A TOOL FOR SCREENING CHILDREN WITH WRITING DIFFICULTIES (ToSC-WD)

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(REGISTER NO. MSHM 0107)

A
Dissertation submitted in
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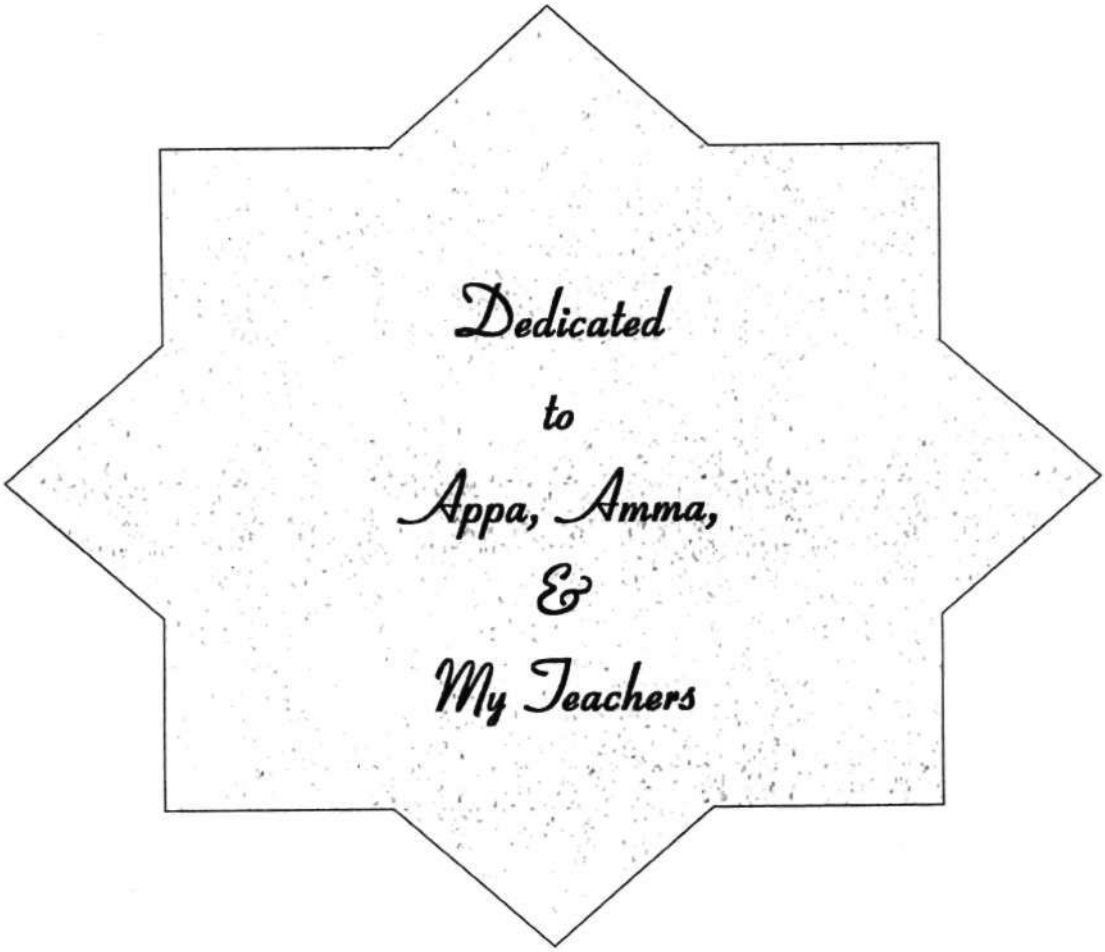
Dedicated
to
Appa, Amma,
&
My Teachers

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Mysore
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C E R T I F I C A T E

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D E C L A R A T I O N

I hereby, declare that this dissertation entitled "A T O O L F O R S C R E E N I N G C H I L D R E N W I T H W R I T I N G D I F F I C U L T I E S (ToSC-WD)" is the result of my own study under the guidance of Dr. K. S. Prema, Lecturer in Language Pathology, Department of Speech and Language Sciences, All India Institute of Speech and Hearing, Mysore and has not been submitted earlier or in any other University for the award of any Diploma or Degree.

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INTRODUCTION

More than by any other attributes, physical or psychological, man is characterized by his use of language. Yet, he is not born with verbal facility, but enters the world with a potential for its acquisition. Just like the spoken communication, reading and writing are forms of communication, which a child acquires through different stages of development. Amongst the three, writing is considered to be a highly complex form of communication. It requires various underlying processing abilities including language capacities, cognitive and psychological abilities (e.g. selective attention, perception, categorization, memory, problem solving) (Litowitz, 1981).

Children progress through various stages when learning to write. Writing development begins with children's drawing and scribbling as they struggle to create forms that resemble letters. Although at this stage the child may pretend to write, she usually does not know letter names nor does she know that print represents spoken words (Sulzby, 1981). In the next stage the child learns to write her name and "well learned words". These familiar words help the child understand that different letters represent different sounds. With the emergence of the following stage, i.e., 'inventive spelling', the child tries to impose regularity on her writing system by matching sounds and letters (Read, 1981). The sound the child hears is matched to the letter, and her writing reflects this match. Initially the child represents the entire word with the first letters and pays little attention to the other letters of the word. For example, DRLM or DBC might represent Daddy. This is similar to the initial stage of reading, in which the child pays attention to only the first letters.

Next the child will represent syllables often without vowels. For example, 'girl', might be written as GRL or boy or BY. In the final stage of inventive

spelling called 'phonemic spelling', the child is aware of the alphabet and the correspondence of graphemes to phonemes. The formal instruction of school brings mastery of the conventional spelling system. Writing, however, involves much more than spelling. The 6 year-old pays little attention to format, spacing, spelling and punctuation, when producing a written piece of work. In addition, better-developed aspects of a child's writing will often deteriorate when new ones are introduced. For example, spelling and sentence structure deteriorate when a child changes from print to script. Writing on a difficult topic can also result in spelling, handwriting, and sentence structure deterioration.

By the middle-school years, the length and diversity of children's written productions increase. With the demands for lengthier writing that middle school imposes increasing cognitive demands for cohesion and organization of ideas. In early writings, the child uses drawings to highlight important parts and to help organize the text. In later writing, the child must recall the order and sequence of events to formulate a cohesive text.

A shift in the child's writing from an egocentric focus to a concern for reader reaction occurs in the third or fourth grade. Writers at this stage can revise and proof read their work (Barlett, 1982; Graver, 1987) because of their knowledge of syntactic rules. The third and fourth school years bring a decrease in the use of incomplete writing sentences, an increase in the use of complex clauses and phrases, and a variety of sentence types (deVilliers and deVilliers, 1978). By the end of elementary school, the complexity of children's written language surpasses that of their spoken language (Gundloch, 1981).

Once the children have gained a working knowledge of spoken language, most of them adopt to the new mode of written language (reading and writing) with relative ease. The underlying linguistic relationships between spoken and

written language make success in this mode possible (Luria, 1973). In addition to the child's linguistic knowledge, there are other non-linguistic factors like grapho-motor skill, appropriate pen or pencil grip, appropriate finger co-ordination, etc., which are equally essential for a successful writing task (Johnson and Myklebust, 1967)

In the normal child these processes develop in an orderly pattern. By the time a child is approximately 6 years of age, he is ready to write when he has developed the skills for visual and auditory discrimination required for reading and visuo-motor integration for forming a stage where he learns to organize words into simple sentences. However, problems in the above skills are often precursors to difficulties with the writing process (Litowitz, 1981) or in other words may lead to varied forms of disorders of written expression (Spagna, Dennis, Cantwell and Baker, 2000)

Hence, disorders of written expression may be defined as a significant impairment in written communication that fall substantially below those expected, given the individual age, measured intelligence, age appropriate education that significantly interferes with academic achievement (Spagna, Dennis, Cantwell and Baker, 2000).

Although, disorders of written expressions have been discussed for more than hundred years (eg. Ogle, 1867), it has been only in the last two decades that the complex set of writing skills has begun to be examined in more detail, particularly, with respect to neuro-cognitive underpinnings that influence the writing process. Levine et.al. (1993) suggested the importance of a variety of cognitive functions in the writing process. These functions include working memory, attention, higher order cognition, language and visual spatial functions. However no data were available to determine when and to what degree these

functions influenced the writing process. It was also difficult to determine and distinguish the underlying factors that could affect the writing skill of an individual.

These factors are well distinguished as linguistic and non-linguistic factors in acquired forms of dysgraphia especially in the adults. But there is little evidence to explain this distinguishing feature in children. However there is literature available in general describing the clinical features in children with disorders of written expression. Abbott and Berninger (1993) noted that oral language and verbal reasoning including such functions as sentence memory, word finding, psychological processing and reading-contributed to composition fluency. Berninger and Rutberg (1992) also described the importance of a finger succession task- an index of early fine motor planning and control to the identification of emerging writing problems in early grade children.

There have been numerous attempts made to develop accurate and comprehensive means of assessing written language skills in children. Education researchers have designed majority of these for use by teachers in the classroom.

NEED FOR THE STUDY

Reviewing the available literature, it has been found that there are two major categories of problems associated with writing disorders:

1) Those due to deficits in underlying cognitive and linguistic processes required for writing and

2) Those due to the nature of the complex components inherent in writing activities especially the non-linguistic factors including the motor skills, motivation, interest and their interaction with underlying abilities.

Written language facility involves a number of component skills, including handwriting, spelling, punctuation, capitalization, vocabulary, syntax, formulation and organization of ideas. Typically students with learning disabilities have difficulty in more than one aspect of written language. Therefore it is important to understand the development of these component skills and their relationship to proficiency in written language.

The review of literature suggests that the causes of disorders of written expression are varied, yet the broader manifestation is almost uniform. But the subtle differences in the clinical features, when tapped may guide us in the differential diagnosis of the disorders of written expression. These clinical features could probably be identified by professionals like the school teachers who directly deal with children with varied academic difficulties, writing difficulty being one among them. Hence, there is a need to develop a tool to identify such difficulties that can be used even in the classroom to assess and identify such children, make an appropriate referral and plan for an appropriate remediation programme. Speech language clinicians, Special educators and teachers need to divert their attention also to written language

OBJECTIVES OF THE STUDY

1) The aim of the present study is to develop a tool for identification of children with writing difficulties within the framework of linguistic and non-linguistic factors that are reported to be crucial for all phases of education.

2) To derive a normative data for linguistic and non-linguistic skills of wnting.

3) To differentiate children with disorders of written expression who have underlying linguistic deficits from those with isolated disorders of written expression due to other causes.

4) Also, to see if it can be used by other professionals like Special educators and teachers as a tool for identifying children with writing difficulties in the school and thus make an appropriate referral for further detailed assessment and remediation.

REVIEW OF LITERATURE

Human beings enter the world with a potential for acquisition of verbal language. He is not born with verbal facility but is confronted with the unique task of learning the language of his culture. He does so, and why man alone achieves linguistic behaviour is a question still under research. Psychologists, educators and linguists, among others, often emphasize the ways in which language; thought and social behaviour are related. Vygotsky (1962) and Brown (1952) stress the interrelations among the language systems- spoken, read and written.

Verbal language is of two types- spoken and written. There is agreement that man acquired ability to use the spoken form of language before he learned to read and write (Diringer, 1962). However, the origin of written language is less controversial than that of the spoken. Also, the period of its origin is less obscured because ability to write is much more recent. Determination of the point of origin, however, assumes definition of what is meant by writing. Gelb (1963) concludes that "writing is clearly a system of human inter communication by means of conventional visible marks"

The study of written expression has lagged well behind the investigation of other academic domains (e.g. reading) particularly with respect to the investigation of its development, behavioral expression, and neuro-cognitive underpinnings. Although disorder of written expression have been discussed for more than hundred years (Ogle, 1861) and models have been evolving since the 1960s (Myklebust, 1965 Luria, 1970; Hayes and Flower 1980; Ellis, 1983; Roeltgen, 1985; Swanson, 1994; Abbott and Berninger, 1998; Berninger and Hayes, 1996; Berninger, Abbott, Graham and Richards, 2002), it has been only in the last two decades that the complex set of writing skills has begun to be examined in more

detail particularly with respect to the specific neuro-cognitive underpinnings that influence the writing process. Accordingly many models have been proposed to explain the complex mechanisms of written language.

A. Models for written language expression

Writing competence is based on the successful orchestration of many abilities, including those needed for lower level transcription skills as well as those essential for higher level composing abilities. Among those who model writing process, there seems to be unanimous agreement that it is a complex process compared to speaking as it requires a high level of abstraction, elaboration, conscious reflection and self regulation (Bereiter and Scardanalia, 1987; Gombert, 1992; Graham and Harris, 1994).

Elhis and Margolin (1984) proposed the information-processing model wherein the writing process is divided into the pre-graphemic and post-graphemic components, impairment of which accord approximately with linguistic and non-linguistic forms of agraphia. The pre-graphemic stage is responsible for generating an abstract representation of the word, called the abstract spelling code, since information about its physical characteristics and ultimate concrete realization is not yet specified.

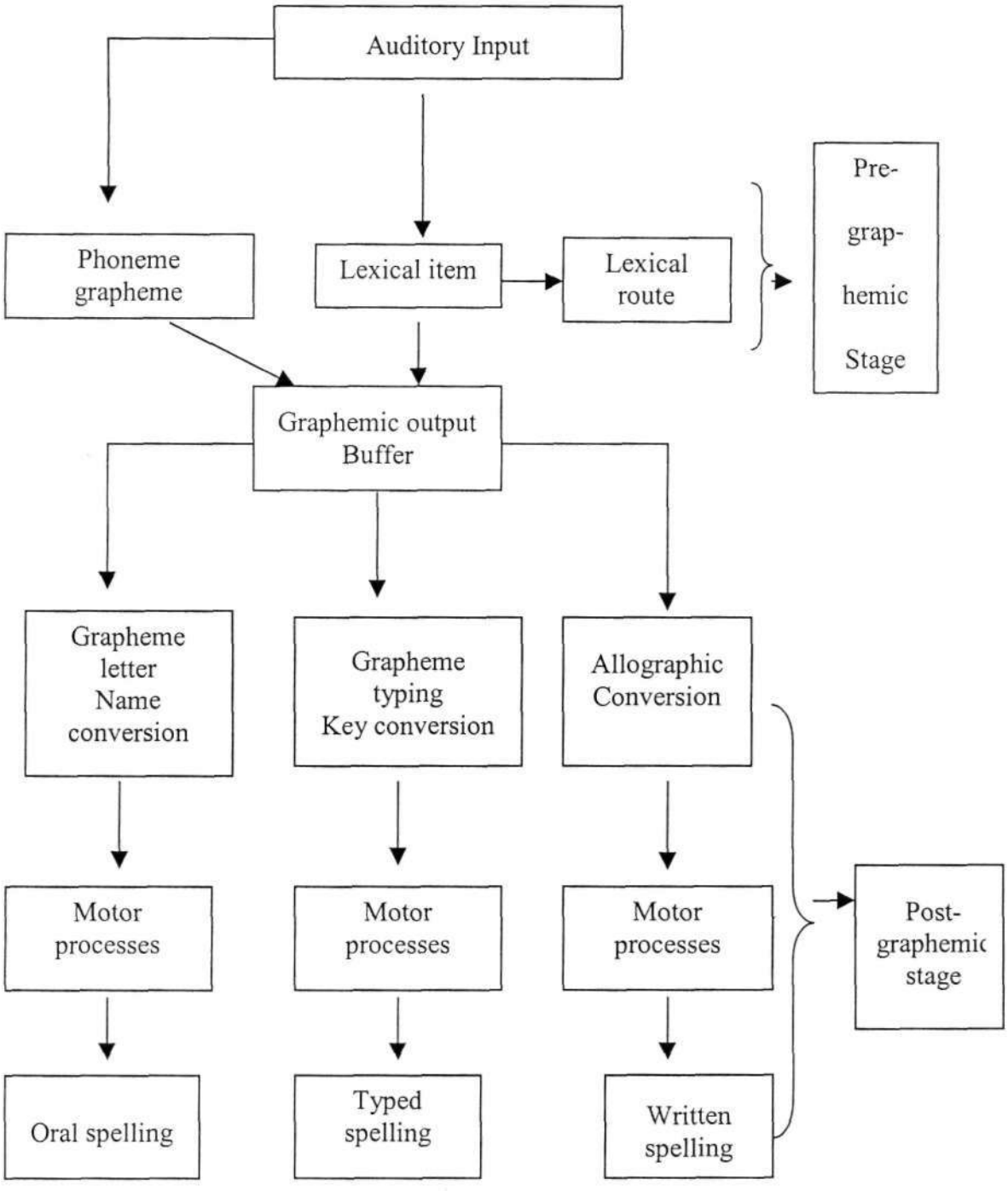

Figure 1: - Schematic representation of spelling systems

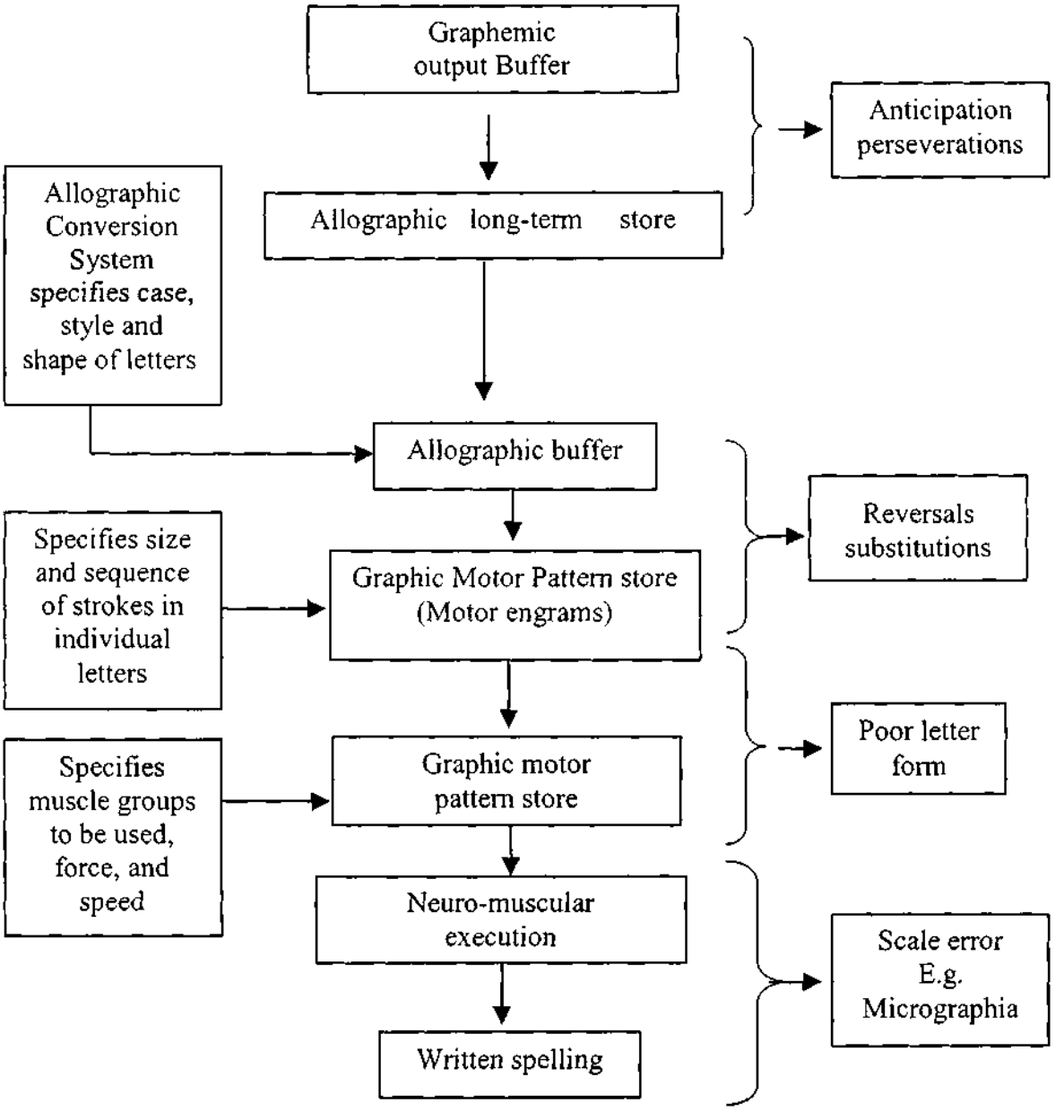

Figure 2: - Schematic representation of the post -graphemic written spelling route

The post-graphemic stage converts the abstract code into the motoric output, either through oral, typed or written spelling. This model includes a buffer for retaining graphemic information as guides to output process. The so-called "graphemic buffer" holds the ordered sequence of abstract letter, identifies necessary information for guiding the serial output of letters (whether oral, written or typed) on all kinds of spelling tasks. Since the buffer receives information from the lexicon which stores the spelling of words and from a non-lexical mechanism for spelling, which maps phonological units smaller than the word onto graphemes. It is used when both words and non-words are spelled. Distinctive patterns of breakdown arise from impairment to this functional writing system and a rich typology of agraphic disorders has been proposed by Hatfield and Patterrson (1984), Margolin (1984), Margolin and Wing (1983).

Frith (1980) argues children's spelling normally involves three stages-first a correct analysis of speech sounds into phonemes and secondly, the conversion of phonemes into graphemes and thirdly, the selection of conventionally correct graphemes out of all the phonetically plausible ones. The different types of models of written language expression has in general stimulated research on acquisition of written language expression skills.

B. Acquisition of written language skills

In recent years, more attention has been devoted to the writing process, as school systems across the country are required to demonstrate increasing accountability for student success in all core academic domains. It is known that the abilities to read and write follow developmentally the abilities to listen and speak. Myklebust (1965, 1978) described the hierarchical process of language acquisition as developing through auditory receptive, auditory expressive,

visual receptive and visual expressive forms. Various investigators suggest certain developmental prerequisites essential for normal acquisition of written language in a child. Myklebust (1968, 1973) described pre-requisites for the development of written language in children. These include,

a) The auditory process

b) The visual process

c) Motor process

d) The inner language processes

a) Auditory Processes

According to Gates (1974) the child first learns one language, i.e., speaking by listening (auditory), and then a second language, the visual, i.e., writing. Disturbance or deprivation of auditory sensation results in a variety of behavioural modifications, including a profound alteration of learning itself (Myklebust and Neyhus, 1970); Hughes, 1971) and hence the written language too. Different auditory processes required for an appropriate development of written language are further described in the following sections.

i) Auditory Memory

Psychologically, auditory memory often has been viewed as ability to reproduce sequences, one of the most common being digit span (Binet and Simon, 1916; Gates, 1947). Other facets of auditory memory are word and sentence span. Spencer (1958) in a study of auditory perception found that up to adulthood the average length of sentence repeated is greater than the number of words written per

sentence. This relation discloses the greater maturity required for written language (Myklebust, 1965). Moreover, by adulthood the number of words recallable by sentence in the spoken form is equivalent to the average number of words written per sentence.

ii) Syllable sequence and Recall of Non-sense syllables

This is said to provide evidence of auditory maturation and psychoneurological intensity i.e., ability to repeat words is appraised by having the child repeat words of different lengths syllabically (Myklebust, Bannochie and Killen, 1971). Recall of nonsense syllables also has proved useful in evaluating auditory perceptual and memory capacities. In a study of written language, developmentally and diagnostically, it is included as an indication of the level of auditory function attained. Ability to repeat nonsense syllables is related to the auditory processes necessary for acquisition of written language.

iii) Syllable Blending

Studies on disorders of written language suggest that a child who cannot retain syllables sequentially and blend them into words cannot use the written word normally, even though he has average ability to read. Children are unable to learn to read unless they can reauditorize and revisualize letters simultaneously. However, these functions seem unrelated to ability to synthesize expressively. Spencer (1958) suggests that unless the child synthesizes at least three syllables to form a word, he lacks the necessary prerequisite for writing (spelling) words.

iv) Auditory Discrimination

Ability to distinguish among sounds is a basic aspect of all auditory behaviour. Templin (1957) reports that ability to discriminate speech sound increases with age, but the rate of growth decelerates after 5 years of age. According to McGrady (1964), if auditory discrimination is grossly deficient in the early life of a child, all language behaviour including the written language is affected. Thus, discrimination is considered to be one of the most basic and consequential of all auditory processes.

v) Oral commissions: Following Directions for oral commands

Baker and Leland (1959) found that by the age of 4 years an average child is capable of following directions such as 'put the book on the table, then get your pencil, and bring your chair over here'. In terms of auditory cognition, this is a complex process, necessitating a long period of maturation. Many children having disorder in written language are found to show deficits in this ability.

b) Visual Processes

i) Visual Discrimination

Writing is not possible until letters can be distinguished one from the other (Gibson, 1969). Children may substitute letters, that appear alike which are probably the most difficult to discriminate. Hence, visual discrimination of letters is considered a very essential prerequisite for acquiring writing skills.

n) Visual Recognition

Recognition and discrimination are not identical processes. For example they can discriminate between 'M' and 'W' but do not recognize them as letters. As a process, visual recognition assumes integration and memory.

iii) Visual Memory

Visual memory comprises of three different aspects: recording visual information, storing the visual information and retrieving the information. Only when all these processes function normally, a child can produce the written word correctly. Minimal integrity of these three aspects of visual memory is essential before written language may be mastered.

iv) Visual imagery

Visual imagery, as a cognitive function, usually refers to ability to recall all parts of an actual experience, picturing it in the mind. This process has been referred to as 'revisualization' (Johnson and Myklebust, 1967). Until such revisualization is possible, at a rudimentary level, the child is unable to use the written word.

c) Motor Processes

Motor ability and facility with writing is related, is apparent from various studies, but the specific relations and the developmental factors of primary consequence have not been well established. However, adequate fine motor control is found to be an important factor for legible writing (Harris, 1963).

Gesell and Amatruda (1947) and Doll (1953) reported that acquisition of the needed motor ability follows a sequential pattern. Their findings revealed age of acquisition of different writing skills, which are displayed, in the following table,

Age of acquisition	Acquisition of motor skills for writing
12 months	Grasps a crayon
18 months	Grasps crayon with a palmar grip
2 years	Uses the thumbs more effectively
4 years	Holds the pencil like an adult
5 to 6 years	Continues to improve in both grasp and co-ordination and at about 6 years copies capital letters
7years	Writes, but the writing is large, awkward, uneven, and irregular in size and position.
9 years	Penmanship becomes smaller and more uniform.
10 years	Begins to write occasional short stories and writing by this time becomes a fundamental means of communication

They also reported that facility with the written output continues to mature for 7 years more.

d) Inner Language Processes

One of the most critical and least understood prerequisite for use of written language, as well as for use of the spoken and read forms, is the manner in which words become associated with meaning, this has been referred to as the 'inner language process' (Myklebust, 1954). Many children with dyslexia write meaningfully and successfully monitor the process, but cannot read what they have written. Another such disability condition with deficits in inner language

process is 'word- writing' wherein the words are written but have no meaning to the writer.

e) **Neuropsychological processes**

The influence of neuropsychological factors (eg., memory, attention) is here well documented in the writing process. The characteristics describing expert versus poor writer suggest strong influence of selected neuropsychological functions in the development and quality of written expression. Levine et al., (1993) suggested the importance of a variety of neuropsychological functions in the writing process. These functions included memory, attention, grapho-motor output, sequential processing, higher order cognition, language and visual-spatial functions. However, there was no data available to explain when and to what degree these functions influenced the writing process.

Abbott and Berninger (1997) provided one of the first empirical studies examining these questions. They noted that oral language and verbal reasoning including such functions as sentence memory, word finding, phonological processing and reading contributed to composition fluency in writing. Berninger and Rutberg (1992) also described the importance of a finger succession task - an index of early fine-motor planning and control to the identification of emergent writing problems in early elementary grades children.

One neuropsychological function that investigators have begun to address with respect to written expression is working memory (Beminger, 1919; Lea and Levy 1999). Working memory is important for written expression because it is the function that underlies the maintenance of multiple ideas, the retrieval of grammatical rules from long-term memory and the self monitoring that is required during the act of writing (Kellogg, 1996, 1999, McCutchen, 1995,

1996; Swanson and Berninger, 1994). Working memory contributes to the management of these simultaneous process and a breakdown of working memory may well lead to problems with written output (Fayol, 1999, Lea and Levy, 1999; Levy and Mark, 1999). McCutchen (1996) has noted that poor writers typically have reduced working memory capacity when compared to expert writers.

Apart from the intactness of the above processes the development of abilities for writing relies on the initial intactness of the oral language capacity. If there are significant verbal language problems, then all capacities above this level will be affected. Therefore, those aspects of functioning that affect the verbal language system will also affect writing performance because of the complexity of writing, underlying processing capacities of attention and memory as well as higher levels of cognitive functioning are essential for accomplishing a writing task.

Children need to develop metacognitive skills so that they are capable of monitoring their own production, evaluating what they are writing in terms of the purpose, taking perspective into account, and using an expanded knowledge base. Finally they need to develop a concept of text, an understanding of the way that coherence is achieved in written language (Applebee, 1978; Englert and Raphael, 1988; Thomas, Englert and Goetz, 1987). Before they can write, children must be able to perform the motor act of writing and must have attained a level of proficiency in spelling. Handwriting is one such grapho-motor skill, which is primarily dependent upon visual perceptual ability, visual memory and hand coordination. These non-linguistic factors apart from the linguistic factors are essential for a successful written output.

Writing task is complex in nature, which requires the simultaneous use of semantic, syntactic, and grapho-phonic information within the framework of linguistic factors and non-linguistic factors such as grapho-motor co-ordination of all of these constraints at one time makes writing difficult for some children. This can often lead to disorders of written expression in children when they cannot co-ordinate these two processes i.e., the linguistic and the non-linguistic processes, which is expected to go hand in hand for appropriate writing skill in normal children.

C. Disorders of written expression

In the normal child the processes required for writing develop in an orderly pattern. By the time a child is approximately 6 yeas of age, he is ready to write when he has developed the skills for visual and auditory discrimination required for reading and visuo-motor integration for forming a stage where he learns to organize words into simple sentences. However, problems in the above skills are often precursors to difficulties with the writing process (Litowitz, 1981) or in other words may lead to varied forms of disorders of written expression (Spagna, Dennis, Cantwell and Baker, 2000). Hence, disorders of written expression may be defined as a significant impairment in written communication that fall substantially below those expected given the individual age, measured intelligence, age appropriate education that significantly interferes with academic achievement (Spagna, Dennis, Cantwell and Baker, 2000).

Johnson and Myklebust (1967) termed the inability to learn the appropriate motor behaviour for writing as dysgraphia. Severe deficits in hand writing may include the inability to maintain an appropriate pencil grip and less severe problems may result in handwriting, which is poorly spaced, awkward, or immature.

Handwriting difficulties may be only one performance of motor activities (Eg., catching or throwing a ball, buttoning a coat, or following a pattern or sequence of movements).

Handwriting difficulties also may be affected by the rate of performance in order for writing to be efficient; it must be performed at a rate appropriate for the task. Although a child's writing may appear adequate, it may have been produced slowly and with difficulty. Such problems result from a lack of automatic motor patterns for letter formation or from slowness in processing and organizing information for the writing task.

Another skill necessary for writing is the ability to recall the spelling of words. Cici (1980) outlined some of the underlying abilities necessary for children to learn to spell words. The abilities to articulate the word correctly, to recall the spoken pattern (i.e., the auditory sequence of the phonemes or syllables) and to recall the visual letter sequences are necessary for learning to spell. Also, children must be able to recall the motor pattern for writing a word and to execute the plan for the motor act. Because the complex nature of the writing task require the simultaneous use of semantic, syntactic and grapho-phonic information, trying to satisfy all of these constraints at one time makes writing difficult.

Owing to the multiple processes involved in writing skill, deficits in any single or multiple processes lead to disorders of written expression. Consequently, the clinical manifestations of disorders of written expression also vary depending on the underlying deficits, thus forming subgroups of disorders of written expression.

a) Classification of disorders of written expression

The major focus of research in the area of learning disability has been on reading disability and only recently has any attention been paid on writing disability. The first attention paid to writing difficulties focused on hand writing and spelling. The earliest view was that writing difficulties were always associated with reading difficulties. In the late 1960s, case studies reported learning disorders that only occurred in written form, with other forms of verbal behavior remaining intact. Difficulties in written expression were grouped into three primary categories:

i. Disorders in visual-motor integration (person could speak and read but could not correctly execute the motor operations necessary to print symbols such as letters and numbers)

ii. Deficits in revisualization (individuals could recognize and read words but could not revisualise letters and words and thus could not write words from dictation or spontaneously) and

iii. Deficiencies in formulation and syntax (individuals could copy printed symbols accurately, could revisualise words, but could not organize thoughts into meaningful written communication (Spagna, Dennis, Cantwell and Baker, 2000).

Disorders of written expression can occur as a consequence of the following,

Grapho-motor dysfunction, which may result in writing problems if there is excessive muscle movement and too little stabilization or too many stabilizing

muscles then the pencil grip is unstable with great pressure and constantly changing.

ii. Finger agnosia, which is a condition where a person is unable to recognize one's fingers or fingers of others (Benson and Geschwind, 1969). This is seen due to lack or deficient motor feedback.

iii. Fine motor dysfunction, which is often considered to be at the root of any writing problems.

iv. Writer's cramp, which is an action induced or task specific dystonia where the act of writing is painful inmost case with illegible, sloppy handwriting and jerky writing motion. Writer's cramp can be associated with essential tremors and may be related to a syndrome as 'primary writing errors' (Weiner and Goetz, 1987)

Boder (1973) has termed the children who produce phonologically incorrect errors as dysphonetic and the children who produce phonologically correct errors as dysdietic. Less commonly, children have been classified on the basis of their spelling of real words and not classified on the basis of their spelling of non-words. Frith (1980) described two groups of children between 11-13 years old who were poor spellers. One group made errors that were phonologically correct. Second did well in spelling non-words, while the other group made errors that were not phonologically correct and had difficulty spelling non-words. In addition, Frith noted that the first group was also distinguishable from the second group by their reading ability, the first group read well while the second one did not. Also described were children who had more trouble spelling irregular than regular words and made errors that were phonologically correct, resembling the patterns of patients with acquired lexical agraphia as studied by Baron (1980). Such varied manifestation of writing errors calls for detailed assessment.

D. Assessment of writing skills

Although a substantial body of literature exists on the assessment of spoken language disorders and reading disability, the literature assessing developmental writing problems is extremely sparse. Professionals facing difficulties in analyzing the writing samples of students with learning disabilities are often unsure of best ways for analyzing written expression. Most standardized instruments are limited in their ability to provide information about a student's writing abilities, because they typically measure performance as one sample in one setting at one time. Although standardization measures are useful as screening instruments, additional evaluation is needed to provide a comprehensive picture of writing skill.

Traditionally, writing tests have been dichotomized into 'atomistic tests', which measures individual writing skills such as spelling, grammar, and punctuation, versus "holistic measures", which evaluates the general communicative effectiveness of a writing sample (Bain, 1988). The atomistic tests reflect a product approach to writing, whereas holistic assessment reflects the curricular shift towards the process approach. The test format may be contrived, the which case the test provides the writing stimuli, such as a dictation spelling test, or it may be spontaneous in which the student composes a writing sample (Hammill and Larsen, 1988). Ideally, both atomistic and holistic assessment, employing both contrive and spontaneous formats, should be incorporated into a comprehensive evaluation of written language proficiency. At present, well-named and reliable standardized tests are available that quantify handwriting legibility, dictation spelling skills, spontaneous spelling skills, vocabulary usage, syntactic accuracy, sentence combining ability, punctuation, and capitalization usage, and conceptual maturity whether measurement of these skills relates meaningfully to

number of sentences (total sentences) and the number of words per sentence (words per sentence). The Syntax scale mainly evaluates the extent to which verbal expressions are used correctly. This correctness is measured in terms of the accuracy of word usage of word endings and of punctuation. The Abstract-Concrete scale was devised to study the effectiveness with which the ideas are conveyed.

Gillingham and Stillman (1970) recommended that assessment begin with determination of handedness. Right or left-handedness helps determine the correct position of the paper and correct body posture. Standards for legibility and a criterion for fluency (legibility and speed) should be established. An informal skill inventory should allow the teachers to determine not only what the child cannot do, but also what he can. Tools should be available in hand for assessing sub-skills as necessary for example copying letters in sequential orders (in words) from one paper to another and print copying as necessary for classroom performance should be informally assessed.

Otto, McMenemy and Smith (1973), reports that difficulties in handwriting may evolve from poor motor skills, unstable and erratic temperament, faulty visual memory and difficulty with sound symbol relationships. Poorly arranged learning conditions also may contribute to writing difficulties. Since writing pervades the curriculum, it is essential that teachers diagnose and remediate handwriting deficits at the earliest possible time or present problems via instruction that is initially individualized to learner needs. Towle (1978) gave a diagnostic assessment for handwriting. According to him before conducting a diagnostic assessment of handwriting it is necessary to see if the child has accomplished the pre-requisite skills necessary for the acquisition of appropriate writing.

Weiner (1980) developed an individualized assessment instrument that facilitates the identification of specific writing problems called the Diagnostic

evaluation of writing skills (DEWS) which is divided into the following categories: Graphic, Orthographic, Phonologic, Syntactic, Semantic and Self-monitoring.

Baker (1983) investigated the writing skills for children from grade 5 to 10 in an attempt to produce some of much needed information and normative data on this. Bakes used DEWS (Weiner, 1980) along with other tests like the Thornalic Assessment of Written Expression (TAWE) by Newman and Milton (1981) and PSLT (Myklebust, 1965). The results suggested that areas of written language such as syntax and spelling are consolidated in the early years while others continue to develop throughout adolescence.

Quantification of written language proficiency can, and in fact should take many forms. There is no simple test that assesses comprehensively all aspects of written language achievement; even if several standardized tests are administered, additional informal diagnostic activities will be necessary in order to develop an appropriate remedial program. Fortunately, in the past decade, several standardized written language tests have been extensively revised and other new tests developed, providing psychologists and educators with a broad range of writing assessment instruments for identifying children in need of special instruction.

Despite significant improvement in writing tests currently, available, test users continue to have a major responsibility to review the technical characteristics of each test they administer, and also to reflect upon issues of test relevance for specific individuals and their educational or occupational milieus (Bailet, 1991). The following tests are reviewed in order to further understand issues related to identifying children with disorders of written expression.

a) Tests for assessing writing skills

Woodcock and Johnson (1977) developed the Woodcock-Johnson Psycho-educational battery, Tests of Achievement (Written Language cluster). The test is part of a larger battery that includes measures of cognitive ability and interest levels in addition to scholastic achievement. It consists of a spelling dictation sub-test and a proofreading sub-test. The dictation sub-test includes items requiring the subject to write alphabet letters, words, abbreviations and punctuation marks from dictation. Several items assess knowledge of regular and irregular plural forms. The proofreading sub-test requires the subject to read sentences and identify errors in word usage, spelling, punctuation and capitalization. However, the Woodcock-Johnson written language cluster provides only a preliminary screen of writing ability and should therefore prefer to be used in conjunction with other writing tasks during the diagnostic process.

Jastak and Wilkinson (1984) developed and revised the Wide Range Achievement Test (WRAT-R). It includes measures of spelling, reading, and mathematics for individual ages five to seventy-five. It consists of two levels; level 1 for children ages five through eleven years, and level 1 for ages twelve through seventy-five years. For both levels, the spelling sub-test follows a single-word dictation format requiring written responses. Overall, the WRAT-R spelling sub-test can be used to screening, educational placement, research and program evaluation.

Larsen and Hammill (1986) developed the test of written spelling-2 (TWS-2), which is a revision of the Test of Written Spelling. It is a single-word dictation-spelling test for individual ages six years six months to eighteen years

five months. The TWS-2 consists of two spelling subtests, on measuring "predictable" words and the other "unpredictable" words. And they are scored as correct or incorrect.

Hammill, Brown, Larsen, and Wiederholt (1987) revised the Test of Adolescent Language (TOAL) as TOAL-2. It is a measure of receptive and expressive oral and written language skills for ages eleven years through eighteen years five months. Eight sub-tests are included that measure vocabulary and grammar skills across the domains of listening, speaking, reading, and writing. The two writing sub-tests include measures of the student's ability to use given vocabulary words in sentences and of the ability to combine two given sentences into one complex sentence. This test is considered to provide important quantitative as well as qualitative data about the written language abilities. Thus, this test considers only the linguistic aspects of writing and does not assess the non-linguistic aspects of writing.

Hresko (1988) developed the Test of Early Written Language (TEWL), which was designed to measure prewriting and writing skills of children of ages three through seven years. This test intended to include identification of children with significant writing difficulty, identification of a child's writing strengths and weaknesses, documentation of progress in written language, and use as a research. It proposes to measure discrimination of verbal versus non-verbal visual representational forms, understanding of linguistic terms and ability to write words, sentences and stories.

Kiran (1994) developed the Test of writing for children in Hindi (TOWCH) to assess writing skills in children in the range of 4-9 years of age. The test consisted of eight sections including the following,

- Simple alphabets
- Syllabary
- Words non-words
- Sentences
- Sentence completion
- Questions and answers
- Text-a) Picture description
  b) Spontaneous writing

The results indicated that all the writing tasks other than copying are developing with age and age of acquisitions vary for different tasks depending on whether the task is copying, dictation or spontaneous writing tasks.

In another similar study Yeshoda (1994) developed the Test of writing for children in Kannada (TOWCK) as a tool to assess the acquisition of writing in children in the age range of 3- 8 years. This test also consisted of the same tasks as that of the TOWCH (Kiran, 1994) divided into eight sections. It was found that writing skills for copying begin to emerge at around 3-4 years of age. Later on the other skills i.e., writing to dictation, sentence completion, etc., are gradually acquired with increasing age. The study also showed that writing is not fully developed even at 7-8 years of age.

The present day education depends primarily on communication through spoken written language. Written language has become a requisite to practically all phases of education. The increasing necessity for the mastery of academic skills for the achievement of an effective role in the present society is throwing into prominence the serious difficulties in learning experienced by a disturbingly large population of children. Despite the significance of writing in the child's learning it

has been given only limited attention and tools for its measurement have been lacking for the Indian population.

The review of literature suggests that there have been tests and norms available for the western population to assess the writing skills of children like the Picture story language test (PSLT) (Myklebust, 1965) and Diagnostic evaluation for writing skills (DEWS) (Weiner, 1980). These tests can be used to quantify the written output of children. However, there are very few Indian tests developed for assessing the writing skills in children. Research conducted till now has mainly concentrated on investigating the age related differences in the levels of written language proficiency. The tools thus developed measure at the most the broader manifestations of written expression in children. However, these children may manifest subtle differences in the clinical features which when tapped may guide us in differential diagnosis within that population and thus these children can be directed accordingly for remediation. These clinical features could probably be identified by professionals like the schoolteachers who directly deal with the children with varied academic difficulties and writing difficulty being one of them. Hence, there is a need to develop a tool to identify such difficulties that can as well be used even in the classroom to assess and identify such children, make an appropriate referral and plan for an appropriate intervention.

METHOD

The aim of the present study is to develop a tool for screening children with writing difficulties within the framework of linguistic and non-linguistic factors that are reported to be crucial for all phases of education.

a) Subjects

Fifty normal children, ten children each from the grade III, IV, V, VI and VII were selected for the study. The children were screened for the following before selecting them for the study:

- Language: Linguistic profile test (Karanth, 1986) was administered to ensure that there was no language delay or discrepancy.
- Intelligence: Gessell's drawing test (Gessell, 1973) was administered to check for a normal intelligence quotient (IQ)
- Hearing: Otoscopic examination and screening pure tone audiometry was carried out to rule out any hearing loss or significant ear infections.
- Vision: Snell's chart was used to rule out any visual problems and the opinion of the class teacher was also taken regarding any significant visual problem as observed in the child by the teacher.
- Motor skills: No gross motor skill deficits observed on a threading task.
- Teachers' opinion regarding an average scholastic performance of the child was taken as the criteria for subject selection.
- Adequate learning environment was ensured taking the teachers' opinion.

b) Test material

The test material was prepared from the English reader books prescribed by the Central Board of Secondary Education and by survey of literature regarding the tests and the test materials previously used for assessing the writing skills. The items were chosen in a simple to complex manner (especially while selecting items for dictation of words) the words included regular and irregular words having nouns and verbs in the list.

The tasks that had to be given to the subjects were divided into three sections. They included the following;

Section 1

- Writing words to dictation
- Writing paragraph to dictation

The subjects were instructed prior to the task that dictation of words and a paragraph would be given and two repetitions of the words was permitted, if required.

Section 2

Copying a paragraph

The subjects were instructed to copy a paragraph as it is, as given in the test sheet provided.

Section 3

Spontaneous writing task

The subjects were instructed to write a paragraph on a given topic -My School. They were instructed to write minimum of five sentences in the paragraph regarding the topic. The test was administered as a group task taking five children from each grade at a time.

The parameters of writing assessed are given in the Table 1.

Table 1

List of test items

SI. No.	Writing tasks	Parameters	No.of items
1	Writing words to dictation Writing paragraph to dictation	Linguistic parameter a) Spelling b) Punctuation and Capitalization Non-linguistic parameter	 6 5 10
2	Copying a paragraph .	Linguistic parameter a) Spelling b) Punctuation and Capitalization Non-linguistic parameter	 6 5 10

3	Spontaneous writing	Linguistic parameter a) Spelling b) Punctuation and Capitalization c) Vocabulary d) Syntax Non-linguistic parameter	 6 5 1 3 10

c) Procedure

The study was carried out as follows:

Stagel: Item development for the tool for screening children with writing difficulties (ToSC-WD)

After reviewing literature on different factors responsible for writing skills like morphology, vocabulary, syntax, grapho-motor control, finger co-ordination, appropriate pen grip, etc. these factors were sub grouped under the linguistic parameters and the non-linguistic parameters. An earlier version of a checklist for disorders of written expression (DWE-C) (Jayashree and Prema, 2001) formed as a reference for development of this tool.

Stage 2: Pilot Study:

A pilot study was conducted on a smaller group of children taking one child each from the grades III, IV, V, VI and VII. The pilot study was

conducted to see approximately the time required by the children to complete the writing task.

Stage 3: Administration of the ToSC-WD by speech language pathologist

This task was carried out as a group task. A group of five children from each grade were taken at a time. The whole task was carried out within 60 minutes (approximately). The children were seated in three rows and care was taken to make sure that they do not copy. Physical training sessions and the SUPW hours of the school were utilized to carryout the tasks to make sure their regular classes were not disturbed. The study was conducted during the mid- academic sessions of their academic year. The children were given incentives in the form of chocolates and stickers after the completion of the task in a session.

The task was carried out in the following order.

- Dictation
- Copying
- Spontaneous writing tasks.

(In the dictation task two repetitions were permitted for the words and the sentences)

Stage 4: Analysis of the written sample by Speech -language pathologist (SLP)

The written samples were analyzed by the SLP based on the parameters prepared under linguistic and non-linguistics domain of the tool.

A three-point evaluation scale was adopted

1 - Definite error
2- Occasional error
3- No error

The above analysis was adopted for all the parameters in the linguistic and the non-linguistic domain. A descriptive analysis of each written sample was also done.

Stage 5: Analysis of the written sample by special educator.

The written sample data was given for analysis to the special educator. They were initially given an orientation regarding the writing difficulties in children. They were instructed to analyze the written sample on parameters of the linguistic and non-linguistic domains on a three-point evaluation scale as mentioned earlier in the stage 4.

Scoring

Scoring was done on a three point rating scale as explained earlier.

The data obtained was subjected to appropriate statistical analysis. A detailed descriptive analysis was also done to study the pattern of errors made by these children.

RESULTS AND DISCUSSIONS

I. Mean and Standard Deviation (SD) across grades

The primary objective of the present study was to develop a Tool for Screening Children with Writing Difficulties (ToSC-WD) within the framework of linguistic and non-linguistic factors and to derive normative data on ToSC-WD.

Table 1

Mean scores and SD values for overall scores across grades

Domain	Grades	Max Score	Mean	SD	-1 SD	-2SD
Overall score (linguistic & non-linguistic domain)	III	201	57.4	7.83	49.57	41.74
	IV	201	72.5	9.47	63.03	53.56
	V	201	86.6	7.27	79.33	72.06
	VI	201	91.0	8.53	82.47	73.94
	VII	201	95.9	7.84	88.06	80.22

Table 1 shows Mean scores, Standard Deviation (SD) values, as well as values that are 1 Standard deviation (SD) and 2 Standard deviation (SD) below the mean for the grades III, IV, V, VI and VII. The overall score (including both linguistic scores and non - linguistic scores) was obtained for all the three writing tasks i.e., dictation, copying and spontaneous writing.

Table 1 shows that for the overall scores, the mean increases and the SD decreases from Grade III through the Grade VII indicating a steady developmental progression in writing skills (Grade III, Mean = 57.4 with an SD = 7.83, Grade VII,

Mean = 95.9 and SD = 7.84). The results indicate a gradual development of writing skills from Grade III to Grade VII.

The results for writing skills support findings of Boder (1971) and Myklebust (1973). According to them the writing skills follow a developmental pattern for children from 9 to 13 years of age with a decline or plateau at 15 years. Thus it can be concluded from the above findings that the acquisition of writing has already begun by Grade III but it continues and shows a developmental progress from Grade III through Grade VII. In India, a Grade III child is generally at around 9 years of age, as admission to Grade I is at around 7 years of age. Hence, the above results can be corroborated with the findings of the above investigators.

Table 1 also indicates 1 SD and 2 SD scores below the mean. - 1 SD can be considered for screening children with writing difficulties and - 2 SD can be considered for diagnostic purposes. The SD values can thus be considered as cut-off point for children at risk for developing writing difficulties. Such children can be identified and subjected for further detailed assessment for writing skills. To illustrate, those children falling below 1SD (1 SD = 49.57) below a score of 49.57 for Grade III (Table 1) are at risk for considering as children with writing difficulties.

Table 2

Mean scores and SD values for linguistic domain across grades

Domain	**Grades**	**Max. Score**	**Mean**	**SD**	**-1 SD**	**-2SD**
Linguistic score	III	111	59.5	9.09	50.41	41.32
	IV	111	77.4	8.82	68.58	59.76
	V	111	92.5	2.75	89.75	87
	VI	111	98.3	4.96	93.9	88.96
	VII	111	103.2	2.86	100.34	97.48

Table 2 shows the mean scores, standard deviation values, as well as values that are -1 SD and -2 SD below the mean for linguistic skills for the grades III, IV, V, VI and VII. The increase in the mean scores and the decrease in the SD values from Grade III (i.e., mean score = 59.5, SD = 9.09) through Grade VII (Mean = 103.2, SD = 2.86) again suggests a gradual developmental progression in the linguistic skills required for writing. The results show that similar to the linguistic factors such as morphology and syntax that show a hierarchical development with age, writing skills also follow a developmental pattern. The results are in agreement with Myklebust (1973).

Table 3

Mean scores and SD values for non-linguistic skills across grades

Domain	**Grades**	**Max. Score**	**Mean**	**SD**	**-1 SD**	**-2 SD**
Non-Linguistic score	III	90	55.30	6.07	49.23	43.16
	IV	90	67.6	7.63	59.97	52.34
	V	90	80.70	5.18	75.52	70.34
	VI	90	83.7	3.30	80.4	77.1
	vII	90	88.6	1.83	86.77	84.94

Table 3 shows the mean scores and SD values for the non-linguistic domain including all the three writing tasks i.e., dictation, copying and spontaneous writing. An increase in the mean scores and a decrease in the SD values from Grade III (Mean = 55.30 and SD = 6.07) to Grade VII (Mean = 88.6 SD = 1.83) shows a developmental trend in the non-linguistic skills i.e., grapho - motor skills, finger co-ordination, pencil grip, etc., required for the acquisition of writing skills. The - 1 SD value could be considered for screening purposes and - 2 SD values could be considered as a cut off point for children at risk for developing writing difficulties.

II. Acquisition of writing skills

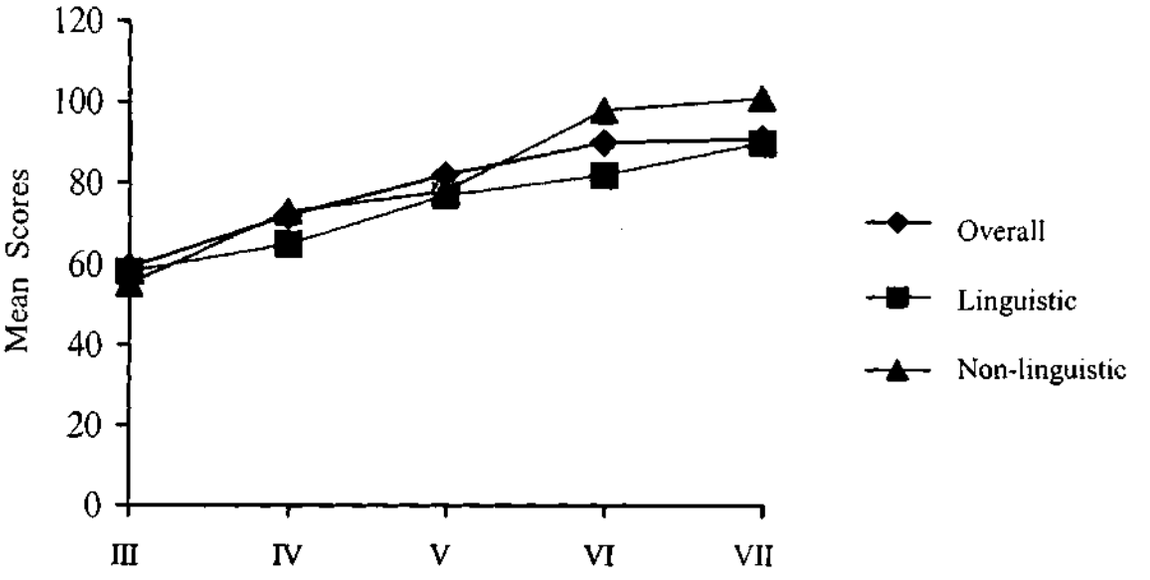

Figure 1 : Mean for overall linguistic and non-linguistic factors

Figure 1 shows that the acquisition of writing skills has begin much before entry to Grade III itself and a developmental pattern is seen until Grade VII. This developmental trend is observed in the linguistic scores and the non-linguistic scores. However, the figure 1 shows that the proficiency in writing does not seem to be complete even by Grade VII.

Figure 1 also shows that the development of non-linguistic skills is ahead of development of linguistic skills right from the Grade III through the Grade VII.

III. Correlation between linguistic and non-linguistic domain

The objective of the study was also to study the correlation between the linguistic domain and the non-linguistic domain in each Grade and to see if children with writing difficulties can be differentiated and classified under linguistic domain and non - linguistic domain. To study this the data was subjected to statistical analysis to get the Cronbach's alpha for internal consistency reliability. This was adopted to study the correlation between the variables of linguistic and non-linguistic domain with in each Grade for different writing tasks i.e., writing to dictation, copying and spontaneous writing.

Table 4

Cronbach's alpha for Linguistic and Non-Linguistic domain

Tasks	III	IV	V	VI	VII
Dictation	0.61	0.69	0.61	0.081	0.000
Copying	0.34	0.53	0.06	0.082	0.051
Spon Writing	0.39	0.76	0.98	0.020	0.081
Overall score	0.44	0.61	0.14	0.061	0.256

Table 4 shows correlation between linguistic domain and non- linguistic domains for the grades III, IV, V, VI and VII. Cronbach's alpha was obtained for the overall scores (including both linguistic and non-linguistic scores), linguistic scores and non-linguistic scores on each of the writing tasks i.e., dictation, copying and spontaneous writing.

The results for overall scores indicated a positive correlation for the linguistic and non-linguistic domain in Grade III (α = 0.44) and Grade IV

($\alpha = 0.61$). However, a minimal correlation was found for Grade V ($\alpha = 0.14$) and Grade VII ($\alpha = 0.256$) no correlation for the Grade VI ($\alpha = 0.061$). This implies that linguistic and non-linguistic factors cannot be well distinguished or isolated from each other in the earlier grades, whereas with increasing grades or in the higher grades these factors may be well distinguished.

Table 4 also shows results for the dictation task on each of these grades. These results indicate a positive correlation in the Grade III ($\alpha = 0.61$), Grade IV ($\alpha = 0.69$) and Grade V ($\alpha = 0.61$), a low correlation for the Grade VI ($\alpha = 0.081$)and no correlation for Grade VII ($\alpha = 0.00$). Thus, we can conclude that on dictation task which takes into consideration a child's auditory discrimination skills, auditory memory skills, visuo - motor co-ordination etc., can be distinguished based on linguistic factors and non - linguistic factor from the Grade VI onwards.

Table 4 also shows correlation co-efficient for linguistic and non-linguistic skills for the copying task. A low positive correlation was obtained for Grade III ($\alpha = 0.34$) and Grade IV ($\alpha = 0.53$) compared to a much lower correlation for Grade V ($\alpha = 0.06$), VI ($\alpha = 0.082$), and VII ($\alpha = 0.051$). While copying task involves visual discrimination and visuo-motor coordination, it is difficulty to differentiate between linguistic and non-linguistic skills within the framework of this study in the earlier grades. This is because although copying task is presumed to be devoid of linguistic skill, a relatively higher correlation between linguistic and non-linguistic skills in the lower grades indicate that there is an overlap in the linguistic and non-linguistic skills in copying. The children in the lower grades depend on linguistic skills for copying whereas, lower correlation in the higher grades suggests that the two skills for copying tasks are distinct from each other.

Children in the lower grades are dependent on the linguistic skill along with the non-linguistic skill for accomplishing a writing task whereas, children in the higher grades can accomplish a writing task independent of linguistic skills probably because writing task in the higher grade becomes more automatic. This does not require linguistic skills but requires more of the non-linguistic skills for writing. Support for these findings can be taken from the information-processing model proposed by Ellis and Morgan in (1984). Children in the process of developing written language in the lower grades require the active processing of information in the pre-graphemic stage (responsible for linguistic factors) and post- graphemic stage (responsible for non-linguistic factors) for writing skills. In the higher grades the pre-graphemic stage can function independent of the post-graphemic stage as writing becomes more automatic and requires more of non-linguistic skills for writing. This can also be seen in figure 1 which shows less difference in the mean for linguistic and non-linguistic skills in the earlier grades and shows a greater difference in the higher grades.

Table 4 also shows results for spontaneous writing for each of these grades between the linguistic and the non-linguistic domain. A high positive correlation co-efficient was found for the Grade IV ($\alpha c = 0.76$) and a low positive correlation for the Grade III ($\alpha = 0.39$).A low correlation was found for Grade V ($\alpha = 0.98$), VI ($\alpha = 0.020$) and Grade VII ($\alpha = 0.081$).

This could be explained based on how the linguistic factors related to writing skills like spelling, punctuation, syntax, vocabulary etc., cannot be isolated from non-linguistic factors like grapho-motor co-ordination, for children in the earlier grades. These factors can be well differentiated in the higher-grade children. Hence, in the initial grades it is difficult to decide whether linguistic factors or non-linguistic factors are contributing more for writing skills in children.

IV. ToSC - WD for other professionals

1. Overall scores

The objective of the study was also to see if this tool can be a user friendly tool for other professionals like Special educators and teachers to identify children with writing difficulties in their realm of profession so that, they themselves can make an appropriate referral for detailed assessment and remediation of writing difficulties.

Table 5

Correlation matrix for overall scores

Analysis by Special educator							
Analysis by SLP	III	Correlation	0.827*	0.833*	0.715	0.723*	0.562
		Sig	0.011	0.015	0.022	0.043	0.147
	IV	Correlation	0.833*	0.868*	0.812*	0.784*	0.689*
		Sig	0.044	0.005	0.004	0.007	0.058
	V	Correlation	0.815*	0.911*	0.986*	0.978**	0.949**
		Sig	0.014	0.002	0.000	0.001	0.013
	VI	Correlation	0.802*	0.902**	0.974**	0.989**	0.973**
		Sig	0.017	0.002	0.000	0.000	0.000
	VII	Correlation	0.769*	0.886**	0.958**	0.986**	0.982**
		Sig	0.026	0.003	0.000	0.000	0.000

** Correlation is significant at 0.01 level (2 tailed)

* Correlation is significant at 0.05 level (2 tailed)

Table 5 shows a correlation matrix, which displays the Karl Pearson's product moment correlation values between the overall scores obtained after analysis by a Speech language pathologist (SLP) and a Special educator.

From the correlation matrix it can be seen that there is a high positive correlation for the overall scores between the SLP and the Special educator for the grades III, IV, V, VI and VII. This is found to be significant at 0.01 level of significance. It can also be observed that the correlation co-efficient for the Grade III (r = 0.797) is lower when compared to the higher grades i.e., for the Grade IV (r = 0.953), V (r = 0.995),VI (r = 0.996) and Grade VII (r = 0.995). Special educators or teachers are required to be aware of certain terminologies in the ToSC - WD.

2. Linguistic domain

Table 6

Correlation matrix for linguistic domain

Analysis by Special educator							
Analysis by SLP			III	IV	V	VI	VII
	III	Correlation	0.797*	0.948**	0.923**	0.938**	0.928
		Sig	0.003	0.000	0.000	0.000	0.000
	IV	Correlation	0.757**	0.963**	0.935**	0.933**	0.907**
		Sig	0.007	0.000	0.000	0.000	0.000
	V	Correlation	0.849**	0.966**	0.995**	0.989**	0.975**
		Sig	0.001	0.000	0.000	0.000	0.000
	VI	Correlation	0.871**	0.969**	0.987**	0.996**	0.990**
		Sig	0.000	0.000	0.000	0.000	0.000
	VII	Correlation	0.869**	0.966**	0.978**	0.995**	0.995**
		Sig	0.001	0.000	0.000	0.000	0.000

** Correlation is significant at 0.01 level (2 tailed)

* Correlation is significant at 0.05 level (2 tailed)

Similarly, Table 6 shows a correlation matrix for linguistic scores obtained from the SLP and the Special educator. Here, also, a high positive correlation was obtained for linguistic scores between the SLP and the Special educator at 0.05 level of significance for the Grade III and Grade V. A high positive correlation at 0.01 level significance was found for the Grade IV, V and Grade VII.

3. Non-linguistic domain

The correlation matrix for non-linguistic domain between the SLP and the Special educator could not be obtained however, the raw scores obtained when the analysis was done by the SLP and the Special educator from Grade III to Grade VII is given in the Table 7.

Table 7

Raw scores obtained by SLP and Special educator

for the non-linguistic domain

Grades	**Max. Score**	**SLP scores**	**Special educator scores**
III	90	57	61
IV	90	60	69
V	90	75	72
VI	90	84	81
VII	90	90	85

Table 7 shows raw scores for non-linguistic domain obtained when the analysis of writing samples of children from Grade III to Grade VII was made. Table 7 is suggestive of the proximity in rating done by the SLP and the Special educator. It was also found that, the rating on the linguistic domain was

comparatively easier than the non-linguistic domain by the SLP and the Special educator.

Overall there is a good agreement between the scores obtained by the SLP and the Special educator. This implies that, ToSC - WD can be a useful tool for Special educator in order to screen children as effectively as a SLP.

V. Descriptive analysis

A descriptive analysis of each of the subjects was carried out to see if any linguistic or non - linguistic features or errors could be traced.

A descriptive analysis of the subject (1) from the Grade III revealed that tests on writing dictation to words, showed that vowel errors, substitution, addition and regularization of irregular words were predominant. While that to paragraph, he showed poor spacing between words, lack of capitalization, with mixed upper case and lower case forms. The same type of errors were also observed in the copying task, in addition to missing of letters in words and words in a sentence. For e.g., for the word "listening" he missed the letter 'g' and wrote it as 'listenin'. On spontaneous writing task inappropriate grammar usage and incorrect word endings were seen. Under the linguistic domain the vocabulary was found to be appropriate but simple sentences, lack of indentation for paragraph was seen. He obtained a score of 53 out of 110.

On the non - linguistic domain the most striking feature when compared to all the other children in the Grade III was that he showed excessive pencil pressure while writing, took relatively longer time and required more repetitions. He obtained a score of 67 out of a total score of 90. The raw scores obtained by subject 1 is displayed in Table 8.

Table 8

Raw scores of Subject 1

Skills	Max. Score	Raw Score
I Linguistic domain	111	59
a) Spelling	54	28
b) Punctuation & capitalization	45	23
c) Vocabulary	3	2
d) Syntax	9	6
II Non-linguistic domain	90	57

VI. Qualitative analysis

A qualitative analysis of the percentage of scores was obtained for spelling, punctuation, vocabulary, syntax and non-linguistic skills was done for all the three writing tasks for all the subjects.

Table 9

Percentage correct scores for linguistic and non-linguistic domain across grades.

Skills	**Grades**				
Domain I	**III**	**IV**	**V**	**VI**	**VII**
a) Spelling	50%	70.3%	79.6%	90.7%	92.5%
b) Punctuation & capitalization	35.5%	66.6%	82.2 %	88.8%	88.8%
c) Vocabulary & syntax	58.3 %	75%	83.3 %	91.6%	91.7%
Total linguistic	47.9%	70.6%	81.7%	90.3%	91%
Domain II Non- linguistic *	60%	80.5 %	90%	90%	98.8 %

* Sub categories were not made for non-linguistic domain as there was an overlap in most of the features such as pencil grip and pencil grasp.

Table 9 shows percentage of scores obtained for spelling, punctuation, vocabulary and syntax, overall linguistic scores (including for spelling, punctuation, vocabulary and syntax) and non-linguistic skills for grades III, IV, V, VI and VII.

For the three writing tasks within each grade, it was found that in the Grade III, percentage of scores was the least for punctuation and capitalization sub section (35.5%o) in the linguistic domain followed by spelling (50%>) and vocabulary and syntax (58.3%) sub-sections. For the Grade IV an increase in the scores of each of these sub-sections can be seen i.e., for punctuation and capitalization it is 66.6 % followed by spelling (70.3%) and vocabulary and syntax (75%>).

Overall, when these percentage scores were analyzed it was found that, the earlier grades obtained low percentage scores for punctuation and capitalization sub-section followed by spelling and then vocabulary and syntax. This implies that the acquisition of punctuation and capitalization skill has begun by the Grade III but this is not complete even by the Grade VII. Acquisition of spelling vocabulary and syntax continues even till the Grade VII.

When the overall percentage scores for linguistic domain and non-linguistic domain was found it revealed that the acquisition skills for non-linguistic domain has already begun by the Grade III along with the skills for linguistic domain. A developmental trend can also be seen here in the non-linguistic domain from the Grade III through the Grade VII i.e., the percentage correct scores shows an increase from Grade III to Grade VII. Similarly, qualitative analysis can be corroborated with the quantitative results discussed earlier.

From, the above we can infer that the acquisition of writing skills has begun in the Grade III itself and continues even till the Grade VII. It also shows that acquisition is not complete even by the Grade VII. Thus, this supports the study conducted by Kiran (1994) and Yeshoda (1994) who studied acquisition of writing skills in children in the age range of 4 to 9 years and found that acquisition of writing skills begin by 4 years and shows a developmental trend till 9 years of age. The percentage scores obtained in the present study also shows a developmental pattern in writing skills from the Grade III to Grade VII. The results are in support for the findings of Myklebust (1973) who found a developmental pattern in the acquisition of writing skills of children from 9 to 13 years of age.

VII. Prevalence

In the present study, three children (6%) were identified as those below 2 SD from the mean scores, out of which two children (4%) from Grade III were classified as having writing difficulties on the linguistic domain and one child (2%) from Grade V were classified as having writing difficulties on the non-linguistic domain. In the above children there could coexistence of reading difficulties along with writing difficulties that has not been tapped.

The prevalence rate of children with writing difficulties has not been well studied. It is thought that the prevalence of the disorder is similar to those of reading disorders i.e., around 4 to 6% in school children. (Spagna, Dennis, Cantwell and Baker, 2000). Thus, this is approximately in agreement with the prevalence rate of children with reading and writing difficulties (Spagna, Dennis, Cantwell and Baker, 2000).

The results of the study reveal that ToSC - WD could be used as a successful tool in the identification of children with writing difficulties. The sensitivity of the tool further enhance by its usefulness in differential classification of children with writing difficulties due to linguistic skills (4%) and non-linguistic skills (2%) that are necessary for writing.

SUMMARY AND CONCLUSIONS

'Writing is difficult'. As the most complex and most late-developing human language skill, its acquisition may be impaired by dysfunction in any of the processes required to write well. Writing task is complex in nature, which requires the simultaneous use of semantic, syntactic, graphophonic information, grapho-motor co-ordination, visuo-motor another skills, etc. In a normal child this process develops in an orderly pattern with age whereas in some children who cannot co-ordinate between these two processes, it can lead to disorders of written expression. Writing for these children becomes a difficult task for them.

The increasing necessity for the mastery of academic skills for the achievement of an effective role in the present society is throwing into prominence the serious difficulties in writing experienced by some children. Despite the significance of writing in the child's learning it has been given only limited attention and tools for its measurement are lacking in the Indian context.

However, tests developed till now have mainly concentrated on investigating age related differences in the written output. These tests at the most tap only the broader manifestations of writing difficulty in a child. However, the subtle features underlying writing difficulty can be tapped, analyzed and grouped as features related to linguistic skills and non-linguistic skills. This will guide us to make appropriate referral for remediation of these children. Tools need to be developed in such a way that it is user friendly for other professionals like school teacher and special educators who directly deal with children in the classroom. This would also help the professionals to make an appropriate referral and plan for an appropriate intervention programme. Hence, the present study was undertaken to develop a tool for screening children with writing difficulties within the framework of linguistic and non - linguistic factors (ToSC-WD).

The primary objective of the present study was to develop the tool and administer it on normal children. The secondary objective was to see if children can be differentiated based on linguistic domain and non-linguistic domain. The third objective of the study was to see if it the ToSC-WD could be used by Special Educators to identify children with writing difficulties.

The items of ToSC-WD was initially selected based on the available literature. Different factors responsible for writing skills like morphology, vocabulary, syntax (Butterworth and Howard, 1987), grapho-motor control, finger co-ordination, appropriate pencil grip, etc., were considered. These were further sub grouped into linguistic domain and non-linguistic domain. The linguistic domain was further subdivided into spelling, punctuation and capitalization, vocabulary and syntax. These parameters were assessed for three writing tasks i.e., writing to dictation, copying and spontaneous writing. These tasks were considered based on the methods used by various other investigators for assessing writing skills in children.

The ToSC-WD was administered on 50 normal children, 10 children each for the grades III, IV, V, VI and VII. The subjects met the selection criteria as mentioned earlier for age appropriate language abilities, normal hearing, normal vision, adequate motor abilities, and adequate learning environment. The scoring was done as scheduled. After administration of the tool the data thus obtained was subjected to statistical analysis.

Mean scores and Standard Deviation (SD) values were obtained for the overall scores, linguistic scores and non-linguistic scores. The results revealed that the mean increases and SD decreases from Grade III through Grade VII. These results are in agreement with Myklebust (1973). Thus, it can be concluded that acquisition of writing skills has already begun by Grade III, it continues and

shows a developmental progression from Grade III to Grade VII. The results also suggests that the developmental progression for linguistic and non-linguistic skills are almost overlapping in the lower grades and become more distinct in the higher grades.

Correlation statistics was done tom study the correlation between the linguistic domain and the non-linguistic domain of ToSC-WD. The results showed that, there was a high positive correlation between the linguistic domain and non-linguistic domain in the lower grades when compared to a lower correlation in the higher grades. This is because children in the lower grades depend on linguistic skills along with non-linguistic skills even for a copying task while lower correlation in the higher grades suggests that the linguistic and non-linguistic skills are distinct from each other.

The results of correlation statistics between the scores got by analyzing the sample by the Speech Language Pathologist (SLP) and the Special educator showed that there was a high positive correlation, which is statistically significant for overall scores, linguistic scores and non-linguistic scores. This implies that the ToSC-WD thus developed can be a user-friendly tool for Special educators and other professionals dealing with such children with writing difficulties.

A qualitative analysis of the percentage of scores obtained for linguistic skills (spelling, punctuation, capitalization, vocabulary and syntax) and non-linguistic skills for all the subjects was done. The results revealed that the acquisition skills for non-linguistic skills has already begun by the Grade III itself, along with the acquisition of linguistic skills for writing. An increase in the percentage correct scores from Grade III to Grade VII is suggestive of a developmental progression in the acquisition of writing skills. The qualitative

analysis can be corroborated with the results of quantitative analysis mentioned earlier in the study.

The ToSC - WD thus developed identified three children (6%) at -2SD from the mean scores. Out of this two children (4%) from the Grade III performed poorly on linguistic domain and one child (2%) from the Grade V performed poorly on non-linguistic domain.

Thus ToSC-WD was successful in identifying 6% of children with writing difficulties. The tool was also successful in differentially classifying children with deficits in linguistic skills (4%) and non-linguistic skills (2%) of writing.

Thus, the tool thus developed can be used effectively as a tool for screening, to identify children with writing difficulties (ToSC-WD), classifying them within the framework of linguistic and non-linguistic domain.

IMPLICATIONS

1) The results of the present study reveal that ToSC-WD can be used as an effective screening tool to identify those children who show difficulties in writing in spite of normal intelligence, normal hearing, normal vision, normal motor abilities and adequate learning environment.

2) This tool can be used to screen and differentiate children in the school who present difficulties in writing due to linguistic factors or non-linguistic factors. In the absence of availability of such tools to date, the mean scores and the standard deviation values across the grades will serve as a norm reference for screening.

3) The ToSC-WD can be a user-friendly tool for professionals like teachers and special educators like dealing with children in an educational set up. Right at the classroom level itself the teachers can screen such children with writing difficulties due to linguistic or non-linguistic factors. These children can be then be referred for a detailed assessment of writing skills and referred further for remediation by concerned professionals. For eg. If a child presents difficulties in writing due to non-linguistic factors he can be referred to occupational therapists to avail necessary services. If he presents difficulties in writing due to linguistic factors then he can be referred to Speech Language pathologists (SLP) or a Special educator.

4) This study has also enriched the existing theoretical literature, which talks of writing difficulties, as a broader manifestation. It also brings into light the subtle differences that could exist within this broader manifestation of writing difficulties as linguistic and non-linguistic factors in writing.

5) This tool is developed for Indian children learning English. Such tool can be developed for other Indian languages.

LIMITATIONS

1) This study included a small sample of children for each grade. Administering it on a larger sample in each grade would help in standardization of the tool for screening children with writing difficulties.

2) Individual skills of the child for each of he writing tasks i.e. writing to dictation, copying and spontaneous writing were not timed. Only the total time taken to

complete all the three tasks was considered. The tool was not given for administration and analysis by the school teachers. This would have given a better idea as to how the tool can be a user-friendly tool for schoolteachers.

3) The educational background of the parents was not controlled. This may have affected the results.

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APPENDIX

I. Words for dictation

1. Tree
2. Brush
3. Table
4. Flower
5. Shoe
6. Bicycle
7. Doctor
8. Leaf
9. Write
10. Mango
11. Mother
12. Dance
13. Show
14. Listen
15. Saw

II. Passage for dictation and copying

Once a wolf stole a lamb from a flock of sheep. As he was carrying it off, the lamb said, "I know you are going to eat me. But will you please fulfil my last wish?"

"What is your wish?" asked the wolf.

The lamb said, "I know you are a very good flute player. I am very fond of listening to the flute. So please play your flute before killing me."

So the wolf took out his flute and played it.

When he stopped playing, the lamb said, "Beautiful ! Beautiful ! You can play the flute far better than the shepherd. I think you can play it better than anyone else. Please do play it once again."

III. Spontaneous Writing

Topic - My School

A TOOL FOR SCREENIING CHILDREN WITH WRITING DIFFICULTIES (ToSC-WD)

LINGUISTIC PARAMETERS

Spelling

a) Spells regular words incorrectly
b) Spells irregular words incorrectly
c) Substitution errors
d) Omission errors
e) Addition errors
f) Transposition errors

2) Punctuation and capitalization

a) Uses inappropriate punctuation
b) Lack of punctuation
c) Uses inappropriate capitalization
d) Mixes upper case and lower case forms
e) Does not indent paragraph

3) Vocabulary

a) Uses age appropriate vocabulary

4) Syntax

a) Uses incorrect word endings
b) Uses inappropriate or in correct grammar
c) Writes incomplete sentences

NON-LINGUSTIC PARAMETERS

a) Fragments words into letters in writing
b) Abnormal pen / pencil grasp
c) Tight / loose pencil grip
d) Excessive pencil pressure
e) Clumsily drawn letters
f) Tremors while writing
g) Poor spacing
h) Overlapped letters
i) Offline writing
j) Shows disinterest or lack of motivation to carryout the writing task

ERROR ANALYSIS

Scores: 1- Definite errors

2- Occasional errors

3- No errors

A TOOL FOR SCREENIING CHILDREN WITH WRITING DIFFICULTIES (ToSC-WD)

SCORE SHEET

Name of the subject: Age/Sex: Grade:

Mother Tongue: School:

I) LINGUISTIC PARAMETERS

Parameters	Test items	Max. Score	Subject score
Spelling	a) Spells regular words incorrectly	3	
	b) Regularizes spells exception words incorrectly	3	
	c) Substitution errors	3	
	d) Omission errors	3	
	e) Addition errors	3	
	f) Transposition errors	3	
Punctuation and capitalization	a) Uses inappropriate punctuation	3	
	b) Lack of punctuation	3	
	c) Uses inappropriate capitalization	3	
	d) Mixes upper case and lower case forms	3	
	e) Does not indent paragraph	3	

Vocabulary	a) Uses age appropriate vocabulary	3	
Syntax	a) Uses incorrect word endings b) Uses inappropriate or in correct grammar c) Writes incomplete sentences	3 3 3	

Overall score =

II) NON-LINGUSTIC PARAMETERS

Test items	Max. Score	Subject Score
a) Fragments words into letters in writing	3	
b) Abnormal pen / pencil grasp	3	
c) Tight / loose pencil grip	3	
d) Excessive pencil pressure	3	
e) Clumsily drawn letters	3	
f) Tremors while writing	3	
g) Poor spacing	3	
h) Overlapped letters	3	
i) Offline writing	3	
j) Shows disinterest or lack of motivation to carryout the writing task	3	

Overall score =