CHAPTER II

REVIEW OF RELATED LITERATURE

2.0 Introduction

A Review of Related Literature gives the investigator an awareness of the developments in the related areas in which efforts have been made and the areas in which efforts are to be taken. Thus makes the researcher to make an effective contribution towards the needed areas. An attempt to review the related literature in the field of the Learning Disabled and Academically Backward has been made in this chapter.

The review of selected works in the field of study have been summarised and presented in the order as shown below:

1. A brief historical background of Learning Disability field
2. Studies related to Learning Disabilities
3. Studies related to Mathematics Disabilities
4. Studies related to Learning Disabilities and Research Variables
5. Previous studies in India-Learning Disabilities.
6. Studies related to Academic Backwardness
7. Studies related to Mathematics Backwardness
8. Studies related to Academic Backwardness and Research Variables.
9. Previous studies in India- Academic Backwardness
10. Studies related to Mathematics Attitude
2.1 A Brief Historical Background of Learning Disability Field

The field of Learning Disabilities is the newest challenging sub area of the broader field of special education. Learning Disabilities is a young field and its history is largely one of the past very few years. All of the relevant history of Learning Disabilities took place within the 20th century. The possible exception was the work of Morgan, an ophthalmologist, who wrote in a British Medical Journal in 1896 about what he called 'word blindness'. The term Learning Disability was proposed in April 6, 1963 by Professor Samuel Kirk and others at a meeting of parents and professionals in Chicago. Investigation of Learning Disabilities however has its roots long before 1963. In 1919, Kurt Goldstein began working with young men with brain injuries who had returned to the United States from World War I. He found many of them distractible, unable to attend to relevant cues, confused and hyperactive.

During the 1920s and 1930s Samuel Orton, a specialist in Neurology developed a number of theories and remedial reading techniques for children with severe reading problems, whom he called "dyslexic" and believed to be brain damaged.

Strauss and Werner (1942) indicated the central nervous system dysfunction to be the most prominent physiological correlate of Learning Disabilities. Later Strauss and Lehtinen (1947) found that the Learning Disabled is mentally less handicapped and may be subjected to remediation and
rehabilitation. In the mid fifties, researchers became aware of the fact that only a marginal brain dysfunction has been found in the Learning Disabled children.

Belmont and Birch (1963) initiated research into lateral dominance and the resulting behaviours in normal and under achieving children. A confusion among the researchers on the appropriate definition of Learning Disabilities occurred especially with learning problems of many types during the 1960s. Minimal brain dysfunction was first introduced by Clements (1966). Some what later Chalfont and Scheffelin (1969) suggested a broader term, central processing dysfunction relating to learning problem behaviour.

During the 1970s the field of Learning Disabilities was embroiled in heated debate about the best approaches to use in the remediation of student's academic deficits. One camp advocated direct instruction and behaviour modification approaches. The other camp advocated the use of perceptual training or process approaches. In the end, an analysis of the research data showed that perceptual approaches were seldom effective in locating academic skills (Hammill and Lassen 1974). The trend of research also concentrated on areas of remedial measures and prevention (Arter and Jenkins 1979).

The 1980s saw a number of different approaches developed and researched. Learning strategies are now being taught to students to help them learn to learn. Other researches explored how individuals who are Learning Disabled acquire, retain and transfer knowledge.
A further diversification of research in Learning Disabilities came with the studies on the prevalence and classification of Learning Disabilities (Gerber, 1984). The disparities in the prevalence on the basis of the geographic location led to an empirical investigation of differences in the scholastic achievement of the students, relating achievement to Learning Disabilities (Kirk and Elkins 1975; Norm and Zigmond 1980, Torgeson and Dice 1980, Kavale and Nye 1981).

Identification of Learning Disabilities had been the focus of research for many researchers. The confusion over the definition of Learning Disability has led to controversy surrounding the most appropriate identification criteria (Epps, Ysseldyke, Algozzine, 1985). Although many criteria have been suggested, consensus appears to have emerged only for discrepancy, that is the difference between expected and actual achievement (Frankenberger and Harper, 1987; Mercer, Hughes and Mercer, 1985).

Discrepancy possesses too many problems to be useful as the primary identification variable for Learning Disability (Algozzine and Ysseldyke, 1987). The work of Ysseldyke and his colleagues (Algozzine and Ysseldyke, 1983; Epps, Ysseldyke & Algozzine 1985. Ysseldyke, Algozzine, Shinn & McGuire, 1982) emphasizing the inability to distinguish between Learning Disability and low achievement is often cited to demonstrate the Learning Disability problem. The problem however is not learning disability but the emphasis on a single criterion like discrepancy. The Learning Disability
phenomenon is far more complex than that which is captured in the notion of discrepancy. Kavale and Nye (1985-86) demonstrated how perceptual, memory, attention, linguistic, social, cognitive and neuro psychological factors are an integral part of Learning Disability. In a meta-analysis of almost 1,1000 studies that compared Learning Disabled and normal comparison subjects along a variety of variables concerning four major domains (linguistic, achievement, social/behaviour and neuro psychological) about 75% of LD subjects would be differentiated clearly

With such a conclusion, it becomes necessary to acknowledge these variables in conceptualizations of LD and move away from the single criterion of discrepancy.

The inability to define Learning Disability has created significant problems in classification efforts. Although Learning Disability research is marked by many sources of variability, the major culprit is heterogeneity, which creates substantial differences in LD samples (Kavale 1987). The problem of heterogeneity has been acknowledged and instead of simply denying diversity, the field is attempting to organize the differences in a meaningful fashion (Keogh 1988)

Trend

The Learning Disabilities field is growing and the growth is in the breadth of concern as much as in the number of approaches. There seems to be
a growing awareness that Learning Disabilities are not confined to a particular age group and that remediation is both possible and worthwhile at any age level. Research programmes are striving for common identification based upon needs and behaviours often held in common by many different categories of exceptionality. Preparation for specific vocational placement and general life skill capabilities has become a major part of many school programmes.

Assessment techniques as well, show the trend toward isolating individual problem factors in special children. These include techniques and instruments for measuring language development, reading comprehension and other subject matters/academic areas.

In many cases, more sophistication and the demand for empirical anchoring are more evident. Every indication is that this trend toward requiring demonstrable validity and reliability in the development of new ideas and techniques will continue.

2.2 Studies Related to Learning Disabilities

Hamada and Tamikawa (1986) developed a rating scale for screening the Learning Disabilities (Windward Rating Scale – WRS) yielded very good results in identifying the children for Specific Learning Disabilities. The methodology adopted to standardize the tool had classified the Learning Disabled correctly to the extent of 82%. The scale consisted of 65 items organized into three substantive areas – personal/social/behavioural
characteristics, perceptual/motor orientation and academic ability. Elementary school teachers were asked to rate individual students on each item using a 4 point scale reflecting the severity of the problem. Sample consisted of 437 students certified as having specific Learning Disabilities, 79 students who had been evaluated but found to be not eligible for special education services and 204 normal students. Their ages ranged from 3 to 13 years.

Descriptive Analysis, Factor Analysis, Multiple Regression Analysis, Discriminant Function Analysis, Canonical Discriminant Analysis were used for analysing the data.

The cut off score was calculated so that the students having scores above the cut off would be referred and those with scores below the cut off would not be referred for Learning Disability evaluations.

Concurrent validity, construct validity, interrater reliability of the tool were established.

Uhlman (1987) conducted a comparative study of three alternative procedures for identifying severe discrepancy in Learning Disabled students. The purpose of this study was to compare Hessler's (1985) procedure for determining a severe discrepancy between ability and achievement with two alternative procedures a) the expert opinion of teachers of learning disabled b) the results of the multidisciplinary evaluation team report. An ex-post facto design was used.
Hessler's procedure was applied using WISC – R full scale scores as the ability measure and reading, mathematics and written language scores from part 2 of the Woodcock – Johnson Psycho Educational Battery. Subjects were 27 fourth and fifth grade students logically identified as Learning Disabled and receiving special education services in Learning Disability programmes. Both test scores and copies of the multidisciplinary evaluation team report were obtained from school records. Questionnaires were used to collect the expert opinions of the teachers of learning disabled.

Correlation coefficients were computed for the three procedures. Major findings were:

1. For reading and written language achievement, there was low, little or no correlation between the procedures.

2. For mathematics achievement, there was low to moderate correlation between the procedures.

3. The higher the students IQ, the higher the correlation between IQ and the expert opinion that a severe discrepancy existed and the same correlation was not found when IQ was compared to the multidisciplinary evaluation report.

Conclusion of the study is that Hessler's procedure is as good as no better than the two alternative procedures.

The study identified Learning Disability characteristics from the diagnostic reports of 46 pre-school age children. The children were identified as Learning Disabled between the ages of three and five and remained identified as Learning Disabled three to seven years later. The symptoms characteristic of pre-school students and school aged Learning Disabled students were identified as characteristic of Learning Disabled if the symptoms appeared in 50% or more of the student records. In the pre-school age group, expressive and receptive language in addition to fine and gross motor deficits were the most frequent symptoms of Learning Disability.

Richards (1989) has undertaken a study on behavioural characteristics of Learning Disabled children.

The purpose of this study was to investigate the behavioural characteristics of Learning Disabled children. This study was designed to determine whether or not the factor structure of the Revised Behaviour Problem Check List reflected the factor structure of the problematic dimensions found in a sample of clinic referred Learning Disabled students of all school ages.

A Principal Components Analysis was performed on parent ratings of Revised Behaviour Problem Check list items for the LD children and it was found that the check list and the subscales were reliable measure of behaviour problems manifested by these LD students.
The incidence rate of clinically meaningful behaviour problems was 23.37%. Although not a particularly high rate, problems for these subjects tended to be more complex. Significant conduct disorders, anxiety withdrawal, attention problems, socialised aggression had occurred most frequently. It would appear that the Revised Behaviour Problem Checklist could be an effective tool in the identification of LD children with behaviour problems.


Maryland Student Behaviour Checklist which assess organizational skills was used as the tool. The sample consisted of a total of 104 elementary school students (52 normally achieving and 52 school identified Learning Disabled students). Descriptive, MANOVA, Discriminant analysis were used for analysis.

Results indicated a statistically significant difference between LD and non-LD students and found that relative to these normally achieving peers, the majority of LD subjects in this study had poorer organizational skills as measured by this checklist. The study empirically documents a defect in the area of organizational skills as measured by the Maryland Student Behaviour Checklist and suggests that there is a significant behaviourial contribution to the assessment of LD.

This study was designed to analyze and describe inconsistencies in procedures for the identification of Learning Disabled students within special education unit. A multiple case study approach was used within the framework of the naturalistic paradigms. Data were presented in ten case studies. Beyond the descriptions of the individual cases, a cross case analysis was used to identify specific points of variance within the Learning Disability programme. Cross case variability in diagnostic evaluation and placement procedures was found to correspond to four theoretical models of assessment a) behavioural b) educational c) psycho educational d) heuristic. Intercase consistency was found between individual definitions of Learning Disabilities and choice of evaluation procedures, utilization of additional resource personnel and criteria for eligibility.

Fuerst (1992) investigated psycho social function of children with Learning Disabilities. A sample of 728 children with LD between the ages of 7 and 13 years were taken for the study. Personality inventory for children was used as the tool. The results suggested that the patterns and level of psycho social adaptation of children with LD are remarkably stable across the age range. It appears that as children with LD grow older, they show no greater incidence of pathological patterns of psycho social functioning.
Mc Leskey (1992) gathered information about 790 students with Learning Disabilities in primary, intermediate and secondary grades and reported that identification of Learning Disabilities peaked in first grade. 76 percent of these students were identified by the end of grade 5, and students with more severe discrepancies tended to be identified at the primary level.

Schulmeyer (1992) has undertaken a study on perceptions of school professionals about Learning Disability.

Perceptions of 61 school professionals were explored regarding factors which influence the identification of students with Learning Disabilities by using a standardized open-ended interview of regular classroom teachers, teachers of students with Learning Disabilities and school psychologists. The results revealed that the three professional groups agreed regarding the typical characteristics of students with Learning Disabilities and the use of an ability-achievement discrepancy for identification.

De Laney and Kathleen (1993) compared patterns of intellectual functioning and levels of academic achievement among three different groups of college undergraduates. The three samples were composed of fifteen students who were previously diagnosed as Learning Disabled before they entered college, fifteen students with Learning Disabilities that were not diagnosed until they entered college and fifteen students without Learning Disabilities.
Woodcock – Johnson Psycho Educational Battery (revised) was administered to each participant. A qualitative interview was also conducted. Descriptive statistics, analysis of variance and multiple analysis of variance were used for data analysis.

Findings were 1) Both LD groups differed significantly from the control group in the area of verbal communication abilities, short term memory, processing speed and fluid reasoning, 2) significant differences existed between the academic achievement of new and previously diagnosed LD students compared to non LD students.

Vineyard (1993) has undertaken a study and analysed the Diagnostic Achievement Battery-2 for identifying Learning Disabled children.

The sample consisted of 28 Learning Disabled and 28 normal learning ability students. The finding was that there were significant differences between the scores (raw and standard) obtained by the LD group and non-LD group on the alphabet/word knowledge and the mathematical calculations.

Mackler (1994) undertook a study to compare neuro psychological and psycho educational approaches to the assessment of Learning Disabilities.

Seventythree special education teachers employed in public schools within New York State responded to questionnaire dealing with their perceptions of psycho educational or a neuropsychological report likes and dislikes, as well as generating recommendations for use with the child in the
The findings suggest that neurological assessment techniques should be utilized when working with a child with more complex cognitive deficits than those found within a child exhibiting signs of a mild Learning Disability. Another possibility is using a combination of approaches when conducting a full assessment of a child, in order to utilize the strengths of each approach.


A comparison was made of teacher's ratings of 16 children with Attention Deficit Hyperactivity Disorder (ADHD), 12 with Nonverbal Learning Disability (NVLD) and 32 Average Achieving (AA) children aged 7 to 13 years. The findings were 1) both ADHD and NVLD children were rated as having more problems than AA children in their attention, language, social, emotional, reading and arithmetic functioning, 2) reading was more of a problem in the ADHD group and arithmetic in the NVLD group. The differences perceived by teachers in the classroom helped to validate the ADHD and NVLD profiles.
Spinelli (1995) conducted a study on theoretical and empirical analysis of the use of severe discrepancy between aptitude and achievement in the identification of Learning Disabilities.

The focus of this study was to determine the extent to which standard score discrepancies were being used to determine eligibility for classification of perceptually impaired. The sample consisted of 50 middle and high school level students, ranging in age from 10.3 years to 18.3 years. Results of the study indicated that severe discrepancy between aptitude and achievement is not being used as the criteria for eligibility for classification of perceptual impairment.

Rankhorn (1996) conducted a study on using measures of adaptive behaviour to identify subtypes of the students with a Learning Disability.

This study investigated the relation of adaptive behaviour as measured by the Vineland Adaptive Behaviour scales – classroom edition to indices of cognitive factors as measured by the Wechsler intelligence scales for Children – Revised. The sample studied consisted of a 82 elementary students in a large suburban school district. Students in the sample were between 7.0 and 12.0 years of age.

Major findings were adaptive behaviour and intellectual measures could establish concurrently valid representations of common Learning Disability subtypes based on academic achievement was not validated. However, results
did indicate that adaptive behaviour measures of this sample were significantly lower than their levels of intellectual ability.

Scott (1996) conducted a study to validate an instrument for screening nonverbal Learning Disabilities in classrooms.

The purpose of the study was to determine the validity and reliability of a Nonverbal Learning Disability Evaluation Scale intended to screen the nonverbal Learning Disabilities in classroom settings. Validity was examined by ANOVA, Discriminant Function Analysis and factor analysis. Reliability was examined by Cronbach’s alpha (α=0.93).

The sample consisted of 10 special education and regular education teachers and 61 of the students they served. The 43 LD students had identified disabilities in learning and represented grade levels from 3-8. The 18 non-LD children were all enrolled at the elementary school level.

The results of the ANOVA and Tukey’s pair wise comparisons on NLDE composite scores indicated that three group means (nonverbal LD, Verbal LD and Non LD children were significantly different from one another. The results of the canonical discriminant functions analysis indicated that there were two functions mostly motor behaviour has separated nonverbal LD group from each of the other two. 2) Mostly the behaviour learned in a classroom setting in the areas of language and mathematics has separated both LD groups and non-LD group. The discriminant analysis correctly classified children into
their original apriori groups. Results supported the existence of a nonverbal LD subtype, (a group of students discriminable from other LD individuals)

Hurley (1997) conducted a study on profiles of Learning Disability subtypes in adolescence. A cluster analysis of 88 LD and 75 Non-LD cases was conducted to determine sub types. The present study was an attempt to empirically sub type children's Learning Disabilities using the Woodcock – Johnson Psycho Educational Battery revised (WJ-R)

A MANOVA was conducted to test the differences among the sub types identified in the sample of students with and without disabilities. Finding was that the students with Learning Disabilities are not one homogeneous group, but a heterogeneous mixture of students with different Learning Disabilities. This study contributes to the considerable amount of evidence and research supporting different types of Learning Disabilities.

2.3 Studies Related to Mathematics Disabilities

Sustained research in the area of Mathematics Disabilities is much less as compared to the area of reading disabilities. In 1919, Henschen reported that number blindness could occur independently of specific reading disability.

Later Cohn (1961) observed that memory and order-disorders frequently occurred along with numerical problems. He concluded that Dyscalculia may result from lesions in widely disparate regions of the brain and these lesions
disturbing the physiology of the central visual apparatus, alter the processes of arithmetical order.

Many children fail to acquire mathematics concepts because they lack the cognitive maturity to understand them. Johnson and Myklebust (1967) reported that in the early years learning disabled children seldom enjoy working with puzzles or blocks, hence difficult in sorting and matching objects, and understanding the language of mathematics.

Piaget’s (1969) work continues to remain the most significant contribution in explaining how children acquire quantitative concepts. According to Piaget, the understanding of mathematical concepts is directly linked with stage specific development.

In the elementary classes, the child with problems in arithmetic will find it difficult to perform simple computational problems (Otto, Mc Menemy and Smith, 1973).

Kosc (1974) introduced the term developmental dyscalculia which he defined as a “structural disorder of mathematics which has its origins as a genetic or constitutional disorder. According to Kosc, an individual who has low functioning in mathematics had above average intelligence.

Johnson (1979) has presented a behavioural task analysis strategy for relating arithmetic difficulties to Learning Disabilities and undertaking informal diagnosis and remediation.
Cawley (1981) noted that information related to the assessment and intervention of student's mathematical problem is so sparse that there is not a sufficient historical perspective to generate issues and controversies. He advocates greater emphasis on what shall we teach, when shall we teach it and in what sequence is it best taught in imparting mathematics to the Learning Disabled children.

Other researchers had spent time comparing the mathematics performance of students with disabilities with that of students without disabilities. Although reports have emerged discussing the poor mathematics performance of many students, numerous investigators had found that students with Learning Disabilities experience even greater difficulty in mathematics than their peers without disabilities (Ackerman, Annalt and Dykman, 1986, Fleischner et. al., 1982, Goldman, 1989, Lee and Hudson, 1981, Mc Leod and Armstrong, 1982).

Structured concrete materials are beneficial at the concept development stage for mathematics topics at all grade levels (Herbert 1985, Suydam, 1984). There is research evidence that students who use concrete materials actually develop more precise and more comprehensive mental representations, may better understand mathematical ideas, and may better apply these to life situations. (Harrison and Harrison, 1986). Structured, concrete materials have been profitably used to develop concepts and to clarify early number relations, place value, computation, fractions, decimals, measurement, geometry, money,
percentage, number based story problems, probability and statistics (Bruni and Silverman, 1986).

Murray (1988) investigated the relationship between spatial abilities and mathematics achievement in normal and Learning Disabled boys. Subjects were 30 normal and 30 Learning Disabled boys, ages 12 to 14. Learning Disabled boys were further divided into those with low achievement in both mathematics concepts and mathematics computation (17 subjects) and those whose achievement in both of these areas was in the average range (13 subjects). Stanford achievement test, JM spatial battery were used as tools.

Major finding was that Normal boys and the Learning Disabled boys with average mathematics achievement performed better on tests of visualization and two dimensional tests than did Learning Disabled boys with low scores in mathematics achievement, when time was not a factor in spatial testing.

Mercer and Miller (1992) in their study found that a curriculum with strategic math series was effective in teaching students with learning problems to acquire and understand basic facts and apply them in problem solving activities.

Montague (1993) conducted a study on cognitive strategy, instruction and mathematical problem solving performance of students with Learning Disabilities. Junior high school students (n=72) with Learning Disabilities...
received direct instruction in cognitive strategies, instruction in meta cognitive activities, or both. Students improved in mathematical word problem performance and compared well with normally achieving peers.

Scott (1993) conducted a study on multi sensory mathematics for children with mild disabilities found that “Touch Math” manipulating materials were helpful for students with disabilities to acquire mathematics facts and computational skills.

Wood (1993) investigated the effects of tape-recorded self instruction cues in the mathematics performance of students with Learning Disabilities. This study, involving 9 students (ages 8-11) with Learning Disabilities found that one session of self-instruction training was not sufficiently powerful for students to learn a strategy for solving arithmetic problems, but a second session and access to tape-recorded cues resulted in improved performance.

Zentall and Ferkis (1993) in their study found that when IQ and reading ability are controlled, “true” math deficits of students with Learning Disabilities, attention deficit disorders and ADHD are specific to mathematical concepts and problem types. Slow computation affects problem solving by increasing attentional load.

scored higher and had greater growth rates in 4 mathematics domains (basic concepts, listening vocabulary, problem solving and fractions) than did age equivalent students (n=206) with mild mental retardation. Data indicate the need to carefully consider curriculum and instructional decisions for these two groups of students.

Jitendra and Hoff (1995) in a study examined the effects of a schema based direct instruction strategy on the addition and subtraction word problem solving performance of three third and fourth grade students with Learning Disabilities. An adapted multiple probe across subjects design was used. The intervention involved training students to distinguish “change”, “group” and “compare” problems and to label problem components using schematic diagrams for these problem types. Results indicated that the intervention was successful in increasing the percentage of correct word problems for all three students.

Jordan (1995) assessed the early mathematical disabilities and examined children’s early mathematical thinking, emphasizing counting and calculation skills.

Miles and Forcht (1995) investigated mathematics strategies for secondary students with Learning Disabilities Deficits common among secondary students with Learning Disabilities were identified and the strategy
involved use of a mentor to help students to comprehend mathematics vocabulary and develop their own problem solving strategy

Shiah (1995) investigated the effects of computer-assisted instruction on the mathematical problem solving of students with Learning Disabilities. This study, involving 30 elementary students with Learning Disabilities, found that students performed significantly better on mathematics tests given using a computer than by paper and pencil. It was found there were no differences among variations of computer-assisted instruction, with either static or animated pictures and either utilizing or not utilizing a seven-step cognitive strategy for solving arithmetic word problems.

Marsh and Cooke (1996) investigated the effects of using manipulations in teaching mathematics problem solving to students with Learning Disabilities. Three third graders with a history of low achievement in mathematics were first given verbal instruction in solving word problems. Students were then introduced to manipulative instruction using Cuisenaire rods to set up word problems. Students exhibited immediate and sustained improvement on subsequent probes administered without manipulatives available.

Salend and Hofsteller (1996) conducted a study on adapting a problem solving approach to teaching mathematics to students with disabilities and concluded to use visual presentations, establishing connections to daily life, use manipulatives, provide models cues and prompts, use peer mediated
instruction, teach self management techniques and learning strategies in teaching mathematics.

2.4 Studies Related to Learning Disabilities and Research Variables

Learning Disabilities and Home Life Experience

Hebda (1988) in a study concluded that the presence of a Learning Disability may be related to additional stressors in the family and Learning Disabled children with greater academic deficits who come from non-intact, larger families characterized by low adaptability appear to be at the greatest risk for the development of coexistent behaviour problems.

Mishra (1991) in his study found that parental aspirations and living conditions of the home environment had a significant effect on the language acquisition of Learning Disabled children.

Grizzle (1994) found a strong relationship between active parent involvement in educational activities at home and academic achievement of Learning Disabled children.

Matsopoulos (1995) reported that considerable variability on parental involvement with learning at home, parental values about school achievement and parental emotions within families with Learning Disabled children. Mothers exhibited more emotional reaction, disappointment and frustration when their children with LD were first born. Parental involvement was significantly higher for parents whose children attended second grade versus parents whose children attended third or fourth grade.
Pope (1997) reported that the parent involvement positively affects outcomes achieved by Learning Disabled students transitioning to post secondary activities (e.g. employment, job training, vocational education, work experience programme, academic programme)

Smith (1997) in his study found that to the extent that the parents were emotionally and psychologically available for their child, the Learning Disabled child appeared to make greater academic progress and to develop positive self-esteem in a number of domains

**Learning Disabilities and Intelligence**

Johnson and Myklebust (1967) suggested that a score of ninety and above in the performance of verbal areas of an intelligence test may be one of the criteria to determine if a child meets the ‘legal definition’ of being Learning Disabled.

Brown (1975) attempted to study the relative influence of cognitive and meta cognitive abilities on Learning Disabilities and found that cognitive abilities are not showing significant influence on Learning Disabilities. Meta cognitive processes were significantly influencing Learning Disabilities.

In a corroborative study of Recarte (1979) made with school children who were not mentally retarded or having any apparent incapacitating deficiencies but had reading disabilities. They manifested poor capacities for verbal intelligence, but they had higher scores on performance measures.

The contemporary thinking that the Learning Disabled need not be isolated and put into a special stream of education emerged from many studies.
in the 1980’s showing the incidence of Learning Disabilities even among otherwise normal children with out any neurological or physical deficits

Naglieri (1980), Fleishner and Danzig (1980) compared general cognitive abilities of the Learning Disabled with that of the abled. Findings were not consistent though some differences could be observed in cognitive ability between normal and brain damaged learning disabled

Clark (1983) in his study attempted to explain the disability with Guilford’s model of intellect and finally found the symbolic content of the intellect alone to be the most discriminating factor of the disabled from the abled and that the other factors of intellect were not so predominant especially among the mildly disabled.

The study of Montgomery (1986) showed that the intelligence scores of the Learning Disabled were identical with that of the normal.

The later half of 1989 brought forth few observations against the IQ correlates of Learning Disabilities (Siegal, 1989) Siegal found poor correlations between low IQ and Learning Disabilities and in some cases low IQ not contributing at all for certain Learning Disability subtypes.

Friedrichs (1990) tried to identify giftedness among the learning disabled.

Naglieri and Dass (1993) found from their observations of the Learning Disabled that it is irrelevant to use an IQ score to predict Learning Disabilities because all those who had resulting failures were otherwise normally achieving.
Learning Disabilities and Behaviour Problems

Research reports on the relation between Learning Disabilities in general and behaviour problems dates back to the forties. Researchers who attempted to justify the independence of behaviour problems among the Learning Disabled fraught with problems and found it to be impossible (Kavale, Forness and Bender 1987).

Myers and Hammill (1969) outline some of the behaviours of Learning Disabled children as Hyperactivity, hypoactivity, in-coordination, prolonged dependency, too little and excessive attention, disorders of perception, memory etc.

Deficits in attention, both in degree and type have been noted in research reports (Hallahan, Kauffman and Ball 1973) and elaborated on at length as a major component of nearly all Learning Disability problems.

Vasumathi (1976) had attempted to investigate the relation between behaviour problems and reading and arithmetic disabilities, with hundred ten year old children and found high positive correlation between behaviour problems and reading and arithmetic disabilities.

The studies of Bryan and Bryan (1978) had indicated about behaviour and personality problems among the Learning Disabled.

Fleener (1983) in his assessment of Learning Disabilities and their attributions found the Learning Disabled students to manifest criminal and delinquent behaviour. Golden (1983) also supported the view that behavioural
maladjustments were prevalent among the learning disabled. Most of the Learning Disabled students were hyperactive, unable to sit still. In fact, the great majority of children with attention deficits are also hyperactive (Whalen, 1983).

Gilge (1989) compared gender differences in Learning Disabilities and analysed the extent of behaviour contribution to Learning Disabilities. The Learning Disabled girls were better than the boys in performance and were found to be more impulsive than boys. The multivariate study of Luebke (1989), White (1989) also suggested the significant influence of behaviour problems among the Learning Disabled.

Richards (1989) in his study on the behavioural characteristics of the Learning Disabled children found withdrawal behaviour, aggression and inattentiveness was nearly always present among the Learning Disabled and emphasized need for effective remedial programme for the learning disabled.

Bender (1990) made an exhaustive and extensive review on the studies with reference to behaviour problems of the Learning Disabled and found consistent and unilateral association revealed between behaviour deficits and learning deficits in most of the studies and also indicated that in almost all the studies the Learning Disabled were found to manifest problem behaviours such as distractibility, impulsivity, conduct disorders and sometimes withdrawal behaviour.
Smith (1990) found behaviour disorders to be positively associated with Learning Disabilities. Similarly Toro (1990) found behaviour problems such as high frustration, intolerance and non-assertiveness among the eleven year old Learning Disabled children, in comparison to the able.

Vasanthi (1991) attempted to study the relationships between behaviour problems and mathematical Learning Disabilities found that there is a positive relation between mathematical Learning Disabilities and behaviour problems among boys, girls and coeducation pupils belonging to monolingual, bilingual and trilingual groups from Government, Matriculation and Central Schools.

2.5 Previous Studies in India - Learning Disabilities

Bhattachary (1977) conducted a diagnostic study on Learning Disabilities in algebra. The important objectives were:

1. To diagnose the detailed patterns of disabilities of the students in specific areas of algebra with the help of specially designed tools.

2. To try out, experimentally, the teaching methods which would prevent the development of Learning Disabilities in those areas.

Sample consisted of slow learners both boys and girls of class III numbering 238 in case of addition and 252 in case of multiplication.

Diagnostic tests in addition and multiplication were developed. The extent of disabilities found by structured interview of 20% randomly selected students was related with the disabilities found by tests.
The major findings were The patterns of disabilities were found to be fifty-nine incase of addition and thirty-seven in case of multiplication The preventive measures developed and which involved teaching through audio-visual methods was tried out by having control groups and experimental groups in four different schools. The same teacher taught the four groups and the developed diagnostic tools were used as post tests. The developed audiovisual method of teaching was found to be effective. It was noticed that it also helped in motivation and retention.

Bhattacharya (1982) has undertaken a study on diagnosis and prevention of the Learning Disabilities of primary school students in arithmetic by selecting a sample of 450 students from Class V

Major findings were: 1) The experimental groups taught by audio-visual materials and techniques achieved significantly more than the controlled groups taught by the conventional method 2) Learning through audiovisual materials and techniques caused more prolonged retention than that by the conventional method. 3) The experimental groups showed more interest in the lesson than the controlled groups

Rama (1984) has undertaken a study on diagnosis and remediation of dyslexia. The major objectives of the study were

1) To identify dyslexics from among Kannada readers studying in grades III and IV of elementary school
2) To develop tests required at different phases of the study
3) To analyse the types of errors committed by different groups of children while reading Kannada

4) To study the effectiveness of the remedial programme in improving the speed and accuracy of Kannada word recognition in case of dyslexics

The sample of 14 dyslexics was drawn from among a group of 550 children who were studying in grades III and IV through an exclusionary approach by using a set of criteria.


One-way ANOVA and chi square techniques were used to analyse the data.

The major findings were 1) Dyslexics were differentiated from the other two groups by visual verbal association ability 2) Dyslexics may or may not have deficiency in one or more visual and auditory processing skills 3) There was no qualitative difference in the reading errors committed by the three groups of readers. 4) The remedial programme was found to be effective in improving the accuracy of letter and word recognition to a considerable extent among all types of dyslexics.

Desai (1985) investigated Learning Disabilities of primary school children. The main objectives of the investigation were 1) To study different
types of Learning Disabilities commonly found in grade IV Primary school children in Ahmedabad City. 2) To investigate their probable causes 3) to devise and try out remedies for correcting those Learning Disabilities. A sample of (grade IV) 272 children was drawn from three private schools and three municipal schools from the Navrangpura. From this sample, seven groups viz., the normal control group, Learning Disability group and five Learning Disability experimental groups were formed. The average IQ of all the six Learning Disability groups was 100 while that of the normal control group was 115.

Goodenough's Draw-a man test, Diagnostic tests in language and arithmetic were used as tools. Interviews of teachers and parents were also held. ANOVA was applied to analyse the data. Major findings were 1) The most potent cause of Learning Disability was poverty. 2) The second cause of the malady was the apathy of teachers to their duties in school. 3) The third cause of Learning Disability was the abolition of examinations from standards I and II in the schools of Gujarat.

Shah (1985) conducted an exploratory study on Dyscalculia amongst first graders of Choryasi. The major objectives were

1. To identify children suffering from dyscalculia in the first grade of primary schools of Choryasi block.
2. To study relationships between the achievement in arithmetic and three psychological factors viz., intelligence, problems faced by the children and parent child relationship.
3. To offer suggestions for decreasing the dyscalculia amongst the first grades
4. To carry out case studies of ten children having severe problems of dyscalculia.

A total sample of 897 children (465 boys and 432 girls) from 22 primary schools were selected for the study. The tools used were 1) Arithmetic evaluation test 2) Individual intelligence test (by Sunil Patel) 3) Student problem inventory 4) Parent-child relationship scale (by Sharma and Chauhan) 5) Interview schedule for the parents. Descriptive and differential analyses were used.

The major findings of the study were:

1. The general mean achievement score of the group was 19.49 (Maximum Marks 70)
2. The children of private schools were significantly superior to children of municipal corporation school and district Panchayat School.
3. Coefficient of correlation of achievement scores with IQs of the whole groups was significant at 0.01 levels.
4. The children were found suffering from the following misconceptions and errors
   a. They considerably failed to take a decision about the process, whether to make addition or subtraction.
   b. The children had a habit of answering the question without understanding or pre-thinking.
   c. Due to poor grasp of words and language, children failed to write the number in words and vice versa.
5) The case studies of the children revealed
   a) Parents were remarkably inattentive towards their children.
   b) The schools had no special programmes or schedule of remedial teaching for these children
   c) Some students suffered from an inferiority complex and lacked self-confidence
   d) In spite of all the physical facilities and good IQs some of the cases were found to be very low in academic progress

Bhattacharya (1987) investigated the Learning Disabilities developed by secondary school students in the area of equation–sums in algebra

The major aims of the study were,

1) To conduct a survey of the Learning Disabilities developed by the beginners in secondary schools under the West Bengal Board of secondary education in linear equation

2) To conduct a scientific experiment on the effectiveness of two mathematical methods for prevention of Learning Disabilities usually developed by beginners in linear equation–sums in one unknown in Algebra and

3) To provide from the results of the experiment a satisfactory mathematical method for beginners for solutions of linear equations.

The sample of 1000 class VIII students of 24 schools were taken for the study. A diagnostic test on linear equations in one unknown and three diagnostic tests on knowledge of solving, understanding and application of the same were administered. Control and experimental groups of equal size were set up in each school. Lesson units were prepared and the experiment was
carried out. t-test, ANOVA were used for analysis. Some of the major findings were:

1. **Students develop more Learning Disabilities in the understanding and application of linear equation sums in one unknown than in the knowledge of solving such sums**

2. **The simplified method is more effective than the method of transposition for the development of knowledge and application ability of students in linear equation sums in one unknown**

Dutta (1990) conducted a diagnostic study of Learning Disabilities in the reasoning power of the students in geometry. The main purposes of the study were:

(i) **To diagnose the major patterns of disabilities in a specific area of geometry with the help of tools specially developed for the purpose.**

(ii) **To tryout experimentally teaching methods which would prevent development of Learning Disabilities in the area under study**

The study had two dimensions. The first was diagnosis of patterns of disabilities of students in the concepts of congruency of triangles in geometry. The second part consisted of preventive measures adopted by the experimenters to check development of Learning Disabilities in this area with the help of audiovisual methods and techniques.

A diagnostic test in congruency of triangles was constructed to identify patterns of disabilities and was administered on 286 slow learners in geometry.
Structured individual interviews were conducted with 20% students selected randomly from the original sample.

In the second phase, the experiment was conducted in four secondary schools with controlled and experimented groups. The initial measures by the verbal creativity test and criterion measures by the diagnostic test in geometry were subjected to analysis of covariance. Some of the findings were:

1. Thirty-three major patterns of disabilities were identified.
2. The experimental groups taught by audio-visual materials and techniques achieved significantly more than controlled groups taught by conventional methods.

Vasanthi (1991) investigated mathematical Learning Disabilities in relation to certain psychological, social and educational factors among seventh standard pupils. The major objectives of the study were:

1) To identify the various types of mathematical Learning Disabilities among seventh standard pupils.
2) To establish the relationship between mathematical Learning Disabilities and psychological factors such as intelligence, extraversion, neuroticism and behaviour problems.
3) To study the relationship between mathematical Learning Disabilities and socio economic status, gender, and linguistic pattern.

A sample of 1172 was taken from seventh standard boys, girls and coeducation pupils belonging to the age group of 11 and 13 years from Government, Matriculation and Central schools.
Mathematical Learning Disabilities test, intelligence test, extraversion neuroticism measure, behaviour problems rating scale and socio economic status scale were used as tools.

Stepwise Regression Analysis and Multivariate Analysis of Variance were used for analysis. Major findings of the study were

1) Mathematical Learning Disabilities have been found to classify into ten interrelated groups.

2) Mathematical Learning Disabilities have a significant relation to intelligence, socio economic status behaviour problems among the different gender, linguistic patterns and different educational systems.

Gupta (1998) had undertaken a study on the incidence and nature of Learning Disabilities at the end of class II in language and arithmetic and to evolve preventive strategies. Major objectives of the study were

1. To find out the incidence rate of children with LDs in the schools of section block under DPEP district M P

2. To explore the procedure to identify and assess the children with LDs.

3. To develop diagnostic tests to study the nature of LDs in Hindi language and in Arithmetic

4. To evaluate strategies to enhance the competencies of regular classroom teachers to prevent LDs to occur at class I and II
Out of 100 children, 68 Learning Disabled children were short listed on the basis of medical and psychological assessment. Finally, 40 LD children 20 each in arithmetic and language were selected on random basis. Diagnostic tests in Hindi and arithmetic were used as tools. Descriptive method was used for statistical analysis.

Major findings were:

1. The incidence of LD children of grade III was found 7.4% in case of Government, Primary Schools which comprise 4% boys and 3.4% girls.

2. All children displayed deficit in Hindi language particularly in written language, oral reading and recognition of words and sentences.

3. In arithmetic, LD children showed deficiency in arithmetic operations, sensation, visual spatial orientation, and auditory sequential memory verbal numerical and temporal relationships and visual auditory association.

Vaidehi (2000) has undertaken a study to find out the problems faced with dyslexic children and remedies to overcome them. In this study, identification and assessment of LD children was taken up. A sample of 1197 children from UKG to class IV level was selected and tested using the grade level assessment device. Children who failed consistently were tested in one class lower to observe for processing problems. A total of 112 such children were identified. A schedule for assessing children to find out their class equivalence in academic performance in India was also developed. Comparison
of the teacher ratings on class tests and the child’s performance on the tool match to a great extent. Resource education package was also provided how to teach such children in detail.

Kumaran and Menon (2002) developed and validated the Rating Scale for Screening the Learning Disabled Normative Survey Method was adopted. Sample consisted of 105 Learning Disabled who were attending special schools and 155 children attending normal schools were randomly selected. The rating scale consisted of 75 problem statements grouped under the areas 1) Problems in Academic Performance 2) Psychosocial Problems 3) Anxiety 4) Problems in Perceptual and Motor Performance.

The teachers in special schools and normal schools were asked to rate each child on each item, using 4 point scale reflecting the severity of the problem.

Factor analysis was used to group the items under four factors mentioned earlier. Discriminant Function Analysis was used to calculate the cut off score. The pupils who scored the above this cut off were called Learning Disabled and those who scored the below that were called normal.

The Reliability of the classification based on the cut off score was tested with the help of Discriminant Function Analysis which has classified 96 15% of cases correctly.
2.6 Studies Related to Academic Backwardness

The importance of Academic Performance has raised several important questions for educational researchers. It seems a fertile area of research for psychology and education. Numerous investigations on the social, psychological correlates of Academic Performance have been reported in India.

The major areas of educational concerns for Academic Performance were

1. School and home environment contributing to students performance
2. Curriculum development and modification
3. Teaching strategies and methods
4. Personal and individual variables attributing to academic performance.
5. Other demographic variables influencing academic performance.

According to Lavin (1965), Academic Performance is based on a number of factors such as children’s attitudes, interests, personality characteristics, social class etc.

Gulliford (1969) identifies five groups among backward pupils such as pupils with limited intelligence, culturally or socially disadvantaged pupils, pupils with personality difficulties, pupils with specific learning difficulties and children with handicaps.
Backman (1970) in his study found that there is a close relationship between socio economic status and educational aspirations of a student.

Kolesnik (1970) reported that the existence of an emotional problem can severally inhibit academic performance.

Buch (1974) reported some of the causes for academic backwardness as poor study habits, adjustment problems, greater anxiety, negative self concept and attitudes, lack of interest, neuroticism, extraversion and poor socio economic status.

Srivastava (1974) expressed the main factors of academic failure as poor environment, crowded living condition, parents ignorance, parents illiteracy and inadequate training by parents.

Perry (1988) has undertaken a study of factors contributing to Academic Backwardness of students in the seventh and eighth grade in a small rural public school and found that study skills, attitudes, perceived parent attitudes are some of the factors contributing to backwardness.

Robertson (1995) in his study examined how the culture and climate of school appeared to impact student academic achievement levels. Findings support that no matter what the students race, ethnicity, cultural affiliation or socio economic standing, the learning environment of the school does indeed play an essential role in enhancing student academic achievement levels.
Lee and Evans (1996) in their study found that weak fine motor skills, poor eye-hand coordination marks academic backwardness. Academic success was more prevalent in higher socio-economic status groups.

Roberts (1996) conducted an exploratory study of factors which stunt the academic achievement and found that inadequate study methods and habits, inadequate academic orientation, defective social orientation, family background problems, educational backlogs, a negative self-concept, language backlogs all contribute to poor academic achievement.

2.7 Studies Related to Mathematics Backwardness

Mathematics educators have stressed factors of cognitive abilities and certain intellectual variables to be prerequisites of mathematical competence. Factors such as low quality of schooling, confusing textbooks, inadequate teaching are other factors found to be interacting with the primary factors of intellectual and non-intellectual nature (Cawley 1976).

Higham (1985) revealed the significant positive influence of cognitive process on mathematical learning difficulties.

Warrick (1990) reported that the four components (planning, attention, simultaneous, successive) of cognitive processing were the best predictors of achievement in three areas of mathematics (mathematics concepts, problem solving, and computation).
Evans and Goodman (1995) analyzed the factors behind children's learning difficulties in mathematics and found that poor self-image, learning style, poor language skills, lack of mathematics experience at home, different cultural backgrounds, gender differences and dyscalculia are some of the factors leading to backwardness in Mathematics.

Cleare (1996) identified eight factors (academic, instructional, psychological, school policies, school personnel attitudes, verbal/ non verbal abilities, mathematics curriculum, and teaching qualities were the possible contributors to under achievement in mathematics among Bahamian High School students.

Wells (1996) in his study found that gender, level of parent's education, degree of mathematics preparation of the teacher, textbook coverage, weekly classroom assessment time, mathematics curriculum, geographic region, and type of school are some of the factors associated with African-American students mathematics success.

2.8 Studies Related to Academic Backwardness and Research Variables

Academic Backwardness and Home Life Experience

Morrow and Williamson (1961) reported that parents with high educational aspirations have been found to give their children more praise and approval, show more interest and understanding, to be closer to their children and to provide them with more of a feeling of family belongingness.
Mehra’s (1980) study revealed that in a large family with many siblings, the achievement scores were affected for the worse and educational status of the family proved to be helpful in achievement than material condition.

Pandey (1985) reported punishment aspect of home environment is negatively related to achievement among deprived and non deprived girls.

Gakhar (1986) found that father’s income, parents education are potentially effective in causing significant differences in the learning of mathematics concepts.

Phillips (1988) has undertaken a study to investigate the characteristics of the student’s family, psychosocial and socio demographic attributes of the family and academic performance in children. He reported that both sociodemographic and psychosocial family attributes related to students achievement. The basic style in the low achiever’s families was characterized by low degree of cohesion, expressiveness, intellectual, cultural orientation, moral-religious emphasis, organization and congruence and high degree of conflict and external locus of control.

Lalyre (1989) has suggested strong links between home environment factors and the early development of mathematical concepts of Hispanics. Caste and immigrant minority categories are better predictors of mathematics achievement among low income Hispanics than parental education and occupation levels.
Han (1990) has undertaken a study to investigate differences in family climate and home literacy environment of high and low achievement groups of Japanese-American students. He reported that home literacy environment has a positive relation to academic achievement but no differences were found between the groups concerning the impact of family climate characteristics.

Sanchez (1992) reported that academic achievement of American-African high school students was a combination of student ability, parent beliefs and parent support for education, a strong belief in education, resulting in a high priority on educational activities and the exercise of parental control provided the student with sufficient time to develop study habits essential to school success.

**Academic Backwardness and Intelligence**

Rao (1965) studied relationship between intelligence and academic performance and found that there was a cumulative effect of intelligence contributing to scholastic performance.

The study conducted by Lalitha (1979) revealed that high and low achievers in mathematics differed significantly in intelligence.

Seginer (1980) in his multivariate model of the study on the effects of cognitive and affective variables on academic ability determined that cognitive variables had a significant contribution to academic ability.
Rastogi (1983) in the study on Diagnosis of weakness in arithmetic as related to the basic arithmetic skills and their remedial measures found that intelligence was related to performance in mathematics.

Vander and Hulshof (1984) in their study found that subjects with low intelligence achieved less in academic performance with high anxiety.

Rao (1986) in the study 'an investigation into the relative effectiveness of guided discovery and expository approaches of teaching mathematics' found that intelligence had no effect on achievement in mathematics when taught by guided discovery and expository approaches, except in the case of urban boys.

Singh (1986) conducted a study of some possible contributing factors on to high and low achievement in mathematics of the high school students of Orissa. The study revealed that achievement in mathematics was positively related with intelligence.

**Academic Backwardness and Behaviour Problems**

Common problems of school children include truancy, bullying, lying, stealing, destruction of common property etc. These problems and mental conflicts may arise due to variety of factors, some residing in the individual, some existing out of school situations, some from uncongenial home conditions and others from unsatisfactory social conditions around.

Morse (1965) through a number of surveys found that the 30% of school age population had behaviour problems.
McCarthy and Paraskevopoulos (1969) used factor analytic techniques to examine the behaviour patterns of learning disabled, emotionally disturbed and average children and it was found that both emotionally disturbed and Learning Disabled when compared to normal children displayed more conduct problem behaviours.

James, Jeanne and Mirian (1975) concluded on the basis of their research study that a student who is attentive, independent and task oriented is more likely to succeed academically than the child who is distractible, dependent and passive.

Stewart and Valentina (1976) found that students who are submissive tend to be more intelligent and demonstrate high academic performance.

McIntosh (1990) examined the aggressive behaviour of children by peer ratings. Significant positive correlation was found between peer ratings and least liked friendships.

Lane (1998) compared the effectiveness of academic and social skills interventions with first grade students identified by their classroom teachers as at risk for behaviour problems. The results suggested that brief interventions implemented in schools without a parental component may not be adequate to prevent behaviour problems in children.

2.9 Previous Studies in India – Academic Backwardness

Lohithakshan (1960) conducted an analytical and experimental study of backwardness at the primary school stage. In this study, out of 710 children
tested, 134 pupils proved to be retarded by over an year in both mother tongue and arithmetic. Major findings were.

1. Educational backwardness is associated with communal backwardness
2. Early admission was found to have healthy influence in educational achievements
3. Poor economic conditions, poor home conditions, irregular school attendance, illiteracy of parents are fairly correlated with educational backwardness
4. There is no marked sex difference in educational backwardness
5. The intelligence of the backward group is significantly lower than the normal children.

Lulla, Shah and Darji (1966) investigated into the academic causes of backwardness in mathematics at the elementary stage (class I – VII) Some of the findings were

1. The syllabus was out of dated and lop-sided.
2. Some content in the syllabus was difficult to teach
3. The textbooks made use of both the old and new measures.
4. Limited scope for oral work weakened the skill of calculation in the pupils.
5. Self explanatory illustrations were found quite inadequate.
6. For first three grades, there were no prescribed textbooks
7. Teachers failed to understand 4 fundamental methods to be followed
8. Majority of the schools had no reference books.
9. Sometimes pupils were admitted at a premature age
10. Time table was not rigidly followed
11. There was no provision for effective and useful teaching aids.
12. Over crowded classes, frequent transfer of the teachers, irregularities of attendance contributed a lot for the low achievement of the pupils.
Patel (1967) has undertaken a critical study of the character traits of dull students studying in the secondary schools in rural area and their educational problems.

The study aimed at 1) locating the dull and educationally backward boys and finding out appropriately the proportion of such students in secondary schools chosen for the study, 2) determining those traits that may be said to be differentiating such students from the average ones, 3) knowing the educational difficulties of such children along with the teachers problems

A sample of 111 dull and backward and 125 normal students was drawn from nine secondary school in rural areas in Gujarat

It was found that (1) tardiness, truancy, unpunctuality and non-talkativeness were the differentiating traits of the dull and backward students 2) Dull and backward students had less educated parents and generally came from poor families. 3) Their families had less hold on the social life of the village and spent less on study. 4) Dull and backward students were slow learners and careless and irregular in their studies and attendance. Students who fail were disturbed at home while studying

Puranik and Kundley (1969) conducted a study of the educationally backward children in the age group 8-12 years in Nagpur schools.
The study was undertaken to study educationally backward pupils with regard to their intelligence, vocabulary equipment, arithmetic ability and emotional problems.

Findings revealed that educationally backward and bright children differed significantly in intelligence, vocabulary and arithmetic ability. Bright ones scored high on each test. These factors seemed responsible for 40% of the backwardness among the children. They hailed from very low socio-economic strata. Of the factors studied, poor socio-economic conditions seemed to be more responsible for causing backwardness among the children.

Gupta (1972) investigated backwardness in mathematics and basic arithmetic skills. The purpose was to provide a standardized tool to the learners and research workers whereby they would be able to diagnose the weak areas in mathematics. The pretreatment tests were administered to 294 boys and 265 girls of grade VIII from selected eight Government schools. Out of these, 180 boys and 176 girls were selected for the final study. Tools used were

1. Raven’s progressive matrices
2. Attitude scale
3. Mathematics achievement survey test prepared by NCERT.
4. Diagnostic tests in basic arithmetic skills

The important findings were 1) Low achievers in mathematics had poor command where as high achievers had good command over basic arithmetic skills. 2) Attitudes improved significantly when command over basic skills improved. 3) Low achievers in basic arithmetic skills had negative attitude.
towards mathematics while high achievers had positive attitude. 4) There was a positive relationship between intelligence and basic arithmetic skills but attitude towards mathematics was not significantly related to intelligence. 5) There was a significant and positive correlation between intelligence and achievement in mathematics. 6) Basic arithmetic skills could be quickly and conveniently mastered by the course of self-help in basic arithmetic skills and 7) There were no significant sex differences either in attitudes or in achievement in mathematics.

Mishra (1977) conducted a study of educational backwardness in science and mathematics at delta level in Varanasi district.

A sample of 1,060 Class VIII from 17 schools of Varanasi district was taken for the study.

Major findings were:

1. In all, 23.58% students were educationally backward in science and mathematics. Out of the total backward cases 63.8% showed marked deficiency in one subject and 36.8% showed backwardness in both the subjects.

2. The general level of achievement in mathematics was almost the same among boys and girls both in urban and rural areas. However backwardness in science was more marked in the rural areas than in the urban.

3. Inferior intellectual potentiality was the most important cause of educational backwardness.

4. Differences in percentage of attainment sex wise and rural/urban area wise were not significant.

5. Socio economic factors were associated with educational attainment.

6. Educational attainment was significantly and negatively related to family size, positively with parental education and hierarchy of father's occupation.
Ghosh (1982) conducted a diagnostic study of scholastic backwardness in the basic processes in arithmetic. Major objectives were: 1) to diagnose children's difficulties in specific areas of addition and subtraction in arithmetic with the help of specially developed diagnostic tools 2) to suggest preventive measure for removing the expected learning difficulties in those areas. Sample consisted of 200 students of class II of six primary schools selected from culturally, socially and economically disadvantaged areas.

Conclusion: The experimental groups taught by the Piagetian methods achieved more than the control groups taught conventionally 2) The experimental groups showed significantly better achievement than the control groups when both the groups were evaluated in the post test, 15 days after the experiment 3) The experimental groups showed greater motivation towards learning.

Upadhyaya (1983) investigated educational backwardness of girls in Rajasthan.

The study aimed at 1) identifying the causes of educational backwardness of girls 2) suggesting remedial measures that would enable a larger number of girls in the age group 6-13 to participate in educational programmes.

50 villages in Rajasthan were selected and collected information about the members of the family and the education of children in the age group 6-16.
The findings were: The poor income of the family, negative attitude of parents and community towards girls education, early marriage, absence of general facilities in the school, poor motivation for learning are some of the causes of educational backwardness of girls.

Meenakshi (1984) investigated the factors causing backwardness in mathematics at the X standard level in some of the city schools in Madras and found out that mathematics backwardness was the result of the combination of several factors like interest, ability, health, attitude towards their teachers, working habits, students behaviour, school and home environments.

2.10 Studies Related to Mathematics Attitude

Mishra (1980) studied the attitude of the pupils towards mathematics in relation to parent's qualifications, profession, income, family size, reading facilities and so on. Of all the variables studied, parent's qualification influences the attitude of boys only whereas girls remain unaffected by the qualification of parents.

Rastogi (1983) while diagnosing weaknesses in arithmetic as related to basic arithmetic skills reported that attitudes were closely linked to mathematics achievement.

Among the IX and X class students Patel (1984) found that the pupils possessing a favourable attitude towards mathematics were better in mathematical ability than those with a less favourable attitude.
Basavayya and Patnaik (1985) also reported that parental education has got a positive effect on the attitude of pupils in mathematics.

However Ismail (1987) in his attempt to identify variables that could predict mathematics about for African-American students in San Francisco Bay area high school found no significant relationship between parental education and attitude, while significant differences in mathematical attitude was reported between achievers and under achievers.

Pillar (1989) investigated the relationship of attitude towards mathematics to the familial and academic environments of eight students using case studies. The findings of the investigation revealed that familial and academic environments are closely related to the development of attitude.

Cynthia and George (1991) investigated the relationships of attitude towards mathematics with mathematics achievement, parental support and gender among the adolescents from United States and Thailand. It was found that mathematics achievement, parental support and gender were significant predictors of attitude towards mathematics.

Rosaly (1992) attempted to find the relationship, if any, between attitude towards Mathematics and Achievement in Mathematics and found a positive relation between them.
2.11 Conclusion

This chapter is devoted to the review of related literature done in the areas of Learning Disability and Academic Backwardness. The findings of the researches have provided the background for planning the present study and also guideline to the investigator.

A survey of research in the area of Learning Disabilities give an idea of the various identification procedures used previously such as discrepancy between ability and achievement, behavioural, educational, neuropsychological and psychoeducational approaches. It also gives an idea about early identifiers of Learning Disabilities, typical characteristics and different types of Learning Disabilities and different tools used for identifying Learning Disabilities.

Even though research studies based on Learning Disabilities had begun from 1920's, only a limited number of studies have been conducted in the field of Mathematics Disabilities. Some of the studies presented here are related to intervention strategies for Learning Disabled in the field of Mathematics.

Research related to Learning Disabilities and Home Life Experience is so scarce. However some studies in this area show that a strong relationship between active parent involvement in educational activities and academic progress of Learning Disabled pupils.

A careful scrutiny of the studies with reference to Learning Disabilities and Intelligence show that low intelligence need not have a significant
contribution for Learning Disabilities. Actually, Learning Disabled pupils possess average or normal intelligence.

Behaviour Problems among Learning Disabled children have been established time and again. The researches thus far reviewed in the western and the Indian setting had been unilateral as shown clearly in the results.

In Indian context, Learning Disability studies have been mostly done in primary stage, mainly on diagnosis and remediation of Learning Disabilities in different subject areas.

A survey of research in the area Academic Backwardness give an idea about the causes of Backwardness and psycho social, demographic correlates of backwardness.

It may be inferred from the review that intellectual and non intellectual factors are responsible for Backwardness in Mathematics. It is evident from the studies related to Home Life Experience and Academic Achievement that better Home Life Experience is positively related to greater academic performance.

Several studies have reported the significant positive correlation between IQ and academic performance. Hence the present study has aimed at investigating the relative influence of intelligence on Academic Performance.
Studies with reference to Behaviour Problems and Academic Backwardness show a positive correlation between them.

In Indian context, the studies of Lohithaksham (1960), Lulla, Shah and Darj (1966), Patel (1967), Puranik and Kundley (1969), Mishra (1977), Gosh (1982), Meenakshi (1984) had emphasised educational Backwardness in general and in Mathematics in particular. They also suggested to adopt remedial teaching to control and eradicate backwardness.

The development of favourable or unfavourable Attitude towards Mathematics has been explored in relation to familial conditions, achievement in Mathematics, cognitive variables, beliefs about Mathematics held by students and parents, gender and many other variables.

Thus the review has provided a strong background for the present study. On the basis of the empirical evidences of the earlier studies, the present study has aimed at investigating disabilities/difficulties faced by Learning Disabled and Academically Backward pupils in Mathematics.