CHAPTER III
METHODOLOGY II

3.0 Phase II

This phase consisted of pilot study, selection of sample and getting a teacher's rating done on the selected sample .

3.1 Selection of sample and pilot study

3.1.1 Developmental measures

1) Pilot study, modification and final selection

A pilot study was undertaken on 10 children from the age group of three to five years of age. Five children were in the age group of 3 to 4 but not completed four years of age and five children were in the age group of 4 to 5 years of age. Children in the lower age group were unable to perform most on the tests of phonemic decoding skills (Phonemic awareness, rhyming words, blending), auditory processing skills (Auditory memory) and visual-spatial motor skills (Spatial orientation test, Visual organization, Visuomotor skills, Picture sequence, Story sequence) in English language. So they were dropped from the study and another group of five children in the age group of 4-5 years of age were selected and were tested. The age group of children is narrowed down to 4-5 years of age where most of the children were able to clear the tests successfully. The numbers of subtests were increased in blending, rhyming, spatial orientation, picture sequence and story sequence tests. Specific effort is made to ensure that the children had understood the test well and not responded correctly to the test by chance.

2) Teacher's rating scale

A semi structured 4 point rating scale based on certain selected parameters to identify learning difficulty was given to the school teachers to assess details regarding the difficulties the child was having in the regular school curricula and difficulties faced by the child in visual,

auditory or phonetic areas. The purpose of this exercise was to validate our tool. We tried to measure the dimensions to get it rated. Some of the dimension could be rated by the teachers. This questionnaire was adapted from the NIMHANS teacher rating scale (Kapoor et al., 91). The teacher's questionnaire was then compared with the present developed tool and content validity of the developed tool is checked on the basis of the correlation.

3.1.2 Sample

Initially, 400 children from 5 English medium schools in and around Rajkot, Gujarat were considered for the study. Using the exclusion and the inclusion criteria given below 42 children were screened out who showed positive symptoms in one of the screening test described below. 358 children were retained for the final study. A screening Intelligence quotient test using Stanford Binet test is administered on 400 children out of whom 358 children passed the screening test and were selected for phase III. Attention deficit hyperactive disorder is screened using DSM-IV criteria. It is difficult to label preschoolers as having ADHD. Any child who was in the spectrum is not labeled as ADHD but was not included in the study. Any child having developmental delay in either motor or mental areas of development (falling outside the normal range of development) was excluded from the study. Children falling in autistic spectrum disorder using the DSM –IV criteria were not included in the study. Children identified as having cerebral palsy from birth history and medical histories and clinical assessment were excluded from the study.

Inclusion criteria: ~

i) Children who are in the age group of 4-5 years of age
ii) The parents reasonably educated (10^{th} – at least one)
iii) Normal IQ for their age (Standford – Binet intelligence test)
iv) Children with normal hearing and vision (medical testing) were selected as sample for the study.

Exclusion criteria: ~

i) Developmental delays (attainment of motor and mental milestones and medical history)

ii) Low IQ (Stanford-Binet Intelligence test) Stanford Binet Intelligence test (Indian adaptation). The word intelligence first appeared in psychology text book in 1905. The revolutionary scale developed by Binet and Simon for assessing intelligence is called '1905 scale of intelligence.' Binet is considered the father of intelligence test. It had 30 tests in increasing order of difficulty for children of 3 to 12 years of age. This scale is revised in 1908 with standardized 58 items. The concept of mental age is introduced where majority of children could pass several items in the test at each level. In 1911 further revision included children upto the age of 15 years. These scales were for quantification of mental abilities. In 1912, William Stern, a German Psychologist, converted mental age into an Intelligence Quotient (IQ). Thus, the formula to calculate IQ is developed. IQ-MA/CA X 100.After Binet's death in 1911, the scale is translated into many languages. The normal intelligence in the general population can be plotted in form of a bell shaped curve. There are different levels of intelligence – above 140 –genius, 120-139 super intelligence, 110-119 –above average, 90-109- average, 71 – 89-borderline intelligence, 50- 70 -Mild retardation, 35 – 49-moderate retardation, 20 – 34-severe retardation, below 20-profound retardation. Binet-Kamat test of intelligence is developed by Dr V V Kamath in 1967 on Marathi and Kannada population and Stanford- Binet test is the Hindi adaptation done at Allahabad by Dr SK Kulshreshtra in 1973. This test covers the age group of three to twenty one years.

iii) Attention deficit hyperactive disorder – using DSM-IV criteria –it is difficult to label preschoolers as having ADHD. Any child who is in the spectrum is not labeled as ADHD but is not included in the study.

iv) Autistic spectrum disorder – using DSM-IV criteria.

v) Cerebral palsy- birth history and medical history and clinical assessment.

Table No. 3.1

Sample Distribution					
Age in mo	48-50	51-53	54-56	57-59	Total
MALE	85	47	37	38	207
	41%	23%	18%	18%	58%
FEMALE	59	36	30	26	151
	39%	24%	20%	17%	42%
Total					358
					100%

3.2 Phase III Modification of the tool and administration of the tool

The tool developed by the researcher was administered on 358 students and their details were noted down. All the results obtained from the tests were coded according to the coding manual prepared earlier. Many tools were looked at before finalizing the measure. Keeping in mind the age group of the children being assessed the following tools were taken into consideration:

- The Stanford-Binet Intelligence Scale (Indian adaptation)
- Malin's Intelligence Scale for Indian Children, Indian adaptation of WISC [MISIC]
- Comprehensive test of non verbal intelligence (C-TONI-2) (Donald D. Hammill, Nils A. Pearson, and J. Lee Wiederholt)
- Comprehensive Test of Phonological Processing (CTOPP- Wagner, Torgensen & Rashotte)
- Test of Phonological Awareness Skills (TOPAS) (Phyllis Newcomer, Edna Barenbaum)
- Lindamood Auditory Conceptualization Test (LAC-3) (Lindamood & Lindamood)

Their utility in the Indian context was looked at and modifications were made where it was found appropriate considering the age and developmental capacities of the children.

The following main dimensions were taken:

1) Phonemic decoding skills (adapted from CTOPP, TOPAS, LAC-3)
2) Auditory processing skills (adapted from LAC-3, NIMHANS index of SLD)
3) Visual spatial motor skills (adapted from NIMHANS index of SLD, MISIC, CTONI 2)
4) Attention (adapted from NIMHANS index of SLD)

Each test was further subdivided into following subtests:

- Phonemic decoding skills- Phonemic awareness, Rhyming word, Blending Rapid naming objects
- Auditory processing skills- Auditory discrimination, Auditory memory
- Visual-spatial motor skills- Visual discrimination test, Spatial orientation test, Visual organization, Visual motor skills, Picture sequence, Story sequence
- Attention- Object cancellation test.

For every correct answer in the test the code was 0 and for every wrong answer the code was 1.Technically, it was possible to score a maximum of 174 if the child has difficulty in all areas of developed tool and minimum score of zero, if child made no mistakes in any of the tests. The time period taken for the administration of the test was around 45 minutes to 1 hour depending on the individual time taken by each child. The screening for inclusion criteria of normal Intelligence Quotient and the administration of the new measure was done on separate days. These children were of a younger age group and it would not have been possible for them to maintain a prolonged sustained attention and do proper justice to the two tests in one go. The children were tested one at a time in separate room where there was minimum disturbance. The child has already become familiar with the tester during the screening procedure and it was easy to establish rapport with most of the children.

3.3 Phase IV Administering the NIMHANS Specific Learning Difficulty Index

After 6 months, children who completed 5 years of age were administered the NIMHANS specific learning difficulty index including those children who were identified as learning disabled by our newly developed tool. NIMHANS Index for specific learning disabilities (Kapur, John, Rozario and Ommen 1991) This test was revised by Kapoor et al in 1992 and has the following subtests-language test which comprises of reading writing and spelling test, arithmetic test which comprises of addition, subtraction, multiplication and division, simple and graded fractions, visual motor skills tested by bender and gestalt and test for visual motor integration, Auditory memory was tested by familiar and unfamiliar pair whereas visual memory was tested by Benton's visual retention test (Benton,1967) and digit cancellation was for attention testing. The NIMHANS Index for Specific Learning Disabilities (SLD) - it was used for confirming the clinical diagnosis of SLD as well as for ruling out SLD for the purpose of selection of normal groups This tool has a test-retest reliability of 0.53 and criterion validity ranging between 0.75 and 0.61.

Considering the fact that the researcher wants to establish the predictive validity of the developed test by correlating the earlier test performance with the test performance on NIMHANS test 6 months after the initial testing, only those parameters which were used in the newly developed tool were selected to be administered. The following tests were used for the children who had crossed five years of age after six months.

- Attention ~ simple color cancellation test
- Visual discrimination
- Visual memory
- Auditory discrimination
- Auditory memory
- Verbal expression
- Visual motor skills
- Writing skills

3.4 PHASE V Standardization of the developed tool

a) *Item Analysis* ~ In order to check the item appropriateness and discriminability we started with a pilot testing. Items which were found to be difficult, ambiguous or with low discriminability were dropped. Because this test had a specific purpose of identifying children with learning difficulty, item difficulty level was maintained in such a way that at least 60% of the children cuold respond to the item correctly. Based on the developmental theory of language acquisition the parameters selected in such a way that children of four years and above are expected to respond correctly to the administered test.

b) *Reliability* -For reliability, we used internal consistency method-Cronbach alpha.

c) *Validity* -We found out validity by cross validating the performance score on the developed test with the teacher's rating questionnaire and NIMHANS test.

i) Content validity -By validating with the teacher's rating scale; the developed test was validated for the content validity.

ii) Predictive Validity -We tried to find out the predictive validity by using NIMHANS specific learning difficulty index after 6 months of initial test administration. The developed test used most of the parameters being used in the NIMHANS specific learning difficulty index except the ones which are not applicable for the lower age group. The parameters used were simpler in formats and tests compatible with the age group (4-5 years) on whom the test is administered.