of the bottom-up model of reading.

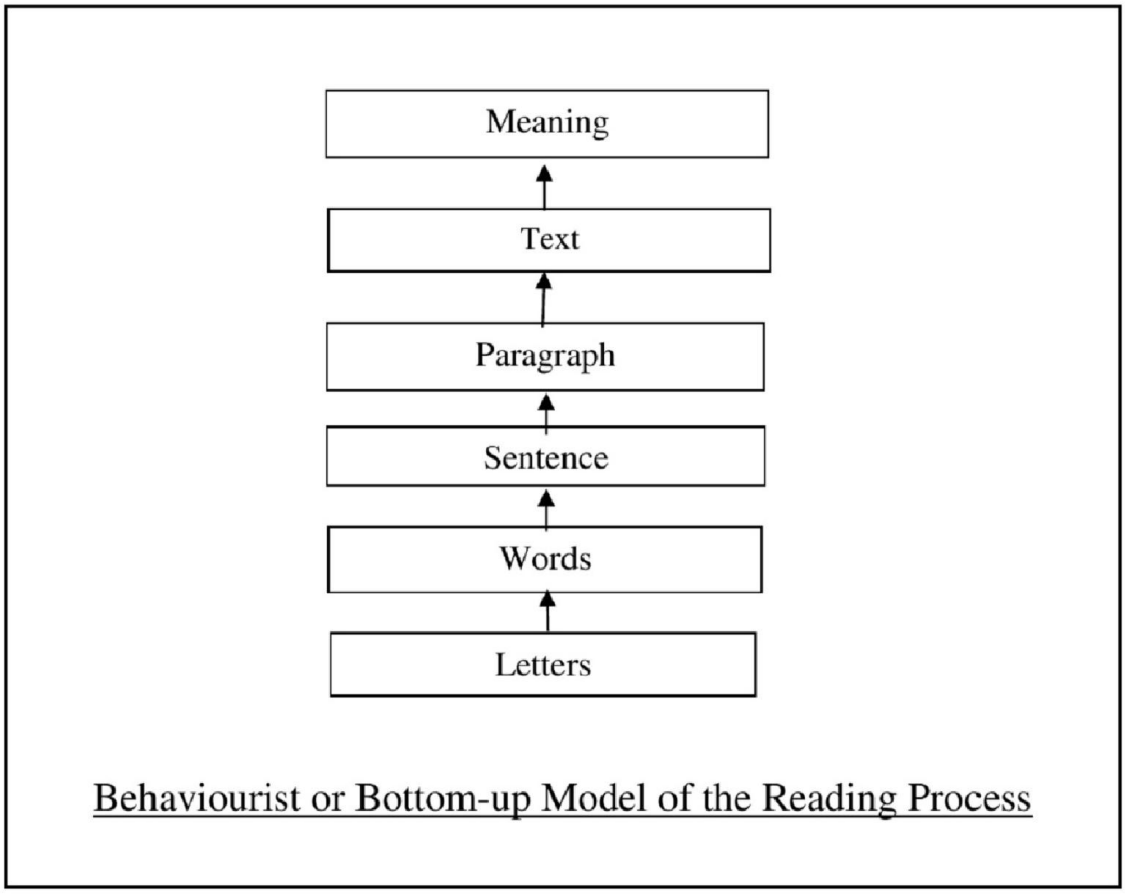

Image 3.1 Bottom-up Model

Image based on the inputs from (http://www.powershow.com/view/3c4c4f).

Eskey (2005:564) suggests a movement "from text to brain" in bottom-up processing. Reading in this model starts with grapheme-phoneme decoding, and proceeds to single words, phrases and then to sentences, in a linear fashion, not recognizing the effect of background knowledge or other factors. In bottom-up processing, linguistic input from the text is mapped against the reader's prior knowledge which makes it data driven as it is evoked by the incoming data. In this mode of processing, students read and reread, calling attention to specific sections of the text. The reading requires language processing at word, sentence and discourse levels.

"Overreliance on text-based or bottom-up processing will be referred to as text-biased processing or text-boundedness" (Carrell, 1988a: 102) which makes the readers' remember only isolated facts without integrating them for producing a cohesive understanding.

3.1.2 Top-Down Model

Top-down oriented models in reading was developed by Smith (1971, 1978) and Goodman (1976). The top-down models focus on how internally developed hypotheses influence the possible meanings of the text material at hand. Top-down model deals with how lower level processes like word recognition contributes to higher level process of achieving meaning.

In top-down model, reading is seen as a "conceptually-driven" process. In this, a reader samples a text either to confirm or to reject the hypothesis about its content. Here, "reading is conceived to be a psycholinguistic guessing game" (Goodman, 1967). In the top down view, a reader's background knowledge is stimulated by the visual clues from the text, and, thus, the reader as Goodman writes "leaps towards meaning" (Goodman, 1967). Readers' expectations represent here a form of pre-processing which speed up the subsequent analysis.

The movement is "from brain to text" in top-down processing (Eskey, 2005: 654). Reading in this model is seen as a selective and purposeful process in which the readers' prior knowledge of the text structure and text content is utilized to make predictions about the text which are either confirmed or rejected after the completion of the process.

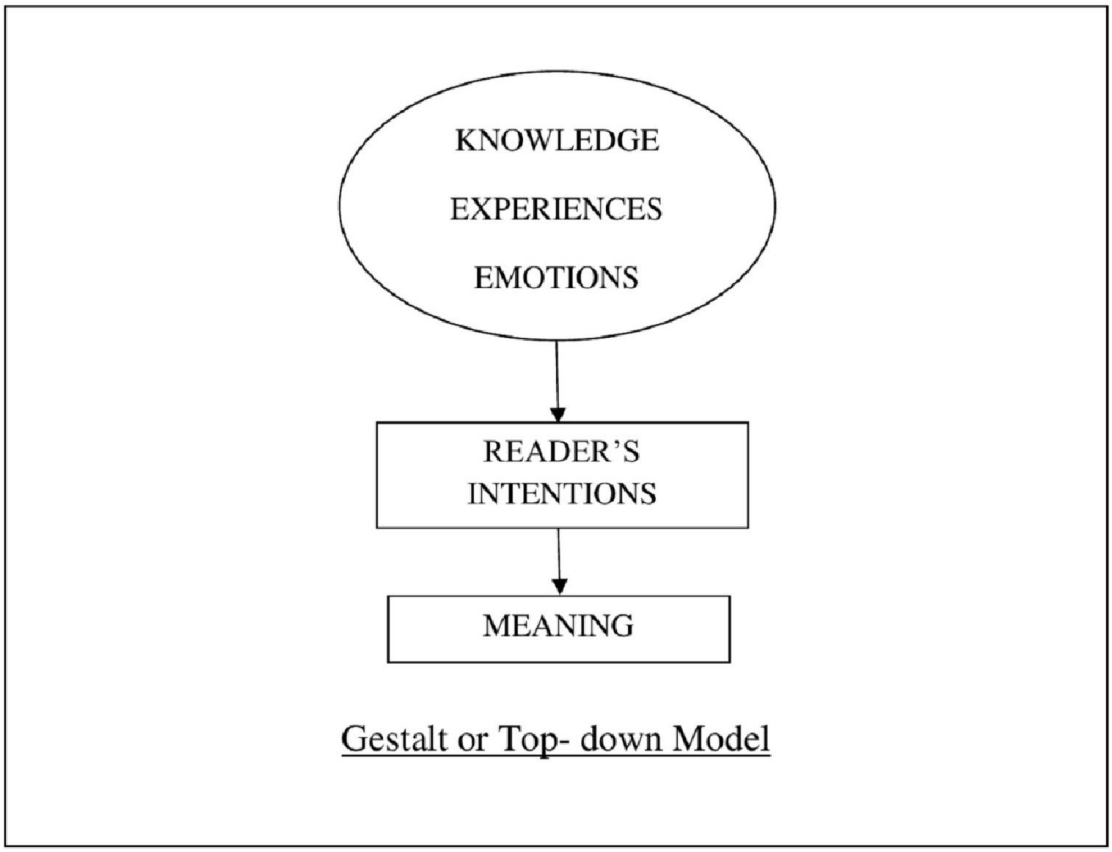

Image 3.2 Top-down Model

Image based on the inputs from (http://www.powershow.com/view/3c4c4f).

Bottom-up and top-down theories differ remarkably in their treatment of ambiguity. In the case of bottom-up processing, higher-order processes do not alter lower-order processes because, here each stage takes its input and output from the preceding stage. If an ambiguity arises at any stage in bottom-up processing alternate interpretations are sent forward for resolving the same at a later point. Whereas in top-down model, arising higher-order expectations may thwart some interpretations before they come off.

3.1.3 Interactive Model of Reading

Interactive models of reading were an outcome of the works of Rumelhart (1977) and Stanovich (1980). Their interactive model gave prime importance to how the flow of information switch from bottom-up to top-down depending on the text, context and reader features.

Carrel in 1988 argued for more balance between top down and bottom up processing. Citing Rumelhart (1980) writes "…schema theory research has shown that the most efficient processing of a text is interactive….a combination of bottom up and top down processing models" (Carrel, 1988). Interactive models dwell on the constant interaction between bottom up and top down models of reading, each source contributing to the comprehensive reconstruction of the meaning of the text.

Interactive model of reading was capable of providing a comprehensive understanding of the reading process from all perspectives including from the learner, the text and also from external factors related to the text and the reader. In the interactive model, the reader interprets the meaning by simultaneously categorizing the processing features like letters, spelling, patterns and on the general context, syntax, and the semantic and syntactic environment in which the words occur.

In the view of Carrell and Eisterhold (1988) "bottom-up and top-down processing occur simultaneously at all levels. The data which is necessary for instantiating the schema becomes available through bottom-up processing whereas top-down processing helps in their assimilation when they are consistent with the reader's conceptual expectations". Bottom-up processing makes the reader sensitive to information that is novel or that does not fit in their ongoing hypothesis about the content structure of the text, while it is the task of the top-down processing to help the reader in resolving ambiguities or to select between alternate possible interpretations of the incoming data.

Nuttal's (1996) explanations of interactive model of reading focus on the continuous shifts from one form to another of the top-down and bottom-up approaches during the process of reading. Learners often adopt the top-down approach for predicting the probable meaning. They opt for the bottom-up approach for verifying whether their predictions match with the writers' intentions.

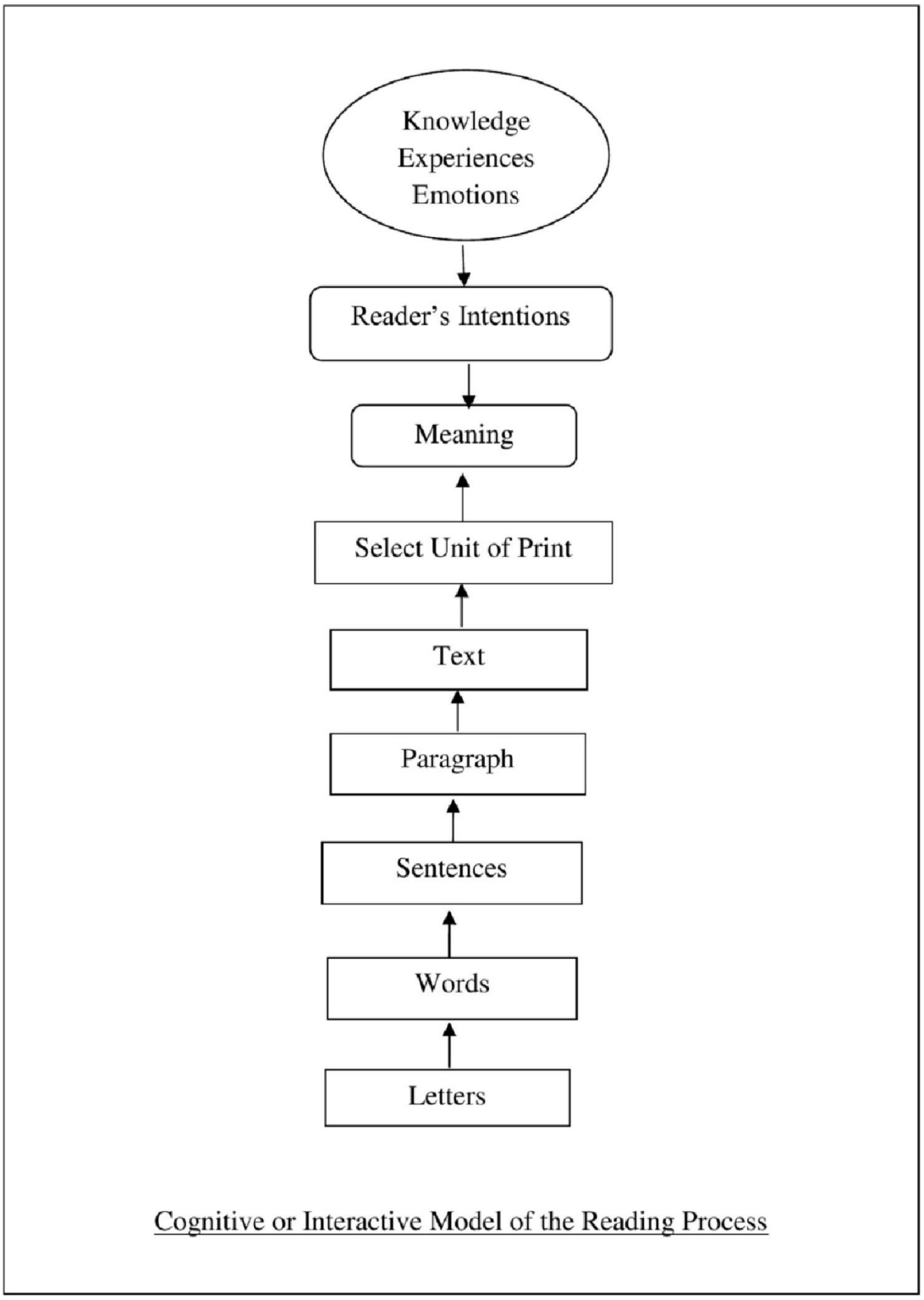

Image 3.3 Interactive Model of Reading

Image based on the inputs from (http://www.powershow.com/view/3c4c4f).

In the interactive model of reading, the strengths of both Gestalt and Behaviorist theories are combined thereby minimizing the weakness associated with each of them. Contemporary second language reading specialists favour the interactive model of reading for the reason that second language readers actively construct meaning of a text by simultaneously utilizing their background knowledge and the information in the text.

3.1.4 Additional Models of Reading

Additional models of reading include sociocognitive and transactional models of reading.

3.1.4.1 Sociocognitive Model of Reading

The sociocognitive model of reading was propounded by Ruddell and Unrau. According to this model, meaning is constructed during a socioculturally contextualized Bottom-Up/ Top-Down reading process. So, in this model when the readers try to interpret and negotiate meanings, they do so by taking into account not only its linguistic elements but also tasks, sources of authority, and socio cultural factors. The sociocognitive model of reading sees context as a key factor that shapes a reader.

The sociocognitive model of reading recognizes the dynamic relation that exists between text producers, text receivers and the text. It acknowledges the socially constructed on going interaction between reader and writer which is mediated by the text and context (Bernhardt, 1991).

3.1.4.2 Transactional Model of Reading

Transactional theory and model of reading and writing was developed by Rosenblatt (1969) from a bunch of disciplines like philosophy, comparative literature, aesthetics, linguistics and sociology in the early 20th century. For Rosenblatt, the reader and the text are the two major aspects of the dynamic process called reading, where meaning emerges from the transaction of these elements (reader and the text). “Every reading act is an event, a transaction involving a particular reader and a particular configuration of marks on a page, and occurring at a particular time in a particular context …and “meaning” does not reside ready-made in the text or in the reader, but happens during the transaction between reader and text” (Rosenblatt, 1988).

The text serves not only the purpose of a stimulus in eliciting ideas from the reader but also shapes the readers' experience and orders the ideas that conform to the text. In this way transactional model of reading highlights the generative nature of the relationship between the reader and the text. Elements in the linguistic/ experiential reservoir of the reader get stirred up during reading which makes him/her to adopt a selective attitude that foregrounds certain aspects of the text and pushes others into the fringes.

In Rosenblatt's view, while transacting with the text, the reader forms what she calls evocations, a structure of the texts' elements that becomes an object of thought. During the reading process, readers respond to these emerging evocations to form interpretations that report, analyze, and explain those evocations.

Rosenblatt's transactional model discusses as to how the readers adopt a stance (which reflects the reader's purpose) towards a text on an 'efferent-aesthetic continuum'. According to Rosenblatt, readers opt for an efferent stance when their sole goal for reading a text is to extract and retain information from it. "The meaning results from an abstracting-out and analytic structuring of the ideas, information, directions, conclusions to be retained, used or acted on after the reading event" (Rosenblatt, 1988). Whereas they would prefer an aesthetic stance when their ultimate aim in reading textual materials is to engage in a lived-through experience. The "meaning evoked during the aesthetic transaction constitutes 'the literary work' the poem, story or play. This evocation, and not the text, is the object of the reader's 'response' and 'interpretation' both during and after the reading event" (Rosenblatt, 1988).

The transactional model of reading has its share of disadvantages in the classroom setting, as questions can be asked regarding what constitutes valid reading of a text and the manner in which one determines the validity of a textual interpretation.

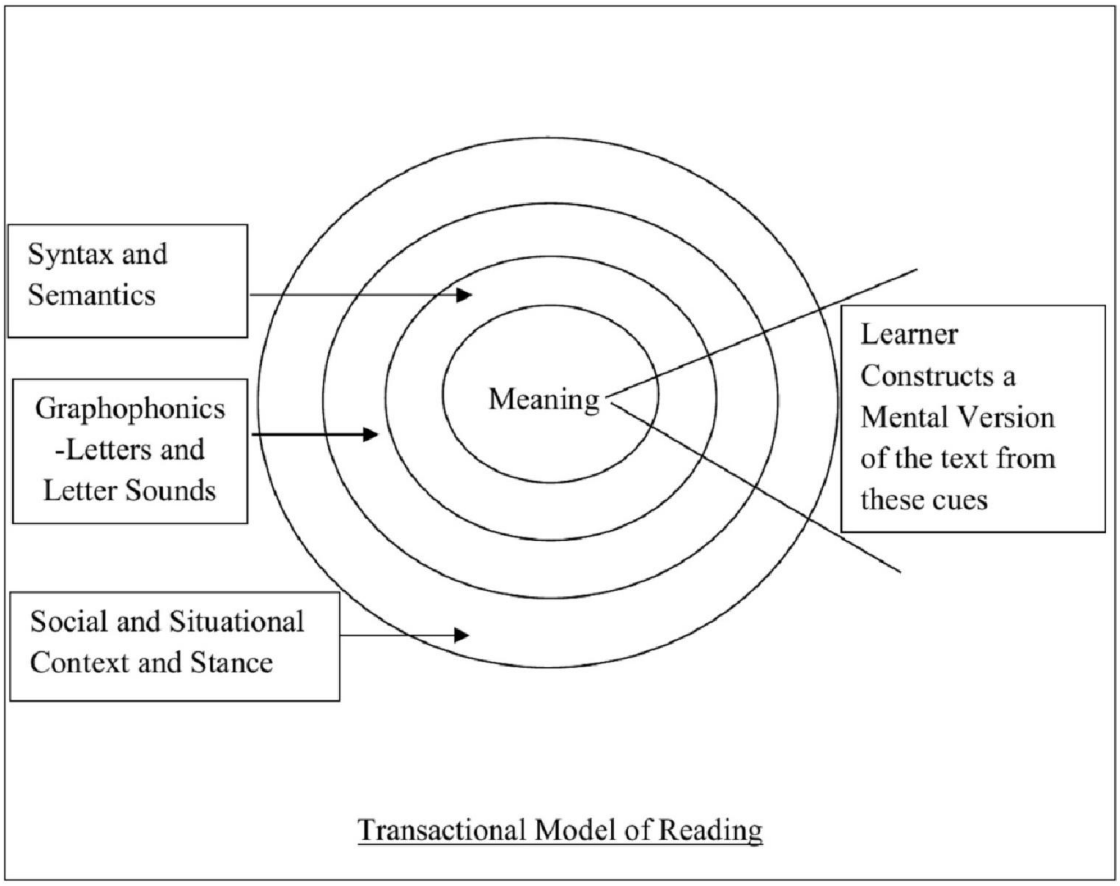

Image 3.4 Transactional Model of Reading

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3.2 Theories of Reading

3.2.1 Brief Introduction to Theories of Reading

Reading has always been an area of immense interest to language teaching experts which leads to the extensive and intensive study of the same. Reading theories were the results of the tremendous effort by these researchers over decades on the nature of reading and on the processes that the readers undertake in comprehending the textual information. In the early stages of the development of reading comprehension theories, theorists often borrowed paradigms or models that are used in computer science, be it traditional or psycholinguistic theories.

Theories on reading are alternative ways of explaining the process of learning to read. Reading theories could be effectively utilized as the basis for improving the techniques of teaching reading. They could assist the teachers to select instructional

choices that help the children to develop successful reading strategies. Knowledge of various theories on reading is a necessary prerequisite for enhancing the reading proficiency of foreign as well as second language learners.

Over the years there occurred transitions in the development of reading theories. There was a gradual move from the traditional theories that focus on the printed form of text to the cognitive theories which give importance not only to what is on the printed page but also to the reader's background knowledge. These traditional and cognitive theories paved the way to metacognitive theories which concern itself with what readers think about while they are reading a text, and how they can control and manipulate the process of comprehending the text.

3.2.2 Traditional Theories

Traditional theories of reading were deeply influenced by the Behaviourist psychology of the1950s which considered learning to be a conditioned response to stimulus. Learning according to behaviourism is based on "habit formation, brought about by the repeated association of a stimulus with a response" and language learning was described as "response system that humans acquire through automatic conditioning process", where "some patterns of language are reinforced (rewarded) and others are not", and "only those patterns reinforced by the community of language users will persist" (Omaggio, 1993: 45-46). For behaviourists, the print on the page serves as the stimulus for reading and word recognition comes as a response for the same. Behaviourist theories see reading as a bottom-up process that progresses from letters to words to sentences to paragraphs to text and finally to meaning.

Traditional theories of reading consider reading to be a process by which readers' learn smaller discrete words and parts of words before going forward to read full sentences and paragraphs. They claim that learners acquire vocabulary and grammatical rules and this will help them in slowly gathering necessary components for fluent reading. The main task of the reader is to break the code of language by identifying the graphemes and connect them to phonemes.

Nunan (1991) views reading as a bottom-up process where "the reader decodes a series of written symbols into their aural equivalents in the quest of making sense of the text. For gaining textual comprehension, lower level skills are connected to the

visual stimulus, or print, and all this consequently end with recognition and recall." Meaning in traditional theories resides in the text and readers act as passive recipients who have to reproduce it.

The bottom-up theories of reading focus on the teaching of reading through separately defined comprehension skills taught in a logical and sequential order. They adopt a skills model which uses a data driven processing. Models of instruction adopted by traditional theories include phonics-based learning (asphonics- learners match letters with sounds in a defined sequence) in which learners sound out phonemes or parts of words and slowly combine these parts of words into whole words. In the same manner, whole words are combined to form sentences as the process continues.

Literal comprehension is the focus of ESL/EFL textbooks that are based on this model. Activities are designed concentrating on recognition and recall of lexical and grammatical forms aiming at perceptual and decoding dimension.

Traditional theories of reading were seen as defective and insufficient for its reliance on the formal features of the language, mainly words and structures. "Little attempt was made to explain what went on within the recesses of the mind that allowed the human to make sense of the printed page" (Samuels and Kamil, 1984) by the traditional theories of reading.

3.2.3 Cognitive Theories

Cognitivism in theory is an amalgam of Behaviourism and Gestalt Theory combining the strengths of both the theories and at the same time minimizing the weaknesses of both these theories. Cognitivism came as an outcome of the paradigm shifts in cognitive sciences during the 1960s. The mind's innate capacity for learning was the focal point of attention for cognitive theory. This helped them in explaining effectively how humans acquired their first language. And this had enormously influenced psycholinguists in the field of ESL and EFL in clarifying "how such internal representations of the foreign language develop within the learner's mind" (Omaggio, 1993:57).

Cognitive theories of reading move out from the views of traditional theories on the fact that in cognitive theories it is the concept and the process of reading that is learned first which at a later point is broken down into individual words, parts of words,

sentences, paragraphs etc. Cognitive theories of reading discusses about a moment in which the readers grasp the process of reading even without having a full awareness of all the discrete components of how to read. The necessary components for reading like individual words, how words fit together, etc become peripheral at such a moment when readers understand the reading process much better in its entirety without at most familiarity with the individual elements of reading. We can place together with this the views of Nunan (1991) and Dubin and Byeina (1991), when they perceive the psycholinguistic model of reading and the top-down model in exact concordance.

It was Goodman (1967) who depicted reading as a psycholinguistic guessing game. According to him, "reading is a process in which readers sample the text, make hypotheses, confirm or reject them, make new hypotheses, and so forth." So, for him it is the reader rather than the text which is at the centre of the reading process. Psycholinguistic theorists rejected the traditional view of reading that considers reading to be a sequence of skills which can be taught. Instead, they came up with a conceptually driven model in which reading is a meaning predicting process that depends on various aspects like reader's knowledge of oral language, syntax, semantics and phonological cues.

It was the cognitive-top-down approach by Smith (1971) that revolutionized the conception of the way learners learn to read. In cognitive theories of reading, meaning does not jump off the text into the reader's head based on an exact rendering of the page. But it is the life experiences and the knowledge that the readers bring to reading that influence them in conditioning the word, sentence and text meaning.

Rather than an act of extracting meaning from a text, reading involves the process of connecting the reader's background knowledge with the information present in the text. Cognitive theorists view reading as "a dialogue between reader and the text, which involves an active cognitive process in which the reader's background knowledge plays a key role in creating meaning" (Tierney and Pearson, 1994). In contrast to the traditional theories, cognitive theories see reading as a purposeful and rational activity that relies on the expectations and pre-existing knowledge of the readers. Interactive nature of reading and constructive nature of comprehension was also the focus of attention of cognitive theories.

Under the category of cognitive theories comes the schema theory of reading. Rumelhart (1977) emphasized the cognitive basis of schema theory where he described schemata as "building blocks of cognition" that can be used in the process of interpreting sensory data, in retrieving information from memory, in organizing goals and sub goals, in allocating resources, and in guiding the flow of the processing system. According to him, an incomplete schema can cause problems for the reader in processing and understanding the text.

Ausubel's concept of meaningful learning had its impact on teaching approaches of second language learning. It became all the more important during the1960s and 70s with an explosion of teaching methods and activities that take into account the learners' experience and knowledge. Ausubel's (1963) cognitive psychology is based on the fundamental concept that learning occurs as a result of the assimilation of new concepts into the existing conceptual frameworks of learners. The learners' prior knowledge and the use of this pre existing knowledge serve as the basis of learning new knowledge. And for Ausubel, meaningful learning happens when new information is linked to the learners' prior knowledge in a non-arbitrary and substantive way.

3.2.4 Schema Theory

Basing its origin in the Gestalt psychology of the1920s and 1950s, schema theory in the current sense was first used by British psychologist, Bartlett in his classic book *Remembering* (Bartlett, 1932). He proposed the notion of schema to signify a hypothetical cognitive structure that was "…an active organisation of past reactions or experiences, which must always be supposed to be operating in a well organized organic response. That is, whenever there is an order or regularity in behaviour, a particular response is possible because it is related to similar responses, which have been serially organized, yet which operate not as individual members coming one after another but as a unitary mass" (Bartlett, 1932). Bartlett's use of phrases like "active organization", "mental set", "past experiences" etc suggest a close resemblance to Ausabel's ideas.

Even though the term 'schema theory' was coined by British psychologist Bartlett, it was Rumelhart, an artificial intelligence expert of the1970s who established and developed schema theory. However, almost all cognitive definitions of schema stem from Bartlett and his 1932 book *Remembering: A study in experimental and social*

psychology. According to Rumelhart "all knowledge is packed into units. These units are the schemata" (Rumelhart, 1980). Few years later, Widdowson (1983) defined schema as "cognitive constructs which allow for the organization of information in a long-term memory". Cohen in 1993 explains schemata as "packets of information stored in memory representing general knowledge about objects, situations, events, or actions". Ajideh in 2003 define schema as "a hypothetical mental structure for representing generic concepts stored in memory. It's a sort of frame work or plan, or script. Schemata are created through experience with people, objects and events in the world".

Schemata are theorised to be abstract knowledge structures or data structures for representing generic concepts stored in memory that have been abstracted by induction from experience. The term 'schema' has been referred to by different scholars. Rumelhart (1980) calls them as "building blocks of cognition" and "the fundamental elements upon which all information processing depends". Kinstch and van Dijk (1978) call them as "macrostructure" because of their significant roles in discourse comprehension and memory.

According to schema theory, knowledge is stored in human brain in units called schemata and these stored knowledge and its structure play a key role in people's cognitive activities. Schema theory gives explanations on how readers combine their background knowledge with the information in a text to comprehend that text. Schema is the knowledge and experience stored in our brain throughout our lives that helps prepare us to understand new material. During reading, readers relate the incoming data to their relevant background knowledge that has already been stored in their mind. Schema activation involves the relationship of how the different knowledge parts stored connect to make meaning of the text. These knowledge parts are called "nodes", "variables", or "slots". This activation of the relevant schema helps the learners in reaching the comprehension they needed to attain.

Schema theory is effective in explaining as to how a learner's schema can guide him/her in making out the meaning of a text with the help of their prior knowledge. "… according to schema theory, a text only provides directions for listeners or readers as to how they should retrieve or construct meaning from their own, previously acquired knowledge" (Carrell and Eisterhold, 1983). Thus, a reader's schema, or

organized knowledge of the world, provides much of the basis for comprehending, learning, and remembering the information that occurs in a text. In schema theoretic terms, a reader comprehends a message when he/she is able to bring to mind a schema that gives a good account of objects and events described in a text.

In schema-theoretic approach, reading comprehension not only includes the retrieving of information from a text but also an interactive process between the reader's background knowledge and the text. Schemata are formed by previously acquired knowledge, and the feelings, personality and culture of the reader. It affects reading comprehension because it acts as building bridges between what is new and what is known**.** The schemata encompassing the past experiences and prior knowledge present in the readers' memory plays a key role in assisting them in making out meaning from a text. When readers' relate new ideas that they confront while reading a text with the ideas and mental constructions that they are already familiar with, they could create a better understanding of the text at hand leading to comprehension.

Schemata are often identified as the 'organized background knowledge' that helps learners to predict aspects in the interpretation of a discourse. The schemata are often noted for its flexibility and creativity. They are flexible in that they undergo a cyclic process within which changes are brought about actively and economically. This helps in evoking information stored in memory when ever needed with the slightest amount of effort. Schemata are creative in that they can be used to represent all types of experiences and knowledge.

The implication of schema theory for understanding reading process is that the more schematic knowledge a reader carries to a reading passage, the better he/she is able to predict and infer about the textual content. Schema theory can help to develop the ESL learners' reading ability, encourage them to use reading strategies and to help them form a good reading habit.

3.2.4.1 Types of Schemata and their Effects on Reading Comprehension

1. **Linguistic Schemata**

   Linguistic schemata indicate the reader's existing language proficiency in vocabulary, grammar and idioms. They play the role of being the base for other schemata. And so it practically impossible for a reader to decode and

comprehend a text without necessary linguistic schemata, as basic language knowledge is a basic prerequisite for the understanding of any text as well as for the functioning of reading strategies and skills. This proves that there exists a positive relationship between language schemata that readers have in their mind and the amount of information they acquire from the text.

2. **Formal Schemata**

   The organizational forms and rhetorical structures of written texts are represented by formal schemata. It includes knowledge of different text types and genres. They are described as abstract, encoded, internalized, coherent patterns of meta-linguistic, discourse and textual organization that guide expectation in our attempt to understand a meaningful piece of language. Experimental results prove the fact that explicit teaching of the text structure can improve students reading comprehension in the ESL/EFL context.

3. **Content Schemata**

   It represents the background knowledge of a reader on the content area of a text. Content schemata comprises of topic familiarity, cultural knowledge and previous experience with the field. It deals with the knowledge related to the content domain of the text and can effectively compensate for the lack of language schemata of the learners by way of predicting. Language not only consists of vocabulary, grammar and sentence structures but also is the carrier of different levels of culture.

3.2.4.2 Schema Theory Based Reading Strategies

Reading strategies play a vital role in schema activation in order to comprehend and interpret the text better. Activities like a combination of previewing, providing key words, scanning, skimming, classifying, asking and answering questions and drawing conclusions contribute to literal comprehension. Activities that help in improving evaluative comprehension include a combination of brainstorming, surveying, reciprocal teaching, evaluation, inferring, re-reading, thinking aloud and discussion**.** In the pre-reading phase, instructors can use pictures, slides, movies, games and other such teaching aids to activate learners' schema. Learners can be asked to write about their knowledge of the subject, and after writing they can be allowed to discuss their knowledge among others in the class. The reading phase allows learners to read about

the subject and thereby build up on their existing schema. During post-reading phase, learners integrate this background knowledge into a new schema structure.

Some of the reading strategies that logically follow schema theory are prediction, pre-reading, visualization, comprehension monitoring, previewing, coding and recall. Schema theory based strategies follow the constructionist view as it exploits the learner's pre-existing knowledge in their interaction with the ESL reading materials. Among these strategies, pre-reading tasks are often used as they render the purpose of activating learners' relevant knowledge, builds up that knowledge and acts as a conceptual guidance in reading the texts.

3.2.4.3 Implications of Schema Theory

Schema theory and its innate intuitive appeal had a great impact on teaching practice. It had far reaching positive effects on reading instruction as it lead to the development of a more learner-centered approach which focused on individual needs and celebrated the diversity of background experiences. Activating the learner's background knowledge can make them understand the reading materials better and gain more information that can be used as background information for future reading activities.

Schema-based pre-reading activities can be used for activating and constructing learners' background knowledge. Pre-reading activities elicit prior knowledge and prepare the reader for linguistic, cultural and conceptual difficulties in a text. It not only compensates for the second language reader's linguistic or socio-cultural inadequacies but also reminds them of what they do, already know and think. Therefore, it activates existing schematic knowledge.

Teachers can help learners in enlarging their vocabulary by imparting learning strategies like associative strategy and context strategy to learn and consolidate new words and language items that can improve language level through an application of the language schema. They can also help the learners in establishing specific content schema through providing background knowledge for learners to predict correctly. Teachers can make use of every available opportunity to introduce and explain the social and cultural backgrounds of different countries to establish learner's content schema. The comprehension of style forms is necessary for the better understanding of

the reading material by the learners. So teachers can help learners in establishing various style form schemas by consciously analyzing the text structure, using Text Structure Analysis and Structured Writing.

Learners familiarity with the topic of the text they are reading (content schemata), their awareness of the discourse level and structural make-up of the genre of the text (formal schema), and the decoding features needed to recognize words and to understand how they fit together in a sentence (language schema) have a great impact on the reading comprehension of the learners both in their first and second language. Applicability of schema theory based instructional strategies in varying learning situations and its ability to explain how different types of knowledge is learned along with its suggestion of strategies appropriate to each type of knowledge makes it an effective theory in developing ESL reading comprehension. Thus schema theory based strategies have a positive effect on the development of the learners' reading ability.

3.2.4.4 Schema Theory and Semantic Mapping

According to schema theorists, the study of abstract concepts should occur only after a prior foundation of concrete, relevant information related to the major concepts to be studied has already been created. For achieving successful comprehension of the material to be read, the learners should bring with them enough background knowledge and experience along with linguistic knowledge. The application of semantic mapping strategy is found useful for the same. In semantic mapping strategy, teachers put to use learners' collective prior knowledge of a particular concept so as to arrange it into related conceptual sub-categories by utilizing the schemata present in their minds. Semantic mapping gives a graphic structure to this schematic knowledge of the learners that is to be used as the basis for organizing new ideas that are to be read. Oxford's (1990) study implies that "semantic mapping in classroom instruction requires a variety of basic memory and comprehension techniques (making associations, grouping, and using visual memory of the semantic map)".

Semantic mapping reading strategy helps teachers in pre-teaching vocabulary by way of presenting words to be taught in semantically and topically related sets. Such an effort can result in improved comprehension as meaning making and evoking of background knowledge occurs simultaneously. The organized arrangement of

vocabulary concepts in semantic mapping reveals what learners already know about the topic and provides them with a base upon which they can add the new information learned from the text. Zimmerman (1997) maintains that direct vocabulary instruction focusing on semantic mapping as an acquisition strategy is more effective than vocabulary acquisition activities that teach only words rather than strategies for acquiring words. Carrel, Pharis, and Liberto (1989) showed that strategy training with semantic mapping has improved reading comprehension scores.

3.2.5 Metacognitive Theories

Research has gone beyond debate on whether reading is a bottom-up or a top-down process on to issues on metacognition. Metacognition refers to the control executed by the readers on their trial to understand a text (Block, 1992). According to Baker and Brown (1984), metacognitive skills are also essential along with cognitive skills for skilled reading. Readers' thinking of what they are doing while reading comes under metacognition. "Metacognitive theories of reading deals with how an individual thinks about his/her reading process before, during and after the actual act of reading" Baker and Brown (1984).

The activities that a reader undertakes along the process of reading are broadly categorized into three stages namely before reading, while reading and after reading. Before reading activities include identifying the purpose of reading as well as identifying the form and type of the text. The reader while reading a text should focus on the general character and features of its form and type which includes factors like locating the topic sentence and following supporting details to arrive at conclusion, highlighting the author's intention behind writing the text, choosing, scanning or reading in detail, and making continuous predictions about what to come next based on already known information. Activities like coming up with a summary, conclusion or inference about what has been read comes after the complete reading of the text.

In short, metacognitive theories of reading regardless of whether they approach reading from traditional, cognitive or both the approaches should focus on making readers capable to classify, sequence, establish part-whole relationships, compare and contrast, find cause-effect, summarize, hypothesize and predict, and to infer and conclude while reading a text. Venting out oral or written reflections after a reading

exercise, note taking on the margins of a page or highlighting passages while reading are all practices that have their roots in metacognitive theory.

3.2.6 Sociocultural Theory

In their efforts to dwell deep into the cognitive and individual processes involved in language learning, cognitive theories often overlooked the social context of learning. Sociocultural theory compensated for the same by focusing on the importance of social factors in the process of language learning. According to Lantolf and Thorne (2006), cognitive development will not occur without social interaction with other more knowledgeable persons. Mediation and scaffolding are essential for successful cognitive development.

The sociocultural view of language gives more importance to the semantic properties of language than its formal properties. For sociocultural theorists a given form does not have one stable meaning but rather multiple personal meanings (senses) that are created through interaction in accordance with the social events in which they occur.

Lantolf and Thorne (2006) argued that "learning an additional language is about enhancing one's repertoire of fragments and patterns that enables participation in a wider array of communicative activities". And sociocultural theory of learning views reading as a social skill which requires an active participation and interaction of the learners involved in it.

3.2.7 Dual Coding Theory

Dual coding theory is a theory on human cognition developed by Allen Paivio of the university of Western Ontario in the 1970s which is considered as "one of the most influential theories of cognition this century" (Marks, 1997). It is also mentioned as a theory of mental imagery, primarily visual imagery. From a historical perspective, dual coding theory is the first systematic attempt to bridge two distinct traditions in philosophy and psychology namely the imagery tradition and the verbal tradition. Dual coding theory gives importance to the power of both imagery and concrete language. 'Coding' here stands as a psychological phrase that talks about the ways in which external stimuli is captured in our brain in internal forms.

Paivio's theory assigns equal importance to verbal as well as non verbal processing. As for Paivio "Human cognition is unique in that it has become specialized for dealing simultaneously with language and with non verbal objects and events. Moreover, the language system is particular in that it deals directly with linguistic input and output (in the form of speech or writing) while at the same time serving a symbolic function with respect to non verbal objects, events and behaviours. Any representational theory must accommodate this dual functionality" (Paivio, 1986: 53).

According to the dual coding theory, humans process information in two different ways; visually and verbally. So, cognition in dual coding theoretic view results from the functioning of two different independent subsystems namely verbal system and non verbal system. The verbal system is specialized in dealing directly with language by encoding and processing verbal stimuli coming from the environment in the form of letters, words or sentences. Nonverbal or imagery system deals with non linguistic objects and events like handling stimuli that comes out of imagery processing. These subsystems work with the help of representational units called 'imagens' for mental images and 'logogens' for verbal entities. These subsystems are activated when one recognizes, manipulate, or just thinks about words or things and could work both in interconnected or independent manner. According to Sternberg (2003), learners could use both visual and verbal codes when they are recalling information. An additive process (abstract language along with concrete language) can lead to better encoding and greater recall.

Paivio and Desrocher's in 1980 propounded a dual coding model for bilingual learners different from the original model. In the new model, a second verbal system was added to represent bilingual capabilities. So, the dual coding model for bilingual learners will have two verbal systems and one imagery system for processing the incoming information. The second verbal system in the new model of dual coding theory provides bilingual learners with an alternative processing route for the incoming information.

Paivio's theory discusses about the three ways in which processing of information happens. The first one is representational, where external input is encoded into meaningful representational units or logogens and imagens for the system to operate fruitfully. In associative relations, text and imagens can influence a mental

trigger. For example, a logogen activates another logogen in the verbal system or an imagen activate another imagen in the imagery system. Referential relationships represent crossover types of processing activity in that the verbal system is activated by the visual communication or vise-versa.

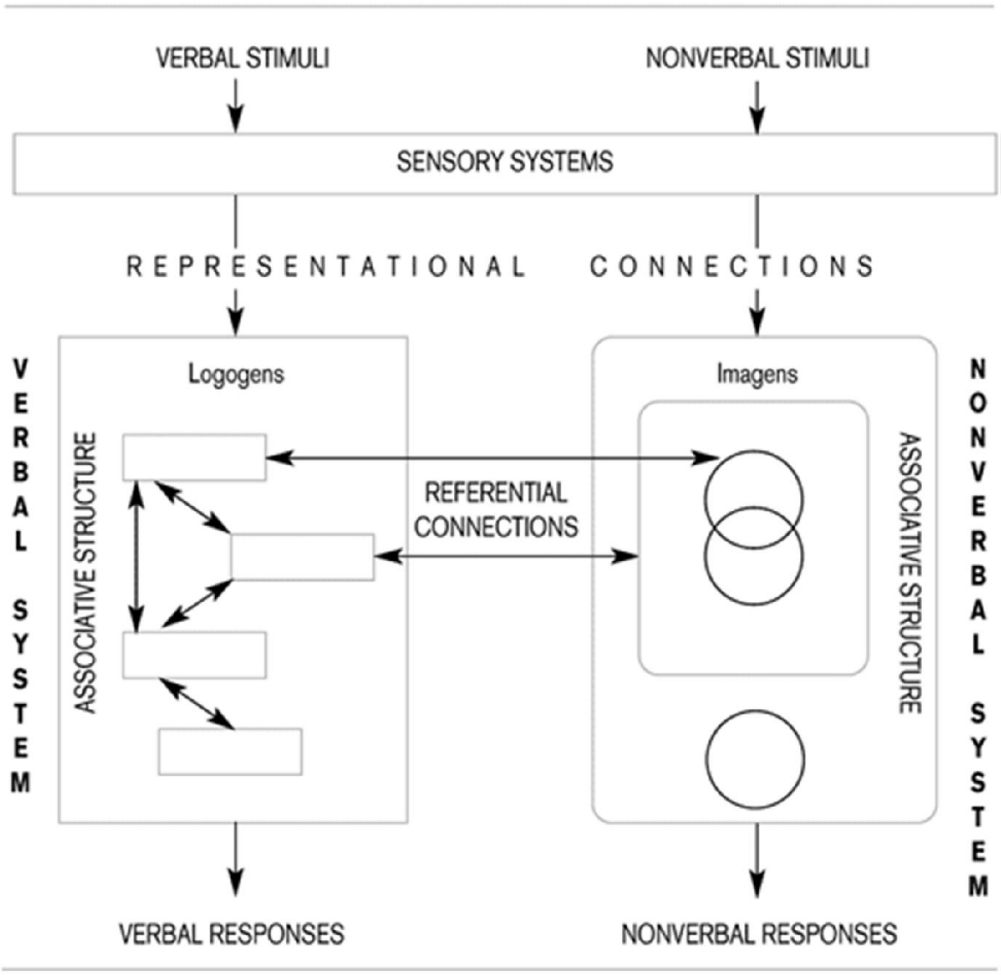

Image 3.5

Given above is an image of a structural model of dual coding theory taken formhttp://worldconferences.net/proceedings/gse2014/toc/papers_gse2014/G%20039%20-%20STEPHEN%20T.F%20POON_Overviewing%20the%20Functioning%20and%20Design%20of%20Educational_read.pdf.

In dual coding theory, there are two different coding systems but they are interconnected and can operate independently, in parallel, or through their interconnections. In some tasks, linguistic or verbal code dominates whereas in some

others, nonverbal code dominates and the diversity and flexibility of cognition is the result of the activity within and between these codes.

Dual coding theory is rooted on the assumption that there exists continuity between perception and memory. External experiences are the byproduct of the stimulation of the senses of the individuals concerned which are in turn encoded in memory traces. These memory traces retain some of their original, concrete qualities as words and things. The reason for considering dual coding theory to be multimodal is that both verbal and non verbal experiences can happen in various sense modalities, including vision, hearing and touch in the case of language, and all five senses in the case of mental images.

3.2.7.1 Implications of Dual Coding Theory

Pictures or concrete language are better understood and recalled by learners than abstract language. Dual coding theory's developmental analysis tries to explain the possible reason for the same. According to this, the nonverbal system is developed at an early stage and it acts as the foundation for the later development of cognitive like language.

Using of advance organizers can improve the comprehension and recall of the texts as the contribution of concreteness-evoked imagery and dual coding add to the meaningfulness, memorability and retrievability of the information presented. Learners should be taught to form images while they are reading because it can contribute to their improvement in vocabulary learning and reading comprehension. When learners combine picture, mental imagery, and verbal elaboration, it promotes their learning and understanding much better, irrespective of whether they belong to grade school or university.

Dual coding theory has its footing on the behavioural and neuropsychological studies. Dual coding theory offers "experimentally backed accounts of all aspects of literacy, that includes decoding, comprehension, and response in reading" (Sadoski & Paivio, 1994, 2001, 2004, 2007) written comprehension (Sadoski & Paivio, 2001) and spelling. Sadoski & Wilson (2006) had successfully applied a large scale instructional programme for improving reading comprehension among learners of urban schools by teaching them to visualize while they are reading a text.

Thompson and Paivio (1994) through their study elaborated on the additive effects that objects, pictures and sounds have on learners' memory. By doing so, they illustrated effectively the assumption of dual coding theory that sensory components of multimodal objects are functionally independent. Purnell and Solomon (1991) had already reported similar results in their study on high school learners' comprehension of technical material where they found the participants' comprehension to be significantly affected by the additive effects of text and illustrations.

3.2.7.2 Schema Theory and Dual Coding Theory

While schema theory focuses on the activation of necessary background knowledge in achieving cognition, dual coding theory is based on the assumption that when verbal and non verbal processors are activated through concrete language, it can effectively build and (build up on)learners' schema and then move from the concrete to the abstract.

3.2.8 Cognitive Load Theory

According to Sweller, an Australian educational psychologist and the formulator of cognitive load theory, it is "a theory that focuses the load on working memory during instruction". It focuses on the notion that "some learning environments impose greater demands than others (and) … impose a high information processing load on limited cognitive sources in working memory" (1998).

For understanding cognitive load theory better, the connection between memory and cognition should be dealt with in detail. Depending upon the duration of memory retention and capacity for recalling after original input is being received; cognitive psychologists have divided memory into two, namely short term memory and long term memory. Short term memory store information while it is being processed whereas long term memory retains it for use in anytime but the immediate future. The information stored in short term memory will pass on to long term memory in due time when strategies like repetition is used by the learner. Gairns and Redman (1986) in their study demonstrated as to how during learning process, new information is first stored in short term memory and then transferred to long term memory (as it can hold any amount of information) for future use. In clinical and research literature, the terms "short term

memory and working memory are often used interchangeably as both the concepts represent the same cognitive process" (Unworth and Engle, 2007).

The basic assumption behind cognitive load theory is that the capacity of the working memory is limited, and the information present in long term memory is stored in the form of schemas. For effective learning to take place, an active processing in working memory and automaticity of schemas in long term memory should take place within the learner.

Best applied in the area of instructional design "Cognitive load theory has been designed to provide guidelines intended to assist in the presentation of information in a manner that encourages learner activities that optimize intellectual performance" (Sweller, 1998). Cognitive load theory makes use of the aspects of information processing theory to underline the inherent limitations of allied working memory load on learning during instruction. It adopt schema as a primary unit of analysis for the design of instructional materials.

Sweller describes different types of memory in his paper "Implications of Cognitive Load Theory for Multimedia Learning" (2005). In his view, long term and working memory are interrelated in such a way that schemas held in long term memory act as a "central executive" affecting the manner in which working memory synthesizes the information. When necessary schemas are absent, it is the instructional guidance that should substitute for learners to develop their own schemas. Sweller with the help of his description of the human cognitive architecture, advocated for the need for applying sound instructional design principles which originates from our knowledge of the brain and memory that has instructional implications on working memory.

Sweller explains three types of cognitive load namely extraneous, intrinsic and germane cognitive load. The total cognitive load is the sum total of these three cognitive loads. When total cognitive load is more than the capacity of the working memory of an individual, it becomes cognitive overload. This cognitive overload interferes with the information in the working memory, which can be lost before being incorporated into the schemas. An active and easy processing of information and an enhanced learning occurs when the cognitive load of an individual is less.

Intrinsic cognitive load is the idea that all instruction has an inherent difficulty associated with it that may not be altered by an instructor as it is thought of as immutable. Nevertheless many schemas may be divided into individual "sub schemas" that could be taught in isolation and can be brought back together later to be described as a combined whole. The "thinking" part of the cognitive load theory is called as the intrinsic load and so the amount of intrinsic load affects the learners learning capacity.

Extraneous cognitive load is the cognitive load that can be manipulated as it is under the control of instructional designers. It is the materials part of the cognitive load generated by the manner in which information is presented to learners (i.e. the design). Germane cognitive load is the third kind of cognitive load that denotes the amount of effort dedicated for building new complex schema. Germane cognitive load is encouraged as it is devoted to the processing, instruction and automation of schemas that helps the learner to move from being a novice to an expert. Even though instructional designers can manipulate both extraneous and germane cognitive load, for better results extraneous cognitive load should be limited and germane cognitive load should be promoted.

3.2.8.1 Implications of Cognitive Load Theory

Learners are endowed with an extremely limited working memory and an essentially unlimited long term memory. Learning is an active process which involves the engagement of working memory in the comprehension instructional materials and encoding of the to-be-learned information into long term memory. Instructional design should be in such a way that it promotes quality instruction that helps the learners in using their limited working memory appropriately.

Instructors should aim hard to lower extraneous cognitive load and to raise the germane cognitive load of their learners. The load on their working memory can be reduced by physically integrating multiple resources of information and by lessening the redundancy and repetitive information. The capacities of working memory can be increased by the simultaneous use of auditory as well as visual information when both sources are essential for understanding.

3.3 Domains of Learning

Domains denote the categories and taxonomy deals with an orderly classification in a field of study. The taxonomy of learning behaviours helps us to know of the various goals of the learning process. Seeing learning purely as a cognitive function is wrong as it takes place differentially pertaining to whether it is on performing a skill or on re-evaluating behaviour. Bloom's taxonomy of learning domains was the outcome of the research of a group of educational psychologists under the leadership of Dr. Benjamin Bloom in 1956 for promoting higher forms of thinking in education. According to them, "there are three domains of educational activities - cognitive, affective and psychomotor." These are again divided into subdivisions starting from the simplest behaviour to the most complex.

Taxonomy of educational objectives of the cognitive domain was the result of the efforts of Bloom, Englehart, Furst, Hill and Krathwohl (1956). Cognitive domain involves the learning and application of knowledge and the development of intellectual skills. The six levels in Bloom's taxonomy of cognitive domain are "knowledge, comprehension, application, analysis, synthesis and evaluation" (Bloom et al., 1956). Learners should master the first level before moving on to the next as it is arranged in the order of their complexity.

Recognition and recall of information occurs at the knowledge level where as the comprehension level demonstrates the learners understanding to mentally organize and arrange a material. At the analysis level, learners think critically and in an in-depth manner engage in cognitive processes like identifying the motives, reasons or causes for a specific happening. Original and creative thinking are the notable features of synthesis level where learners come up with some original communication. Evaluation or the final stage in the cognitive domain requires the learners to judge the merit of an idea, a solution to a problem, or an aesthetic work for which there is no single correct answer.

The affective domain addresses the manner in which learners' deals with things emotionally, such as feelings, values, appreciation, enthusiasm, motivation and attitudes. So if teachers want to change the attitude or behaviour of their learners, they should structure their instruction to be best suited for progressing in various levels of the affective domain. The affective domain stands for the emotional side of the human behavior. It encompasses a variety of personality factors, feelings about us and about

others with whom we come into contact (Brown, 2000). It was Krathwohl (1964) who developed the taxonomy of affective domain. The five major categories in the affective domain are receiving, responding, valuing, organization, and characterization by value or value complex.

Passive attending to a phenomenon or stimuli happens at the receiving level. The responding level deals with the active participation of learners not only in attending to a stimulus but also in reacting to it in some ways. In valuing, the learner attaches a worth to a particular object, phenomenon or behaviour that ranges from acceptance to commitment. An internally consistent value system will be developed by the learner at the organization level by combining different values and by resolving conflicts among them. At the characterisation by value level a prevalent, consistent and predictable value system or behaviour will be developed by the learner.

The psychomotor domain addresses the development of the body and the skills the body performs. Even though several taxonomies on the psychomotor domain exist, Simpson's taxonomy of 1972 that focuses on the progression from perception to organization is discussed here. The taxonomy starts with perception in which sensory cues guide the motor activities. It proceeds on to set the mental, physical and emotional dispositions that make them respond in a certain way to a situation. In guided response, the learner first try out a physical skill, and then carry forward with trial and error as well as practice for attaining better performance. Mechanism concern itself with responses that are habituated with a medium level of assurance and proficiency. It is followed by complex and overt response level and adaptation level that culminates in organization. On reaching the organization level, the learner will be capable of creating new movements or specialized stimulus.

3.4 The Affective Filter Hypothesis

Affective variables include certain emotional states like motivation, self confidence and anxiety that have an effect on the learners' acquisition of a second language, by way of preventing the necessary second language information from reaching those areas of the mind which deals with language processing. The theoretical construct of affective filter has its origin in the idea that these affective variables act as intermediary sources in hindering the learners from acquiring a second language. Affective filter is an invisible psychological filter which helps us in explaining the

importance of emotional variables in the success or failure of an individual in acquiring a second language.

Affective filter hypothesis was proposed for the first time in the1970s by Dulay and Burt and was later developed and perfected by the linguist and educational researcher Krashen, in his theory of second language acquisition which was published in the form of his 1982 work *Principles and Practices in Second Language Acquisition* (Krashen, 1982). According to Krashen's Monitor Model, the five hypotheses that accounts for a learners' acquisition of second language are acquisition-learning hypothesis, natural order hypothesis, monitor hypothesis, input hypothesis and affective filter hypothesis.

The last hypothesis or the affective filter hypothesis deals with the influence of affective (non-linguistic) factors like anxiety, motivation and self confidence on second language acquisition. "The filter hypothesis explains why it is possible for an acquirer to obtain a great deal of comprehensible input and yet stop short of the native speaker level" (Krashen, 1982). It is not learning but acquisition that got affected by the affective filter as the affective filter either facilitates or prevents the comprehensible input from reaching the LAD (Language Acquisition Device).

"A learner who is tense, angry, anxious or bored will screen out input, making it unavailable for acquisition. Thus, depending on the learner's state of mind or disposition, the filter limits what is noticed and what is acquired. The filter will be up or operating when the learner is stressed, self-conscious or unmotivated. It will be down when the learner is relaxed or motivated" (Lightbown and Spada, 1993). It is likely for a learner to succeed in acquiring a language when he/she is provided with comprehensible input or teaching and knowledge and his/her affective filter is low. According to Parrish (2004), the optimal conditions for second language acquisition will be possible when affective filter is low enough to allow the comprehensible input.

In Krashen's view, affective filter serves as a psychological obstacle that impedes the learners from absorbing the available comprehensible input fully. Affective factors here act as filters as they determine the proportion of language learners' input and intake. Language learners with high motivation, self confidence and a low level of anxiety have only low affective filters and are able to take in plenty of input which will equip them for better success in second language acquisition. Low level affective filters

facilitate risk-taking behaviour with respect to the practice and learning of a second language. When the level of learners' affective filter is high, they will experience low self esteem, low motivation, and high anxiety which act as a mental block preventing the successful intake of the comprehensible input. When learners fail to acquire a language, they will become anxious and uncomfortable, which in turn activates the filter. And second language acquisition will turn out to be a harder affair for those learners who need to overcome the barrier of affective filters.

According to Krashen, there would be a dramatic increase in the affective filter of the learners during puberty. He assumes that it is the emotional upheaval and hypersensitivity associated with puberty time that contributes to this affective filter. However, if it was the case then affective filter should slowly disappear as the learner reaches adulthood. But Krashen again disagrees with this.

The key points of Krashen's affective filter hypothesis are the following

1. A raised affective filter can block input from reaching LAD.
2. A lowered affective filter allows the input to "strike deeper" and be acquired.
3. The affective filter is responsible for individual variation in SLA.
4. Note that the affective filter is not an issue for first language acquisition: children don't have it/ use it.
   (Du, 2009)

"Acquirers with optimal attitudes are hypothesized to have "low" affective filters. Classrooms that encourage low filters are those that promote low anxiety among students that keep student "off the defensive" (Stevik, 1976).

3.4.1 Neuroscience and Affective Filter Theory

Studies in cognitive psychology give clinical evidence as to how "stress, boredom, confusion, low motivation and anxiety can individually, and in combination interfere with the learning of individuals" (Christianson, 1992). "Neuroimaging and measurement of brain chemicals (neuro transmitters) show us what happens in the brain during stressful emotional states. By reading glucose or oxygen use and blood flow, position emission tomography (PET) and functional magnetic resonance imagery

(fMRI) indicate activity in identifiable regions of the brain. These scans demonstrate that under stressful conditions information is blocked from entering the brain's areas of higher cognitive memory consolidation and storage. In other words, when stress activates the brain's affective filters, information flow to the higher cognitive networks is limited and the learning process grinds to a halt" (Willis, 2007).

On the contrary, when the learners are engaged and motivated and feel minimal stress, the information flows freely through the affective filter in the amygdale. This in turn helps them in achieving higher level of cognition. It can also aid them in making connection and experience "aha" moments. And "it was for this very reason that neuroimaging and neurochemical research argues for an educational model devoid of stress and anxiety" (Chugani, 1998).

3.4.2 Classroom Implications of Affective Filter Hypothesis

Since learners with "optimal attitudes" are hypothesised to posses' low affective filters, teachers can work to reduce learners' negative emotional states as it will provide them with a higher competence in accessing the available comprehensible input. According to Krashen, "the best methods…are therefore those that supply 'comprehensible input' in low anxiety situations, containing messages that students really want to hear" (1987).

Efforts should be made by the language instructor in minimizing the effects of affective filter as a low affective filter is considered a necessary prerequisite for effective language teaching. According to Parrish (2004), the affective filter of learners can be reduced if teachers provide them with meaningful encouragement, and allow them to make and learn from mistakes, avoid putting them in spotlight, and accept their varied learning styles and needs.

By analyzing the learners' learning motivation and by motivating and helping them in possessing positive attitudes, teachers can boost their learning confidence as well as lower their language anxiety. The chief implication of the affective filter hypothesis is that the selection of the pedagogical goals should not only incorporate ample options for the supply of comprehensible input, but it should also create situations that arouse only a low filter.

3.4.3 Criticism of Affective Filter Hypothesis

Krashen (1982) is of the view that there is a "strengthening of the filter around puberty" (44).If we are to accept this view, it would lead to the inference that it would be a bad idea to start learning a language as a teenager. But contrary evidences cited by MacLaughlin (1987) reject Krashen's perspective by suggesting that early adolescence is the best time to start second language learning.

According to Vannaiarajan (2010), Krashen fails to note that the learner could have had a bad experience learning a new language that might have resulted in their high levels of anxiety, low motivation and negative attitudes rather than the other way round.

3.4.4 Anxiety and Affective Filter Hypothesis

Krashen argued that "the best acquisition will happen in an environment where anxiety is low and defensiveness absent." He states:

> There is also a relationship between anxiety and language acquisition, very simply, the lower the anxiety, the better the language acquisition. Anxiety does not affect every (academic) subject. But for language acquisition, it is a very important factor (2011).

3.5 Reasons for Using Semantic Mapping Strategy to Reduce the Second Language Anxiety and Second Language Reading Anxiety of ESL Learners

According to Ausubel's cognitive psychology, meaningful learning occurs when new concepts and propositions are assimilated into the learner's existing conceptual framework or schemata (Ausubel, 1963). Mayer in 1984 confirmed Ausubel's views in stating that the use of graphic organizers in reading (information processing and storage process) is beneficial as they could effectively display the linkage of the concepts within the text which can be easily connected to the learners existing knowledge base.

Ausubel's concept of "ideational scaffolding" (Ausubel, 1963) can be borrowed for explaining schemata or the cognitive structure, which provides the learner with a cognitive filter that helps him/her to view the world and to infer what is read. The cognitive filter created by the schemata balances the affective filter produced by anxiety in second language learning. Thus, by activating learners' schemata during semantic

mapping strategy successfully counters the affective filter produced as a result of anxiety driven by second language learning and second language reading. The anxiety driven by affective filter is thus compensated by the cognitive filter produced by the activation of the necessary schemata by the introduction of semantic mapping strategy which has its theoretical underpinnings in schema theory, dual coding theory and cognitive load theory.

Semantic mapping strategy can be used for schema activation in the pre-reading phase. During the reading phase it can help learners to build up on their own existing schema and in post- reading phase it can be used to integrate their background knowledge into a new schema structure. Semantic mapping as a pre-reading activity elicits previous knowledge of the readers and prepares them for linguistic, cultural and conceptual difficulties in a text. In the case of second language readers, it compensates for linguistic or socio-cultural inadequacies.

According to Freire (1987) reading involves not only the decoding of written word (language) but also the knowledge of the world that the reader already possesses. So there exists a dynamic connection between words on the page and reality that precedes the same. In order to critically understand a text, the reader should perceive the relationship between text and context. For doing the same, they should carefully avoid mechanically memorizing the descriptions on the page, and should rather look for underlying significances.

Learning to read can be seen as a creative task as it involves creating and assembling a written expression for what can be orally said. In the case of reading, reading the world always precedes reading the word. And this movement persists as reading the word in turn implies continually reading the world. So reading encompasses decodifying the codifications resulting in critical perception of the meaning. Thus reading involves critical perception, interpretation, and rewriting of what is read (Freire, 1987).

In this way, Freire stresses the importance of prior knowledge that the reader brings to the text in making out its meaning. Similarly, semantic mapping strategy relies on the pre-determined knowledge frames or post-determined knowledge frames of the world that the readers inhabit. So semantic mapping can be seen as border crossings

where readers make sense of the world and their self rather than approximate to a non-agentive linguistic code that predominate reading comprehension assessment.

Dual coding theory views human memory to be a conglomeration of two separate subsystems called the verbal system and the non verbal system. This verbal system and the non verbal system are the linguistic and visual codes that function not only independently but also in parallel and in integrated ways. Information is organized and processed sequentially and syntactically by verbal subsystem whereas it is processed in a holistic and synchronic manner by the non verbal subsystem (Sadoski, Paivio & Gortz, 1991). Enhancement in cognitive learning of the learners can be achieved when there is an interaction between these two systems in their processing of the incoming information.

The positive impact of using visual learning techniques trigger a dual coding effect on the learners which helps them to comprehend more information, by way of associating it with other ideas and by incorporating new insights into their already existing knowledge frame work. When a stimulus is coded in two different ways, it increase the chances of retaining that item in the memory in comparison with a stimulus which is coded only in one way. So verbal-nonverbal dual coding can be considered as an important strategy that can promote the memorizing and retrieval of text information at hand (Sadoski et al., 1991; Sadoski & Paivio, 2001). Verbal and non verbal systems can either function independently or interactively through recursive and hierarchical operations. Purnell and Solomon's 1991 study noted that additive effects of text and illustrations enhance the comprehension of technical material by high school learners.

"Dual coding theory provided a theoretical basic for graphic representations in reading and writing. With the use of graphic organizers, learners' are allowed dealing with information in verbal as well as nonverbal formats" (AEL, 2003). As Sadoski & Paivio (2001) explains, the using of verbal and non verbal formats allow the learners' to pay added attention on the information, which will stay longer in their memory and can be recalled easily. Graphic organizers also help the learners in organizing and unifying the ideas that they generate during the comprehension process.

Being a kind of graphic organizer semantic mapping represents the connections between the key ideas or concepts that are present in a text in a visual manner. Being a visual representation of knowledge, semantic mapping helps in forming

interconnections between verbal and non verbal systems. Semantic mapping stimulates a dual coding effect which has an additive effect on the learners' comprehension of reading materials.

Novak in *A Theory of Education* (1977) says "Cognitive learning is accompanied by emotional experience, therefore affective development will be a necessary concomitant of cognitive learning. Emotional experience is most likely to be positive when instruction is planned to maximize cognitive learning, and hence positive affective development is greater when conditions that favour cognitive growth are present" (158). It can be deduced from this that when there is a positive interaction of cognition and affect then there will be an improvement in the learning of learners.

To sum up, in Paivio's (1991) "dual coding theory of information storage, information is processed and stored in memory in two forms: a linguistic form which comprises words and statements and a non linguistic, visual form that encompasses the mental pictures or the physical sensation." How the learners' code knowledge in their brain has great impact on the ways teachers can use to help their learners in acquiring and retaining knowledge. In the usual teaching learning context, verbal processing of knowledge is the main concern and it is up to the learners to come up with their own visual representations. But when semantic mapping strategy is adopted, what the learners do on their own like connecting the ideas concepts and information will be done automatically by the strategy without any added effort by the learners. Thus semantic mapping strategy provides a positive cognitive growth which favours affective growth and this positive interaction of cognition and affect enhances the learners' second language learning.

Second language learning is highly demanding for learners because of the high information processing load imposed by the same on the learners' working memory. Sweller perceived a strong interrelation between long term and working memory of an individual so that the schemas present in long term memory acts as a "central executer" that determines the way in which information is synthesised in the working memory. Semantic mapping facilitate the presentation of information in a manner that stimulate learner activities thereby optimizing their intellectual performance.

Sweller, through his cognitive load theory suggested that in order to attain optimal learning, the learners should minimize the variables that hinder working

memory from getting converted into long-term memory (Sweller, 1988). Since the capacity of the working memory is limited, “cognitive load theory advocates for learning techniques intended in reducing unnecessary cognitive load” (Sweller, 1988). Several studies in the early 1990s proved the effectiveness of the learning techniques in compensating the limitations of working memory (Just & Carpenter, 1992; Sweller & Chandler, 1994). Pedagogical implication of cognitive load theory relies on its emphasis on the presentation and use of instructional designs that enable the learners in minimizing their capacity of working memory so that they could learn more new materials and could also effectively transfer what they have learned into their long term memory.

Graphic organizer is a learning technique that processes the information visually so as to attain an enhanced understanding of the reading material by way of demonstrating the interrelations among main ideas and detailed information. Appropriate use of graphic organizers is helpful in minimizing the learners’ cognitive load and thus maximizing their capacity of working memory thereby resulting in increased learning (AEL, 2003).

The ability to arrive at meaning from the reading process denotes a reduction in the cognitive load of the learners working memory that helps him/her in decoding the words and phrases fluently so as to derive meaning of the unfamiliar vocabulary that they encounter (Daneman and Green 1986; Pressley, 1998).In the pre-reading stage of semantic mapping, teachers guide/assist learners in activating the schemas held in long term memory and this in turn affects the manner in which working memory synthesizes information. Intrinsic cognitive load is reduced by the instructor when he/she categorises the key concepts in a reading text into individual “sub schemas” that could be discussed in isolation. This is then brought back together in the post reading session as the modified version of semantic map in which the sub schemas are represented as a combined whole.

Germane cognitive load is promoted when semantic mapping strategy is used, as semantic mapping is devoted to the processing, (instruction) and automation of schemas that helps the learner to move from being a novice to an expert. With the help of semantic mapping, second language instructors manipulate both extraneous and germane cognitive load as they can reduce extraneous cognitive load and promote

germane cognitive load. Semantic mapping helps the learners in using the limited working memory appropriately and to encode the 'to-be-learned' information into long term memory, as the visual plus verbal format used in the semantic mapping enhances the capacity of the working memory.

Semantic mapping can be linked with Gardner's (1985) theory of Multiple Intelligences. According to Gardner's theory of Multiple Intelligences, learners can better learn and internalize information from a text when that information is provided to them in more than one learning modality. Semantic mapping utilizes this by the employment of more than one modality as an instructional strategy when it integrates text and visual imagery in achieving more whole brain experience.

Being a cognitive strategy, semantic mapping owes its base to Gestalt psychology which perceives the whole to be more than the sum of its component parts. Semantic map is a well-thought out visual that is capable of providing information which is much broader than the sum of the component information spread on the page. Presenting information in the form of a semantic map makes it clearer and more economic than the original text.

Second language reading anxiety could also be the byproduct of an imbalance between active and passive vocabulary. Semantic mapping facilitates the grouping of items in semantic fields such as topics which lead to the better encoding and retrieving of information into and from the long term memory. In this way, vocabulary that is present in a learner's passive vocabulary will be added to their active vocabulary and thereby anxiety arising due to the same will be reduced.

Thus, as result of the positive interaction between cognition and affect, the additive effect of the visual and verbal formats used, and by the reduction of the cognitive load of the learners, semantic mapping strategy compensates for the negative effects of anxiety that the learners suffer while they are learning and reading in a second language.

3.6 Chapter Overview

This chapter provided an overview of the various models and theories on reading so that it could be helpful in understanding the mental processes involved in the act of reading. This served as a base for the integration of these ideas in explaining as to how semantic mapping can be beneficial in improving the reading comprehension of the learners and compensating for the adverse effects of anxiety in second language learning and reading.