CHAPTER II

THEORETICAL OVERVIEW

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CHAPTER II
THEORETICAL OVERVIEW

The present study is an attempt to conduct research in the area of learning disability which keeps on expanding day by day in scope and outcomes. The topic for the study is a specific one, i.e., reading disability or dyslexia, selected from a whole gamut of learning disabilities. To set a congenial background for the study, it becomes mandatory on the part of the researcher to examine and elucidate the concerned theories which are normally found to be highly relevant to this branch of study.

2.1 LEARNING DISABILITY

A child with poor academic achievement could be a source of anxiety for teachers and parents. Hence it is necessary to find out the probable causes thereof. The major reasons of failure in children may be the child himself/herself, his family and school as are listed below:

1) Intelligence deficit: Low intelligence makes it difficult for the child to comprehend complex and abstract concepts and keep them in memory.

2) Neuropsychological deficit: Specific developmental disorders of scholastic skills which are characterized by specific disability in reading, writing or mathematical skills in spite of normal intelligence.

3) Attention deficit: Children with attention deficit hyper activity disorder have relatively poor concentration and restlessness which makes learning difficult.
4) Emotional deficit: Emotional problems due to various factors are prone to pose impediments in the process of learning.

5) Linguistic deficit: Language related disabilities also might cause hindrances and problems for some children.

The above mentioned deficits result in disabilities which are indicative of dysfunction in one or more processes related to perceiving, thinking, remembering or learning. These include language processing, phonological processing, visual spatial processing, processing speed, memory and attention and executive functions.

The term ‘learning disability’ refers to multifunctional deficiency related to various learning habits of individuals. Deficiency in a certain learning area may cause further disadvantage in others. According to the Learning Disabilities Association of Canada, 2002; “Learning Disabilities’ refer to a number of disorders which may affect the acquisition, organization, retention, understanding or use of verbal or nonverbal information. These disorders affect learning in individuals who otherwise demonstrate at least average abilities essential for thinking and/or reasoning. As such, learning disabilities are distinct from global intellectual deficiency.”

Learning anomalies are due to genetic and/or neurobiological factors or injury that alters brain functioning in a manner which hinders one or more processes associated with learning. These disorders are not always due to hearing and/or vision problems, socio-economic factors, cultural or linguistic differences, lack of motivation or ineffective teaching. But these factors may further complicate the issues faced by individuals with learning disabilities. These may co-exist with various
conditions including behavioural and emotional disorders, sensory defects or other clinical conditions.

Individuals with learning difficulties call for early diagnosis and timely assessment. It also requires intervention plans involving home, school, community and workplace settings so as to put the redemption process on wheels. The intervention needs to be in line with each individual's learning disability subtype and at a minimum, include the provision of:

- specific skill instruction;
- accommodations;
- compensatory strategies; and
- self-advocacy skills.

**Range and Classification**

Learning disabilities range in intensity and content. It may interfere with the acquisition and use of one or more of the following:

- Oral language
- Reading
- Written language and
- Mathematics

Learning difficulties may also involve anomalies related to organizational skills, social perception, social interaction and perspective formation.

Learning related disabilities may remain with the individual throughout life. The way in which they are expressed fluctuates over the lifetime, depending on the
interaction between the demands of the environment and the individual's strengths and needs.

2.1.1 Reading Disability or Dyslexia

The term ‘dyslexia’ comes from the Greek dys –which means ‘impaired’ – and lexis –which means ‘word’, and refers to an inability to read and spell that is quite unrelated to low intelligence or lack of educational opportunity. Studies estimate that millions of people worldwide (around one in ten English-speakers) have dyslexia, a learning difficulty that seriously hinders their ability to read, write, and spell, find employment, and fulfil their potential. Those who are lucky are diagnosed sufficiently early in their school lives and receive remedial support.

According to a recent study by Julie Logan (2012), Professor of Entrepreneurship at London’s Cass business school, around 35% of entrepreneurs in the United States, compared to 20% in UK, are dyslexic. In their comprehensive work on the impact of dyslexia in society titled ‘Dyslexia from a cultural perspective’, Asher and Martin Hoyles (2007) enumerate that among the black community in Britain around 40% of the general public and 40% of the prisoners are dyslexic.

Dyslexics usually exhibit difficulty with the alphabet, reading, writing and spelling in spite of normal to above average intelligence, conventional teaching, and adequate socio-cultural opportunity. Dyslexia is found to be both genetic and hereditary. Dyslexia is not caused by poor vision or visual deficit as one would imagine.
Definitions

Dyslexia is defined as ‘a disorder manifested by difficulty in learning to read despite conventional instruction, adequate intelligence, and socio-cultural opportunity’ by the World Federation of Neurology (1968) (cited in Critchley and Critchley, 1978; Riddick, 1996; Fawcett and Nicolson, 1994). In fact, this definition is a widely quoted one.

The International Dyslexia Association (2002) has suggested a more advanced definition:

“Dyslexia is a specific learning disability that is neurological in origin. It is characterized by difficulties with accurate and/or fluent word recognition and by poor spelling and decoding abilities. These difficulties typically result from a deficit in the phonological component of language that is often unexpected in relation to other cognitive abilities and the provision of effective classroom instruction. Secondary consequences may include problems in reading comprehension and reduced reading experience that can impede growth of vocabulary and background knowledge”.

In an attempt to provide a comprehensible and accessible description, the British Dyslexia Association-BDA (2009) has offered the following definition: ‘Dyslexia is a specific learning difficulty which mainly affects the development of literacy and language related skills. It is likely to be present at birth and to be lifelong in its effects. It is characterized by difficulties with phonological processing, rapid naming, working memory, processing speed, and the automatic development of skills that may not match up to an individual’s other cognitive abilities. It tends to be resistant to conventional teaching methods, but its effects can be mitigated by
appropriately specific intervention, including the application of information technology and supportive counseling”. From the above definition, it is clear that BDA identify dyslexia as a collection of reading, spelling, naming, and memory impairments caused by problems with perceiving and manipulating the sounds of language and also associating written letters with their spoken representations.

**History of Dyslexia**

Dyslexia is a global phenomenon which traces back to the origin of learning. There were dyslexic people everywhere in the world especially since the inception of writing and reading. Once identified, the anomaly was brought to special scrutiny and investigation at various levels in the twentieth and twenty first century. The study of dyslexia advanced in the recent period due to the well focused scientific and medical research on specific conditions of this disorder. Neuro-imaging techniques like PET, fMRI and fMRS have been of immense help in processing neural signals and identifying specific patterns in both normal and affected conditions. Experimental approaches on phonemic processing and orthographic patterns have been successful in developing advanced methods of intervention. Alphabetic scripts, cognitive subgroups and innovations in assistive technology to help the concerned are the recent activities in this realm. Increase in case reports, testing procedures and medical technology indicate better rates of success.

Oswald Berkhan, a German physician from Blankenburgam Harz, is credited with the identification of dyslexia in 1881. But the term ‘dyslexia' was later coined in 1887 by Rudolf Berlin, an ophthalmologist from Stuttgart, Germany. In 1896, W. Pringle Morgan, a British physician from Seaford, Sussex, published a description of
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a reading-specific learning disorder titled "Congenital Word Blindness" in the British Medical Journal. 1890s and early 1900s saw a British ophthalmologist James Binshelwood publishing a series of articles in medical journals describing similar cases of congenital word blindness. In his book 'Congenital Word Blindness' (1917) Binshelwood asserted that the primary disability was in visual memory for words and letters and the secondary symptoms included letter reversals and difficulties with spelling and reading comprehension.

In 1925, American physician Samuel T. Orton found a syndrome unrelated to brain damage that made learning to read difficult. He used the term ‘strephosymbolia’ to describe the implications of word blindness. Orton observed that reading deficits in dyslexia did not seem to stem from strictly visual deficits. The failure to establish hemispheric dominance in the brain was cited as the reason by him. Later, he worked with psychologist and educator Anna Gillingham to develop an educational intervention that pioneered the use of simultaneous multisensory instruction.

But Orton’s view was opposed by many like Dearborn, Gates, Bennet and Blau. They believed that a faulty guidance of the seeing mechanism to be the major cause. They sought to discover if a conflict between spontaneous orientation of the scanning action of the eyes from right to left and training focussed at the acquisition of an opposite direction would allow an interpretation of the facts observed in the dyslexic disorder. The phenomenon appeared clearly linked to the dynamics of sight as it does not occur when the space between letters is increased. This experience also explains the ability to mirror-read.
A deficit in phonological processing or difficulty in recognizing that spoken words are formed by discrete phonemes was cited as the major causative factor for dyslexia. Affected individuals have difficulty associating these sounds with the visual letters that make up written words.

The study by Galaburda et al. (1985) reported observed anatomical differences in the language center in a dyslexic brain. The work of Cohen et al. (1989) suggested abnormal cortical development, which was presumed to happen before or during the sixth month of the brain development of the foetus.

Galaburda et al. (1994) reported from post autopsy specimens that abnormal auditory processing in people with dyslexia suggests that accompanying anatomical abnormalities might be present in the auditory system. The study also supported behavioural findings of a left hemisphere-based phonological defect in dyslexic individuals.

Dyslexia research gained momentum in the 1980s and 90s in consonance with the development of neuro imaging technologies. Positron emission tomography (PET) and functional magnetic resonance imaging (fMRI) studies have revealed the neural signature of adult normal reading (Fiez and Petersen, 1998; Turkeltaub et al., 2002) and phonological processing (Gelfand and Bookheimer, 2003; Poldrack et al., 1999). Making use of various experimental approaches and paradigms these studies have located dysfunctional phonological processing in dyslexia to left-hemisphere peri sylvian regions, especially for the alphabetic writing system (Paulesu et al., 2001; Eden and Zeffiro, 1998). It has also been demonstrated that in non alphabetic scripts, where reading places less demands on phonemic processing and the integration of
visual-orthographic information is vital, dyslexia is associated with dysfunction of the left middle frontal gyrus (Siok et al., 2004).

The case study of an English-Japanese bilingual with monolingual dyslexia (Wydell and Butterworth, 1999) suggested that any language where orthography-to-phonology mapping is transparent, or even opaque, or any language whose orthographic unit representing sound is coarse will not produce a high incidence of developmental phonological dyslexia. This clearly indicates that orthography could influence dyslexic symptoms.

A review (Collins and Rourke, 2003) concluded that the current models explaining the reported relation between the brain and dyslexia generally focus on some form of defective or delayed brain maturation. The paper titled "Cognitive subtypes of dyslexia" by Heim et al (2008) described the different sub-groups of dyslexics in comparison with a control group. This is one of the first studies going beyond comparing dyslexics and non-dyslexic and went further to compare the different cognitive sub groups with a non-dyslexic control group.

The paper titled "A structural-functional basis for dyslexia in the cortex of Chinese readers" by Wai Ting Siok et al. (2008) described how dyslexia is language dependent, and especially between alphabetic and non-alphabetic writing systems. The study "Cognitive profiles of Hong Kong Chinese adolescents with dyslexia" by Chung et al. (2010) was another major investigation in this direction.

2.1.2 Types of Dyslexia

A number of different types of dyslexia have been identified. One general distinction is between acquired dyslexia and developmental dyslexia.
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I. Acquired dyslexia

One type of reading disability that is caused by brain injury is acquired dyslexia. The different forms of acquired dyslexia are,

a) Deep dyslexia

b) Surface dyslexia, and

c) Phonological dyslexia.

The patient suffering from deep dyslexia experiences great difficulty reading simple words such as the, and, so, and abstract words, such as calm. They may be able to read nouns, though they will often be read incorrectly. For example, the word sofa might be read as ‘soft’, dream as ‘sleep’. Nonsense words such as grik will not be read at all.

Another type of reading disability is named surface dyslexia wherein the patients are able to read real words such as box and fat and nonsense words such as kort and rebmish but not irregular words such as knight. Regularly spelt words are pronounced according to the most common letter-sound patterns of the language, so hot is pronounced to rhyme with the similarly spelt word pot. Irregular words do not conform to common letter-sound patterns, so pint is not pronounced to rhyme with the similarly spelt words mint, glint and stint.

Phonological dyslexia results when able to read regular and irregular real words with an inability to read nonsense words. The term ‘phonological’ refers to the speech sounds within language. A patient with phonological dyslexia is unable to convert the written letters of nonsense words (e.g. dfughtym) into the sounds that they represent, so these words are not read.
When the term dyslexia is used on its own, it invariably refers to *developmental* dyslexia.

II. Developmental dyslexia

Developmental dyslexia is impairment in the *development* of skilled reading and spelling. Although there is no single, universally accepted, definition of developmental dyslexia, the many definitions that have been proposed generally describe its symptoms and hint at its possible cause; some also suggest ways in which its symptoms might be managed.

As the number and extent of signs and symptoms is so variable, it is often helpful to have a shorthand way of classifying individuals with common dyslexic difficulties as given below.

i) **Phonological developmental dyslexia** is characterized by a difficulty in converting written letters into their corresponding sounds. Individuals have difficulty reading unfamiliar real words and nonsense, made-up, words (e.g. *glomp*).

ii) **Surface developmental dyslexia** is characterized by difficulty in recognizing words visually, as whole units. Individuals have difficulty reading irregular words (e.g. *aisle* or *chord*).

iii) **Mixed developmental dyslexia** is another one. This kind of difficulty may exist where individuals have difficulty both recognizing words as whole units and converting individual written letters within words into their corresponding sounds. Individuals have difficulty reading unfamiliar words, nonsense words, and irregular words. It is widely acknowledged that
problems associated with processing sounds is a consistent feature of developmental dyslexia. However, the purely visual difficulties of surface dyslexia are rarely seen in the absence of sound processing difficulties. The majority of dyslexic readers, therefore, can be classified as displaying a mix of difficulties.

It should be noted that the characteristics of dyslexia can vary greatly from one individual to another and all individuals will not have all these difficulties. It is also worthwhile to mention here that all individuals who have difficulties with these skills may not be always dyslexic.

Sub types of Developmental Dyslexia

The concept of sub typing within developmental dyslexia originally stemmed from literature of people such as Boder (1968, 1971). Boder identified three subtypes of developmental dyslexia, according to the child’s word reading and spelling abilities:

1) **Dysphonetic dyslexia**, characterized by a primary deficit in grapheme-phoneme integration, resulting in the child being unable to sound out words.

2) **Dyseidetic dyslexia**, characterized by a primary deficit in the ability to perceive letters or words as whole-word units, resulting in a reliance on sounding each word out.

3) **Mixed dysphonetic-dyseidetic dyslexia**, characterized by primary deficits in both phonetic word-analysis skills and whole-word reading. Inspired by Coltheart’s dual-route model of reading (1978, 1985), researchers in the field of cognitive neuropsychology went on to seek support for the model from cases of
developmental dyslexia, where one reading route had developed at a markedly delayed rate, impairing the child’s phonological or whole-word reading ability.

The initial case study of developmental dyslexia that drew similarities with acquired phonological dyslexia was the one given by Temple and Marshall (1983). They assessed HM, a 17-year-old girl whose spelling and reading abilities were significantly impaired. When reading non words, HM showed greater impairment than when reading regular words and irregular words and were completely unable to read any long nonsense words or long unusual regular words correctly. Following analysis of HM’s data, Temple and Marshall concluded that all of the features of her reading abilities were consistent with the features characteristic of acquired phonological dyslexia. The conclusion was that HM could be confidently regarded as a developmental phonological dyslexic.

2.1.3 Signs and Symptoms of Dyslexia

Dyslexia is marked by multi-dimensional characteristics and symptoms. The specific signs and symptoms are variable and depend on the person’s age, gender, family background, educational experience, level of intelligence, etc. Whether the dyslexic has other developmental problems is also of crucial importance. The presence of a large number of symptoms should persuade individuals, parents, teachers, and psychologists to be on the lookout for dyslexia. It goes without saying that all dyslexic readers are unlikely to display all the symptoms enlisted and where symptoms are seen, they may not be displayed to the same degree. Some of the symptoms cited, of course, may also be seen in people who are not dyslexic. Despite this variability, one might expect to see cluster of particular signs and symptoms of
dyslexia at specific stages of development. Some of the more typical ones are enumerated below:

**Early signs of dyslexia in pre-school children**

- Delayed speech development
- Consistent difficulties with the pronunciation of multi-syllabic words
- Difficulty in learning nursery rhymes
- Difficulty in learning spoken word sequences
- Difficulty in playing simple sound games
- Difficulty in acquiring new vocabulary
- Showing no particular interest in written letters and words
- Difficulty in clapping out a fairly simple rhythm
- Difficulties in getting dressed
- Difficulty in following simple spoken directions
- Problems related to catching, kicking or throwing a ball.

**Signs of dyslexia in primary school children (Five To Eleven Years)**

- Attempts to avoid reading aloud
- Hesitant and laboured reading
- Difficulty in pronouncing unknown words
- Frequent loss of place in the text page while reading
- Same words read correctly and incorrectly in the same piece of writing
- Frequent omission and/or repetition of words while reading
- Inaccuracy in reading similar looking words
- Poor reading comprehension
• A clear difference between written and spoken language ability
• Messy handwriting
• Effortful-looking handwriting
• Frequent misspellings, even of high-frequency words
• Bizarre spelling which results from confusion between letters
• Same words spelt differently in the same piece of writing
• Continued difficulty with pronouncing multi-syllabic words
• Taking much longer than expected time to complete written work
• Memory limitations
• Short attention span
• Generally poor sense of direction
• Overall clumsiness
• Behavioural problems in the classroom
• Very low level of confidence.

(British Dyslexia Association, 2005).

2.2 THEORIES OF DYSLEXIA

The exact causes of dyslexia which result in the display of some of the characteristics shown above are still not completely clear. However, from the available research literature, some major deficit theories and certain hypotheses provide evidence to the causes of the identified characteristics of dyslexia. These deficit theories and hypotheses are
(i) The phonological theory (Frith, 1997; Padget, 1998; Shaywitz et al., 1999; Ramus et al. 2003; Lyon et al., 2003; Blomert et al., 2004;), this is by far the most researched and developed theory over the past decade.

(ii) The cerebellar theory (Ramus et al., 2003).

(iii) The magno cellular (auditory and visual) theory (Stein, 2001, Heiervang et al., 2002; Ramus et al., 2003; Blomert et al., 2004; Pammer & Vidyasagar, 2005).

(iv) Perceptual visual-noise exclusion hypothesis (Sperling, Anne J.; Zhong-Lin Lu; Franklin R. Manis, Mark S. Seidenberg, 2006).


From a decade of literature, there are different versions of each theory, which have been developed over time. As far as the researcher is aware, the current, most prominent version of each theory is described here.

(i) **The Phonological Theory**

This theory revolves around the phonological dimensions of language. The theory is based on speech sounds and postulates that dyslexics have difficulties in representing, storing and/or retrieving sounds. According to this theory the difficulty in reading for the dyslexics is the result of inability to learn to read an alphabetic system which requires learning the grapheme-phoneme relationship. In simple terms, there is an obvious impairment in the ability to relate written letters to their speech sounds. This theory also implies a direct link between a cognitive deficit and difficulty in reading.
The theory is adequately endorsed by specific traits associated with the dyslexics. Major support comes from evidence that dyslexic individuals perform particularly poorly on tasks which call for phonological awareness. However, despite all the evidence supporting the phonological theory, an outright confirmation still remains a far cry. One could see the current status of the theory when Frith (1997) sums up “the precise nature of the phonological deficit remains tantalizingly elusive.”

(ii) The Cerebellar Theory

This theory illustrates that the dyslexics’ cerebellum is mildly dysfunctional and that a number of cognitive difficulties will appear, including balance, motor skill, phonological skill and rapid processing (Fawcett, 2001; Ramus et al., 2003;). As a number of these skills are not language based, the phonological theory was not adequate enough to explain all the problems associated with dyslexia.

It is evident that the problems in motor skill and automatisation point to the cerebellum. But this was dismissed in dyslexia because there were no known connections between language and cerebellum. There is also evidence that the cerebellum is involved in both language and cognitive skill, including involvement in reading (Fulbright et al., 1999). Support for this theory has also been derived from the evidence of poor performance of dyslexics in a variety of motor, time estimation and balance tasks (Fawcett & Nicolson, 1999, Fawcett et al., 1996). Brain imaging studies have also given metabolic, anatomical, and activation differences in the cerebellum of dyslexics (Ramus et al., 2003, Brown et al., 2001).
(iii) The Magnocellular (Auditory and Visual) Theory

Visual and auditory disorders used to be considered separately, but now there is an agreement that they come under the general area of a magnocellular dysfunction (Tallal et al., 1998, Ramus et al., 2003). This theory explains that the deficit lies in the perception of short or rapidly varying sounds or difficulty processing the letters and words on a page of textual matter. This theory emphasizes the visual and auditory contribution to the reading problem without excluding a phonological deficit.

To put it succinctly, the phonological theory explains many of the problems which dyslexic individuals show in linking sounds with symbols while reading. The cerebellar theory suggests that there is a difficulty experienced by dyslexics in central processing related to learning. The magnocellular theory of dyslexia proposes that the problems a dyslexic individual may exhibit are a result of visual and auditory deficits.

Each theory also has shortcomings associated with it. The phonological theory does not explain the occurrence of sensory or motor disorders that are present in a significant proportion of dyslexics, while the magnocellular theory is inadequate in explaining the absence of sensory and motor disorders in a significant proportion of individuals with dyslexia. Both types of problems are presented by the cerebellar theory. Even though these theories are dealt with separately, there is an obvious synergy between these theories and it is possible that all three theories are true for different individuals.

(iv) Perceptual visual-noise exclusion hypothesis

Research supports the concept of perceptual noise exclusion hypothesis. Evidence shows that subjects with dyslexia experience difficulty in performing visual
tasks such as motion detection in the presence of perceptual distractions. They do not show the same impairment when the distracting factors are removed. It was asserted that dyslexic symptoms arise because of an impaired ability to distinguish the important sensory data from the irrelevant.

(V) **Rapid auditory processing theory**

The rapid auditory processing theory is another version of the phonological deficit theory. It specifies that the primary deficit lies in the perception of short or rapidly varying sounds. This theory is supported by the fact that people with dyslexia show poor performance on a number of auditory tasks.

Lyon et al. (2003) proclaims that dyslexia is of neurobiological origin supported by data from functional brain imaging investigations. The studies suggest that there are observable differences in how the dyslexic brain functions when compared to the brain of a good reader. Using fMRI, Shaywitz found that reading shows a consistent pattern of strong activation in the back of the brain with weaker activation in the front of the brain during reading. At the same time the brain activation pattern in dyslexics is the opposite during reading tasks-the frontal part of the brain becomes overactive with weaker activation in the back.

The studies carried out since the turn of the century gave rise to another theory of dyslexia which is not based on a deficit theory. This is known as the transactional theory of dyslexia. The transactional view draws on works based on cognition (Anderson, 2003), socio-cultural (Gee, 2001) and learning theories with more focus on the instructional aspect (Clay, 2001). It postulates that reading ability is not a property of the reader but depends on the complex social contexts and events in which
it takes place. The transactional view on reading difficulties proposes that understanding the natural variability of readers is more important and productive than diagnostic categories (McEneaney et al., 2006).

Anatomical and brain imagery studies have shown that dyslexia is a neurological disorder with a possible genetic origin, as it occurs most often in families (Lyon et al., 2003, Ramus et al., 2003). Some researchers have identified a gene responsible for dyslexia, and this gene makes dyslexia an inheritable condition (Grigorenko et al., 1997, Cardon et al., 1994). Current research has found no evidence of an association between the identified gene and dyslexia (Field & Kaplan, 1998). So the genetic origin of dyslexia is still a debatable subject and continues to be the focus of modern day research. However there is agreement that problems with phonology are associated with dyslexia but it is getting evident that phonology is not the only problem.

2.3 PHONEMIC AWARENESS

Phonemic awareness is the conscious awareness and knowledge that words are composed of individual sounds or phonemes and the ability to manipulate sounds in words (Smith, Simmons, & Kame'enui, 1995). Hoover (2002) explains phonemic awareness as a cognitive skill which involves three aspects – knowledge about the phonemes, explicit and conscious awareness about the linguistic units and the ability to manipulate phonemes. Phonemes are the most basic units of speech “that speakers and listeners unconsciously combine and contrast to produce and perceive words in spoken language” (McGhee, 1996, p. 633). The phonemic awareness involves the ability to manipulate, blend and segment sounds in spoken words. Children who have
control over the smallest units of speech are considered phonemically aware (Yopp, 1992). Research has affirmed the importance of phonemic awareness and its relation to reading acquisition. Reviews of the literature (Hurford, Darrow, Edwards, Howerton, Mote, Schauf, & Coffey, 1993; Mann, 1993; National Reading Panel, 2000, Hoover, 2002) indicated that the presence of phonemic awareness is a characteristic of good readers while its absence is a consistent trait of poor readers.

Phonemic awareness entails distinctive levels ranging from primitive to more advanced ones which reflect a growing understanding about the sound structure of language (Adams, 1990; Blevins, 1997; Hempenstall, 2003). Adams (1990) identified five levels of phonemic awareness: 1) the ability to hear rhymes and alliterations; 2) the ability to do oddity tasks; 3) the ability to blend separate sounds into words and split syllables orally; 4) the ability to segment words orally into the component phonemes and 5) the ability to manipulate phonemes by deleting or substituting the initial consonants of words. Blevins (1997) summarizes the five levels of phonemic awareness as; 1) rhyme and alliterations; 2) oddity tasks; 3) oral blending; 4) oral segmentations; 5) phonemic manipulation.

Researchers consider phonemic awareness as a strong sign of success in attainment of early literacy skills (Adams, 1990; Stanovich, 1994). In addition phonemic awareness also serves as an indicator of reading disability (Yopp, 1992). Lack of phonemic awareness is evidently a chief barrier in the process of learning to read (Juel, 1988; Wagner & Torgeson, 1987). In an alphabetic language like English, sounds are encoded at the level of phonemes (Yopp, 1992) and by the letters of the
Phonemic awareness helps children understand and use the alphabetic principle to read and write (NRP, 2000, Griffith & Olson, 1992).

Mastering the alphabetic principle requires an understanding that spoken words can be divided into their constituent sounds. Children who know that phonemes are isolate individual sounds in words, associate them with the letters of the alphabet whereas those without phonemic awareness may only memorize isolated letter-sound relationships by rote (Griffith & Olson, 1992).

Phonemic awareness has been an extensively researched area because of its direct relation with the ability to read unfamiliar words independently and with ease (Vellutino & Scanlon, 1987; Stanovich, 1985; Cornwall, 1992; Lenchner, Rack et al., 1992; Snowling, 1991; Torgesen et al., 1997; Wagner, 1988; National Reading Panel, 2000). The ability to hear and consciously use sounds in language can be manifested in many processes fundamental to reading. A number of reviews specifically concluded that converging evidence is strong enough to establish a causal relationship between phonemic awareness and reading acquisition (Wagner & Torgesen, 1987; Mann & Brady, 1988; Wagner, 1988; National Reading Panel, 2000).

The practical significance of the reciprocal relation between reading and phonemic awareness development has been advocated extensively by several authors (Stanovich, 1985; Adams, 1990; Vellutino & Scanlon, 1987; Wagner & Torgesen, 1987). The research literature includes consistent recommendations for early identification of students at-risk for reading failure and early explicit instruction in phonemic awareness prior to and along with beginning reading instruction (O'Connor et al., 1993, Ball & Blachman, 1991; Cunningham, 1990;).
2.3.1 Phonemic Awareness and Phonics

Phonemic awareness is quite often confused with phonics. Phonemic awareness focuses on perception and manipulation of individual sounds that make up spoken words. Phonics heightens the relationships between the letters in written language and the sounds in spoken language. To perform phonic skills requires the understanding of alphabetic principle of the language. Phonemic awareness helps children understand the principles underlying the alphabetic code (Griffith & Olson, 1992). Without phonemic awareness phonics does not make sense to children and they learn spelling by rote (Poindexter & Oliver, 1998). Children who lack phonemic awareness are unlikely to benefit fully from phonics instruction. Hence phonemic awareness is considered a prerequisite to phonics.

Phonemic awareness is an aural/oral skill (Hempenstall, 2003). The beginning levels of phonemic awareness do not necessarily involve letters. So, the instruction of phonemic awareness can be accomplished either with or without any letters.

2.3.2 Phonemic Awareness Instruction

Most experts advocate phonemic awareness activities that are child appropriate for the development of the same in children at an early stage. (International Reading Association & the National Association for the Education of Young Children, 1998). Adams and Bruck (1995) proposed that songs, chants, and word-sound games are suitable for developing young children’s sensitivity to the sound structure of language. Beck and Juel (1995) postulated that time spent on word play, nursery rhymes and general exposure to storybooks contributes to the development of phonemic awareness. Mattingly (1984) advocated that teachers
should provide their students with linguistic stimulation in the form of stories, word games, rhymes and riddles in order to facilitate phonemic awareness. Yopp (1992) advocated that phonemic awareness instruction for young children should be interactive and social, playful and engaging. It should arouse curiosity and experimentation with language. Phonemic awareness instruction should be imparted deliberately and purposefully. Adams and Bruck (1995) emphasized that game based language activities will be most effective in developing phonemic awareness if they are used purposefully. Hence intentional, suitable phonemic awareness instruction should be provided in classrooms at the early stages of English language education.

Phonemic awareness instruction must be viewed as only one part of a much broader literacy program. It is important only in the context of comprehensive reading instruction. Indeed, Griffith and Olson (1992) argued that phonemic awareness activities will not be useful unless they can be placed in a context of real reading and writing. Furthermore, teachers must recognize that sensitivity to the sounds of language helps in literacy development. Teachers should consider various dimensions of phonemic awareness instruction when planning and designing learning activities. These include the unit of sound to be emphasized, the type of operation to be performed on those units, and whether the activities are to be strictly oral or include concrete cues such as chips and letters. While almost all children seem to develop the ability to produce speech with little or no direct instruction (Sensenbaugh, 1996), some children may find it difficult to gain control over phonemes. (Griffith & Olson, 1992; Yopp, 1992). Studies have shown that children who receive explicit instruction
on phonemic awareness improve significantly in their word recognition and spelling abilities (Ball and Blachman, 1991; Lundberg, Peterson and Frost, 1988).

Phonemic awareness is a subcategory of a broader notion called phonological awareness, which is the ability to comprehend and manipulate spoken language in different levels, such as words, rhymes, syllables, onsets and rimes. Onset and rime, a stage prior to phoneme in the phonological processing, is considered effective in promoting phonemic awareness (Osborne & Chard, 1999).

### 2.3.3 The importance of Onset and Rime

Spoken words can be phonologically subdivided into different levels. They are syllables, onsets and rimes within the syllables, and individual phonemes. A syllable has two parts: ‘onset’, which consists of the initial consonant or consonant cluster, and ‘rime’ which is made up of the vowel and any final consonants as /at/ in the word *fat* (Snow, Burns & Griffin, 1998).

Onset and rime are considered the natural units of a syllable (Goswami, 2000; Treiman, 1985). The vowel which is central to a syllable is called a nucleus. The optional consonant or consonant cluster that comes before the nucleus is termed as the onset, and the consonant cluster that comes after the nucleus is the coda. The nucleus and the coda together form a rime. Onsets and rimes are regarded as the most effective focus of phonological activities for beginning reading and spelling (Bowey & Francis, cited in Hempenstall, 2003). Children appear to be better able to discern onset-rime structure than the phonemic structure of the syllable in learning to read (Goswami, 2000; Treiman, 1985; Chard & Osborne, 1999). Before they learn how to read, children are well aware of larger units, viz. onsets and rimes, but that may not be
the case with phonemic awareness (Bradley & Bryant, 1985). Skills in blending and segmenting onsets and rimes may serve as a stepping-stone to reading. Research has suggested teaching phonemic awareness by breaking down words on the basis of onsets and rimes. Then move on to phonemic blending and segmentation have to be introduced only after children master the skills of onset and rime (Blevins, 2006; Gunning, 1995).

A body of research also reveals that onset and rime may be a valuable emphasis to teach children with reading disabilities. Rimes have more predictable and regular pronunciations over individual letters (Adams, 1990; Gunning, 1995). Knowing that ring and sing rhyme, children are likely to read bring and swing by analogy (Hempenstall, 2003). Since children with reading disabilities are inclined to have phonological deficiencies, this strategy has made some researchers to propose that focusing on onsets and rimes may be an easy access to other phonological skills and subsequent reading skills (Bowey, Cain, & Ryan, 1992; Hulme & Snowling, 1992). In learning to read, children are likely to become more sensitive to the onset-rime structure than to the full phonemic structure of the syllable. Onset and rime is therefore held as the most effective focus for promoting the development of awareness at the more difficult phoneme level of phonological awareness.

**Importance of Nursery Rhymes**

Nursery rhymes are songs and poems recited to children from generation to generation (Danielson, 2000). They introduce young children to the ways in which English language works. Nursery rhymes act as good boosters in the development of language skills. Nursery rhymes are a socially engaging, activity oriented and
developmentally appropriate way for young children to hear and experiment with the sounds of language.

Integrating nursery rhymes with traditional literature in the early childhood curriculum contributes to a linguistically rich environment wherein young children are exposed to the rich vocabulary, syntax and de contextualized language contained within the English language. Combining language with tactile-kinesthetic activities within the context of nursery rhymes and literature enhances phonological awareness, sensitivity to rhyme and phonemes, and may augment phonemic skill development. This skill development contributes to the ability to read and has positive effects on reading and spelling. As children develop sensitivity to single phonemes and awareness of sound patterns of language leading them to recognize new words in contexts, their reading ability improves (Bradley & Bryant, 1985). This in turn improves their writing and spelling (Strickland & Schickedanz, 2004).

2.4 VOCABULARY INSTRUCTION

Students’ word knowledge or vocabulary is often linked to academic success. Vocabulary is one of the five core components of reading instruction that are essential for children to learn to read. These core components include phonemic awareness, vocabulary, fluency, phonics and comprehension (National Reading Panel, 2000). Knowledge of vocabulary is important because it encompasses all the words we must know to communicate effectively and to learn about new concepts. “Vocabulary is the glue that holds stories, ideas and content together… making comprehension accessible for children.” (Rupley, Logan & Nichols, 1998/99).
Students with large vocabularies can comprehend new ideas and concepts quickly and easily than students with limited vocabularies. The correlation in the research literature of word knowledge with reading comprehension shows that if students do not adequately expand their vocabulary knowledge, reading comprehension will be affected (Jacobs & Chall, 2003). There is an urgent need for more vocabulary instruction at all grade levels. On an average, students should add 2,000 to 3,000 new vocabulary items a year to their reading vocabularies (Beck, McKeown & Kucan, 2002).

2.4.1 Vocabulary Knowledge and Reading Comprehension

What is reading comprehension? Reading comprehension is far more than recognizing words and their meanings. It is common knowledge that if a student does not know the meanings of a sufficient proportion of words in the text, comprehension becomes impossible. Vocabulary experts agree that adequate reading comprehension depends on a person knowing between 90 and 95 percent of the words in a text (Hirsch, 2003). Knowing at least 90 percent of the words enables the reader to get the main idea from the reading and guess the meanings of unfamiliar words correctly which will enable them to learn new words. Readers who do not recognize majority of words will have difficulty comprehending the text and they will miss out on the opportunity to learn new words.

Good and poor readers

Initial word learning happens when children listen to people around. The source for learning new words changes to written context from reading materials. As written text does not offer features of oral language such as intonation and body
language, it is difficult to learn new words from reading (Beck, McKeown & Kucan, 2002). Students differ widely in their vocabulary knowledge when they reach school. Their socioeconomic backgrounds and the language use in their homes and communities can significantly influence opportunities to expand their vocabularies. Some students possess only limited vocabulary knowledge as a result of a language-based learning disability.

The issue of vocabulary instruction is of importance right from the moulding years in the kindergarten. Needless to say that good oral vocabulary is the cornerstone of later success in reading. Students who have more vocabulary knowledge in kindergarten become better readers. (National Institute for Literacy, 2001). The gap in the vocabulary knowledge that some students bring to the primary grades widens as students progress through the grades. Students with inadequate vocabulary have difficulty getting meaning from what they read, so they read less as reading becomes difficult for them. It is a cumulative process and as a result, they learn fewer words because they are not reading widely enough to encounter and learn new words. At the same time, students with large vocabularies read more, which definitely improves their reading skill, and they learn more words – this may be called the vicious circle of reading disability.

Weak decoding skills also contribute to the gap between how much good and poor readers will read and encounter new vocabulary. Over the years, poor readers fall further behind. Stanovich (1986) termed this situation the “Matthew Effect”. Unfortunately, research has shown that this gap continues to grow wider as students
reach third grade. Jeanne Chall (1983) coined the term “fourth-grade slump” to describe the drop-off between third and fourth grade in literacy development.

**Vocabulary development**

Lack of fluency tends to result ultimately in children reading less and avoiding more difficult materials (Chall & Jacobs, 2003). This has a major effect on their ability to acquire new vocabulary. Research shows that the differences in children’s word knowledge are due largely to differences in the amount of text to which they are exposed (Stahl, 1999) and that students need to read gradually more difficult materials to develop vocabulary. Children with reading difficulties read less and as such their vocabulary knowledge suffers. Without reading more they cannot learn the vocabulary they need to be able to read further.

**2.4.2 Effective Vocabulary Instruction**

In its analysis of the research on vocabulary instruction, the National Reading Panel (2000) found that there is no one best method for vocabulary instruction and that vocabulary should be taught both directly and indirectly. Direct instruction means pre-teaching vocabulary prior to reading a selection. Research has shown that students can be taught explicitly some 400 words per year in school (Beck, McKeown &n Kucan, 2002).

Students can’t be taught all of the words they need to learn. That necessitates vocabulary instruction must include indirect instruction such as giving students exposure to lots of new words and having them read a lot. Indirect instruction should help students develop an appreciation for words and experience, satisfaction and enjoyment in their use. (Kame’enui & Ash, Baumann, 2003).
Vocabulary also can be learned incidentally in the context of storybook reading or in listening to others. Learning words before reading a text is helpful. Techniques such as restructuring of tasks and repeated exposures seem to enhance vocabulary development. Substituting easy words with more difficult words can assist low-achieving students.

Vocabulary instruction is a multi-dimensional endeavour. Experts recommend a multi-component approach to developing vocabulary knowledge. Graves (2000) has advocated a four-part program that includes wide reading, teaching individual words, teaching word learning strategies, and fostering word consciousness. Stahl’s model (1999) views vocabulary instruction as a process that involves the use of different approaches:

1. Include both definitional and contextual information about words and their meanings for instruction.
2. Involve children actively in word learning process.
3. Provide multiple exposures and meaningful information about the word.

The TRA (Teacher Reading Academy, 2002) professional development materials were developed by the University of Texas Center for Reading and Language Arts in Austin. The TRA materials identify the following research-based components for effective vocabulary instruction:

1. Encourage extensive reading
2. Expose students to good quality language
3. Promote word consciousness
4. Teach word meanings directly
5. Teach independent word-learning strategies

**Indirect Vocabulary Instruction**

Reading augments the word power of a person. A student who reads voraciously will develop an adequate knowledge of vocabulary. Students learn new words by encountering them through their own reading and also by being read to. Increasing the opportunities for encountering words in text improves students’ knowledge of vocabulary which in turn improves their ability to read more complex text. Hence a student must be motivated to read more in order to expand their vocabulary knowledge.

**Importance of multiple exposure**

Linguistic interaction at multiple levels helps in enhancing word-power. The growth of word knowledge is slow and incremental, requiring multiple exposures to words (Hirsch, 2003; Stahl, 2004). This does not mean simply repeating the word and a definition or synonym, but seeing the word in different contexts. When we encounter a word repeatedly, more and more information accumulates about that word until we have a vague notion of what it means.

It is helpful for students to understand how they gradually learn words. Teachers should encourage students to actively construct links between new information and previously known information about a word. Being active and cognizant of this process will result in better memory about new words. Dale and O’Rourke (1986) proposed a model of four levels of word knowledge. This model should be shared with students so they can be more meta cognitive and meta linguistic when learning new words:
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1. I never saw it before
2. I’ve heard of it
3. I recognize it in context
4. I know it

When a student really knows a word, he knows more than the word’s definition. He also knows how that word functions in different contexts. Knowledge of a word includes knowing how it sounds, how it is written, how it is used as a part of speech, and its multiple meanings (Juel & Deffes, 2004).

Stahl (2003) makes the distinction between *definitional knowledge* and *contextual knowledge*. In order to fully learn a word and its connotations, a student needs multiple exposures to the word in different reading contexts.

**Importance of background knowledge**

Background knowledge is a student’s knowledge and experience of the world. Research has indicated that readers’ existing knowledge is critical for them to comprehend what they read (Anderson & Pearson, 1984). Mere vocabulary knowledge is not enough to understand most texts. To make constructive use of vocabulary the student also needs some knowledge about the topic. This enables him to make sense of the word combinations and choose among multiple possible word meanings (Hirsch, 2003).

Interest in topic enhances command over the vocabulary concerned. People who know a great deal about a topic also know its vocabulary. “Word meanings are not just unrelated bits of information, but are part of larger knowledge structures.” (Stahl, 1999).
Direct Vocabulary Instruction

Creating word consciousness is a direct technique to assist vocabulary building. Word consciousness means awareness about words. It involves an understanding of word structure, including awareness about word parts and word order. Students are required to draw their attention to the distinctive structures of written language such as compound and complex sentence structures, phrasing within sentences, how punctuation is used to indicate phrasing, and paragraph structure. Word conscious students enjoy learning new words and engaging in word play (Texas Reading Initiative, 2002). One way to promote word consciousness is to point out examples of descriptions, interesting metaphors, similes and other forms of figurative language.

Students may be advised to select examples of use of words when they read and save them in a book or share them with others. Teachers should take advantage of opportunities to develop student interest in words. Students are seen to benefit from hearing language that incorporates the vocabulary and syntax in high-quality written English. Written English used by literates incorporate words and grammatical structures in different ways and reading good literature aloud exposes students to many genres of written English (Texas Reading Initiative, 2002).

It is not easy to teach all the new words students must learn each year, but it is useful to provide direct instruction for some words. This includes pre-teaching key vocabulary prior to reading a selection. It is estimated that students can be taught explicitly some 400 words per year in school (Beck, McKewon & Kucan, 2002).
Selection of Vocabulary Items

Vocabulary instruction calls for prior selection and gradation of word items in view of the requirements. Before instruction, the text should be previewed, even when using text that has pre-selected vocabulary words. In consideration of the students’ prior knowledge, the difficulty to understand is to be ascertained first. Words that are important to understanding the text and the words that may challenge the students may be specifically earmarked. The words students already know based on their prefixes, suffixes and base or roots may also be identified. If structural elements help students determine words’ meanings, it is ideal to teach them indirectly.

Structural Analysis of words

If students confront unknown words they can use knowledge of word parts viz. root words, suffixes and prefixes to reach the meaning. This is especially true when reading content text books because these texts often contain many words that are derived from the same word parts. For example, the Greek root “bio” appears repeatedly in a typical middle school life science textbook (e.g., biology, biodegradable, biochemical, biologist, biosphere). Analysis of the structure of a word draws the student’s attention to the individual units of meaning in the word, known as morphemes. A free morpheme, or root word, can stand alone, while a bound morpheme needs to be attached to another morpheme and two free morphemes can combine to form a compound word (Blachowicz & Fisher, 2004).

Analyzing the meaningful parts of a word may help determine its overall meaning. Some students may not realize that they can use their knowledge about how to divide words into parts to figure out word meanings. It is important to note that
struggling readers and students with learning disabilities in particular may be lacking in word analysis skills or the ability to readily learn and apply these skills. This often is part of the reason why they have difficulty in reading.

**Teaching contextual meanings**

It is common knowledge that good readers often use context clues to determine the meanings of unfamiliar words. They can locate other words and phrases in a passage that give clues about what an unknown word means. Struggling readers who do not do this should be given direct instruction in how to effectively look for clues or definitions. “Click and Clunk” strategy (Vaughn et al, 2001) teaches students to follow three steps when they come across a word they do not know: (‘Clunk’ is the term used to refer to the word that they do not know)

1. Reread the sentence with the clunk. Look for key words.
2. Reread the sentence without the clunk. What word makes sense?
3. Reread the sentence before and after the clunk. Look for clues.

The clues may be any of the following types of information embedded in the text: definition, restatement, example, comparison or contrast, description, synonym or antonym. Expository, non-fiction text tends to offer more context clues than narrative story text. One suggestion to help students become more aware of using context is to provide them with the terms “rich context” and “lean context”. It is important to point out that not all contexts are helpful. Contexts vary in their helpfulness of how much information they provide a reader. Sometimes the context provides a direct explanation of the meaning of a new word and sometimes it provides
only some information about a new word, but not enough for the student to be
definite about its meaning:

**Using dictionary**

There is a great deal of research showing that children cannot use conventional
definitions to learn words (Scott & Nagy, 1997). That does not imply that students
should not use dictionaries. Ideally, their use should be limited and students must be
taught how to use a dictionary properly and choose the right definition. Students need
explicit instruction on how to use what they find in a dictionary entry, in order to
transfer that information into something useful. Students may be confused by different
meanings for the same word or the wording in a dictionary entry may be too difficult
to read or understand. The following suggestions were adapted from the Texas Center
for Reading and Language Arts (2002):

To choose the right definition, the student must:

- Use background knowledge about the content in the text
- Have a sense of the grammatical use in the text
- Read and understand each definition

It is better for students to reword the definition in their own words, to identify
synonyms and antonyms for the word, to use the word in their own meaningful
sentence, and to recognize that the word may be used differently in other contexts.

Struggling readers and students with learning disabilities in particular have difficulty
using a dictionary. The process is slow and laboured, often making the time it takes to
look up a word frustrating and not worth the effort. These students tend to have a poor
sense of the order of the letters in the alphabet, and they have significant difficulty
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“skimming” down a list of words that are visually similar. Once they locate the word, they tend to be overloaded with the amount of information and reading level of the words in the entry. For non-readers, the task is impossible. The key thing to remember about using a dictionary is that research supports combining both the definitions of new words with the context in which the words are used (Texas Center for Reading and Language Arts, 2002).

Vocabulary instruction is a crucial component of reading instruction. The goal of vocabulary instruction is to help students learn the meanings of many words so as to help them communicate effectively and achieve academically. Effective vocabulary instruction requires educators to intentionally provide many rich, robust opportunities for students to learn words, related concepts and their meanings. Students need strong instructional opportunities to build their personal warehouse of words, to develop deep levels of word knowledge and acquire a toolbox of strategies that aid their independent word acquisition.

The available theoretical literature regarding learning disability, dyslexia, phonemic awareness and vocabulary instruction were thoroughly analyzed to get focused on the study. The researcher could get new vistas open on various concepts related to the study by reviewing the theoretical framework. It also paved the way for an insightful delineation and exquisite presentation of the thesis in all its details.