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The Learning Disabled and Their Education - A Theoretical Overview

The Learning Disabled

It is evident from the pilot study conducted by administering learning disability tests that there are a considerable number of students who have learning difficulties. How to minimise these difficulties is still a problem confronted by teachers and schools. Teachers apply several devices, both clinical and non-clinical. Still the result is not appreciable. The supposed disabilities are presumed to be contributing to poor learning in schools where teachers in general adopt methods that lead to rote learning. It is, in this context, assumed that if methods that would activate their thinking are employed in teaching, they may perhaps help the students, both the disabled and the non-disabled, to perform better. The present study is designed upon this assumption.

Today, several self-instructional strategies and classroom instructional strategies that are based on thinking process are available, but they were not tested for their role in minimising the disabilities of the students who learn biology. The investigator therefore selected it as the problem for research.

Before the investigator proceeds to develop the tools and test the strategies, she should have a thorough understanding of the theories related to learning disabilities, self-study approach and modern instructional strategies. In this chapter these areas are discussed briefly citing the works of educators and psychologists.
Learning Disabilities

Learning disability is found across all the ages and in all socio-economic classes. In the early 1960's the difficulty that many children were having with learning began to attract serious attention. An increasing number of children were found unable to cope with schoolwork especially with reading, writing and arithmetic. These children were otherwise bright, fairly articulate in their verbal expression and did not appear to have any form of mental retardation, sensory handicap or visual impairment. On April 6, 1963 Samuel Kirk addressed a gathering of anxious parents in Chicago, at which he first used the term learning disability to describe these children. The term learning disability was formally accepted and an organization called the Association for Children with Learning Disabilities (ACLD) was started in America to provide services for individuals of all ages. Since then the theories developed in the west are followed. The attempt to study the children with learning disabilities is very sparse in the East. Bateman (1965) defined learning disabled children as "children who manifest an educationally significant discrepancy between their estimated intellectual potential and actual level of performance related to basic disorders in the learning processes, which may or may not be accompanied by demonstrable central nervous system dysfunction and which are not secondary to generalised mental retardation, educational or cultural deprivation, severe emotional disturbance or sensory loss."

In 1969 the U.S. National Advisory Committee on Handicapped Children defined learning problems in the same way.
Because of the continued problems in definition of learning disabilities a group of specialists from several organizations was convened. This Council defined learning disabilities as a generic term that refers to a heterogeneous group of disorders manifested by significant difficulties in the acquisition and use of listening, speaking, reading, writing, reasoning or mathematical abilities. Learning disabled children exhibit disorders in listening, thinking, talking, reading, writing, spelling and arithmetic, but learning problems, which are primarily due to visual, hearing or motor handicaps, mental retardation, emotional disturbance or the environmental disadvantage are not included.

The various definitions of learning disability encompass a broad spectrum of disorders, both clinical and non-clinical. The investigator likes to delimit the disability that affects the classroom learning of biology alone. She therefore pursues the search for an operational definition of the learning disability that she can adopt for identifying the students who have learning difficulties.

Learning disabilities requiring special care gained recognition only in the middle of 1960's. In the West many councils and organizations were formed. Many parents and groups started to bring the findings in this field to the attention of educators, physicians and legislators. But not much has been done in India where the educational system is plagued with the twin problems of wastage and stagnation. The learning disabled occupy no specific place in the centrally sponsored scheme of integrated education for disabled children. This speaks of the extent to which learning disabilities are ignored and the problems not tackled.
Indian research on learning disabilities is in its infancy. Even approximate estimates of the incidence of learning disabilities are lacking indicating the magnitude of negligence to which these children are exposed. In the absence of proper measures to be taken in diagnosis and remedy, most children with learning disabilities go unnoticed in the guise of low achievers, underachievers, truant or disinterested. They are denied special educational facilities. In these children there is an educationally significant discrepancy between the child’s estimated intellectual potential and actual level of performance related to basic disorders in the learning process which is not applicable to the physically or mentally handicapped.

Learning Disabilities - a Complex Field

The field of learning disabilities is very complex for several reasons. First, numerous definitions of the term have been proposed in a very brief time span since the term was first used in 1963. These definitions are related to different perspectives on learning disabilities. A second reason for complexity in the field is the diversity of the professionals concerned with the disabilities of children. Many of the historical figures that did research leading to the development of the field were working independently of others who worked in the same general area. Finally, because of the relatively late consolidation of the field, much of the initial research with children who exhibited learning disabilities was conducted by researchers whose primary focus was in educational psychology and learning problems in a general sense, rather than on learning disabilities themselves.
Groups of Theorists

There are three important groups of theorists in the field of learning disabilities. They are Perceptual Motor Theorists, Language Theorists (Mercer, 1987) and Information Processing Theorists (Lerner, 1989).

As the name implies, perceptual motor theorists were concerned with impaired perception and delayed motor development as possible causes of learning problems. Children who had difficulty in copying material from the blackboard, who frequently reversed letters, numbers and words, who could not accurately reproduce a geometric design, were believed to demonstrate perceptual motor problems. This emphasis on brain-based perception accounts for the present emphasis on reading problems based on letter and/or word reversals, as well as on certain problems in writing.

Another group of theorists tended to view academic achievement in terms of the use of language. From this perspective, children would be described as learning disabled based on incomplete speech development, incorrect usage of various rules of grammar, inappropriate understanding of pronoun reference and other speech and language problems. These problems were believed to be the basis of other difficulties in written language and reading. The emphasis on language arts and reading skills within the present instructional approaches to learning disabilities can be traced directly to this group.
Information Processing theorists explore how the learning disabled child takes in sensory data, interprets and elaborates this information, and uses it to perform a task (Lerner, 1989). According to Swanson (1989), first the sensory information comes to the individual (input stimuli), who then clusters it with previous knowledge within the brain (memory and experience) and programmes or manipulates the information (executive function), which leads to a response or performance activity (output performance). This theory emphasises that the learner must co-ordinate several kinds of cognitive abilities rather than using a single appropriate cognitive strategy. Learners must not only integrate abilities and types of knowledge but also select from a repertoire of possible strategies, a plan of action relevant for solving a problem or completing a task. The cognitive theories of learning disabilities imply that these children have deficits in cognitive processing abilities that impede their ability to learn.

**Individual Differences**

One of the most significant features of the present scientific movement in education is the recognition of the great differences among children. Education is concerned with individual differences resulting from the differing degrees of maturity or growth and those previous education and training have caused.

Any programme of instruction must take into consideration the important facts about differences in individuals and traits. It is only recently that we have
recognized that there are some groups of exceptional children notably the learning disabled. As we increase the number of instructional options or administrative plans for serving exceptional children, we introduce a flexibility that helps us to move out of the rigid practices of the past. This noticeable flexibility may well be the first step toward some fundamental reassessments of our practices.

According to Lord (1972) educational programming for exceptional children should profit very directly from many current innovations as well as a few from the past. It is suggested that at least three educational movements should be useful in making the regular classroom a more acceptable place for learning disabled children: (1) Individualization of instruction; (2) programmed instruction and recent related technology; and (3) the emerging practice of the open classroom at the elementary level.

The academic, physical, and social needs vary greatly from child to child. However, we must view all children as having at some time or other some unique learning problems. Indeed, the able child who is an advanced reader may well have problems in schools. Some relatively normal children progress in the different subjects at uneven rates. These variations in growth have inspired numerous plans for the individualization of instruction during the past one hundred years.
Methods of Gathering Information

Because of the convenient and plentiful nature of standardized tests, it is perhaps tempting to administer a battery (group) of tests to a student and make an eligibility or placement determination based upon the results. However, tests alone will not give a comprehensive picture of how a child performs or what he or she knows or does not know. Evaluators need to use a variety of tools and approaches to assess a child, including observing the child in different settings to see how he or she functions in those environments, interviewing individuals who know the child to gain their insights, and testing the child to evaluate his or her competence in whatever skill areas appear affected by the suspected disability, as well as those that may be areas of strength. There are, recently, a number of other approaches being used to collect information about students as well; these include curriculum-based assessment, ecological assessment, task analysis, dynamic assessment, and assessment of learning style. These approaches which yield rich information about students, are especially important when assessing students who are from culturally or linguistically diverse backgrounds, and, therefore, are critical methods in the overall approach to assessment, diagnoses, placement decisions, and instructional plans. Only through collecting data from a variety of approaches (observations, interviews, tests, curriculum-based assessment, and so on) and sources (parents, teachers, specialists, peers, students) can an adequate picture be obtained of the child's strengths and weaknesses.
Reviewing School Records

School records can be a rich source of information about a student and his or her background. Many students, for example, begin the year with poor grades and then show gradual improvement as they get back into the swing of school. For others, the reverse may be true: During the early part of the year, when prior school material is being reviewed, they may do well, but decline in their grades as new material is introduced. Also, transition points such as beginning the fourth grade or middle school may cause students problems; the nature and purpose of reading, for example, tends to change when students enter the fourth grade, where reading to learn content becomes more central. Similarly, middle school requires students to assume more responsibility for long-term projects (Hoy & Gregg, 1994). These shifts may bring about a noticeable decline in grades for some students.

Test scores are also important to review. Comparing these scores to a student’s current classroom performance can indicate that the student's difficulties are new ones, perhaps resulting from some environmental change that needs to be investigated more fully, or the comparison may show that the student has always found a particular skill area to be problematic. "In this situation, the current problems the student is experiencing indicate that the classroom demands have reached a point that the student requires more support to be successful" (Hoy & Gregg, 1994, p. 37).
**Looking at Student Work**

Often, an initial part of the assessment process includes examining a student's work, either by selecting work samples that can be analyzed to identify academic skills and deficits, or by conducting a portfolio assessment, where folders of the student's work are examined. Analyzing the student's work can yield valuable insight into the nature of his or her difficulties and suggest possible solutions. Maintaining portfolios of student work has become a popular way for teachers to track student progress.

**Observing the Environment**

Observing the student and his or her environment is an important part of any assessment process. Observations in the classroom and in other settings where the student operates can provide valuable information about his or her academic, motor, communication, or social skills, behaviours that contribute to or detract from learning, and overall attitude or demeanour (Waterman, 1994).

**Anecdotal Records**: The observer describes incidents or behaviours observed in a particular student in question, his or her parents, teachers, and other adults setting in concrete, narrative terms. This type of record allows insight into cause and effect by detailing what occurred before the behaviour took place, the behaviour itself, and the consequences or events that occurred after the behaviour.
**Checklists and Rating Scales**: A checklist usually requires the observer to note whether a particular characteristic is present or absent, while a rating scale typically asks the observer to note the degree to which a characteristic is present or how often a behaviour occurs. There are many commercially available checklists and rating scales, but they may be developed locally as well.

**Interviews**: Interviewing of peers can provide a great deal of useful information about the student. Ultimately, "an interview should be a conversation with a purpose" (Wallace, Larsen, & Elksnin, 1992), with questions designed to collect information that "relates to the observed or suspected disability of the child".

Teachers can provide insight into the types of situations or tasks that the child finds demanding or easy, what factors appear to contribute to the child's difficulties, and what has produced positive results (e.g., specific activities, types of rewards, Wodrich & Joy, 1986). The student, too, may have much to say to illuminate the problem. "All persons interviewed should be asked if they know of information important to the solution of the academic or behaviour problem that was not covered during the interview" (Hoy & Gregg, 1994, p. 44).

**Testing**: Most assessments include tests, although this has become increasingly controversial. Some tests are known as criterion-referenced tests. This means that they are scored according to a standard, or criterion, that the teacher, school, or test publisher decides. The tests, sometimes called content-referenced tests, are concerned with the mastery of specific, defined skills; the student's performance on
the test indicates whether or not he or she has mastered those skills. Other tests are known as norm-referenced tests. Scores on these tests are not interpreted according to an absolute standard or criterion (i.e., 8 out of 10 correct) but, rather, according to how the student's performance compares with that of a particular group of individuals.

**Primary Areas of Assessment**

**Intelligence:** Kamphaus (1993) summarizes a number of research findings related to the use of intelligence tests. The finding that intelligence and academic achievement appear to be highly related supports the notion that intelligence and achievement tests may not be so different from each other and that "intelligence tests may be interpreted as specialized types of achievement measures" (Kamphaus, 1993, p. 65). This is consistent with the suggestion that intelligence tests may be best used to determine specific skills, abilities, and knowledge.

**Language:** Through interviews, observations, and teaching, teachers can gather valuable information about a student's language use. By engaging in what is known as diagnostic teaching, the teacher can become invaluable participant in the ongoing assessment and remediation of a child's language deficiencies. It is important, however, for teachers to be thoroughly familiar with the developmental milestones of normal language functioning. A case history of the child (in most cases, from the parents) can also be valuable in the initial stages of assessment. Knowing in detail how the child's language has developed can yield information
relevant to the problem and in gaining an understanding of the early stages of the disorder. (Wallace, Larsen, & Elksnin, 1992, p. 260).

**Academic Achievement:** Academic achievement refers to how well the child is performing in core skill areas such as reading, mathematics, and writing. Information about the child's placement (i.e., below, at, or above) in his or her peer group and knowledge about the specific skills the child possesses are important both for the planning and evaluation of instruction.

After a thorough study of the theories involved in learning disabilities and the details of identification, the investigator made a pilot study in the area of difficulty for the learning disabled in the secondary school curriculum especially in learning biology. She was convinced of the fact that academic achievement in biology is much related to the child’s language ability, intelligence and ability for critical thinking and reasoning. To identify the learning disabled in the schools of Kerala which is the focus of the study, the investigator constructed a standardized test named as *Diagnostic Test of Learning Disability*. This test has five sub-tests measuring the child’s written expression, listening comprehension, reading comprehension and mathematical computation and mathematical reasoning. In addition, a pupil behaviour rating scale and a learning problem checklist were also prepared for the identification of the learning disabled pupils in the secondary schools.
**Teaching Strategies**

Much research during 1970's was concentrated on teaching strategies for acquiring language skills and mathematical skills. Theories of language acquisition include behavioral, Psycholinguistic, and cognitive-approaches. The behavioral theories emphasize the role of reinforcement and imitation. The Psycholinguistic theory focuses on language as an innate characteristic in human beings. The cognitive theory emphasizes the role of one's existing cognitive structure in learning.

Mathematics instruction is built upon (1) Developmental learning hierarchies, (2) Mastery learning, (3) Cognitive learning strategies and (4) problem-solving. Developmental learning hierarchy theory emphasizes the normal developmental stages that the student goes through in intellectual learning.

In teaching Mathematics to the learning disabled one must take these strategies into account. Mastery learning stresses the objective to be taught and the sequential steps needed to reach those objectives. Cognitive learning strategies and problem solving approaches emphasize the thinking strategies the student develops to solve problems.

Educational researchers have concluded that a systematic approach to providing instruction greatly improves student achievement. It can only help to further improve educational opportunities for all students, especially those who have learning disabilities.
Rosenshine and Stevens (1986) have identified common teaching practices of successful teachers, such as teaching in small steps, practising after each step, guiding students during initial practice, and providing all students with opportunities for success. Englert (1984) pointed out that successful teacher's use lesson strategies to provide students with both direct instruction and the opportunity for practice. Lesson strategies include: communicating the rules and expectations of the lesson, stating instructional objectives and linking them to previous lessons, providing numerous examples, prompting student responses, and providing drill and further practice immediately following incorrect responses. Sindelar, Espin, Smith, and Harriman (1990) add that the more time an actively engaged educator spends in the instructional process, the more positive student behaviour and achievement will be. Sindelar et al. (1990) suggest that effective teachers limit seatwork activities, provide ample opportunities for student overlearning through teacher questioning, and allow time to socially interact with students. They conclude that encouraging higher levels of student participation, providing effective classroom transitions (i.e., concluding one activity and moving on to another), and bringing lessons to a close by providing assignments for further practice are consistent with teacher-directed learning.

Nowacek, McKinney, and Hallahan (1990) indicate that teacher-directed, rather than student-directed, activities provide for an effective educational experience that is more likely to improve student achievement. Higher levels of student achievement occur because teachers, using a systematic approach, are more organised, have clearer expectations, maintain student attention, and provide
immediate, corrective, and constructive feedback. Because their instruction is highly structured, these teachers provide a positive environment in which to learn. Using a systematic approach to teaching does not suggest that teacher and student creativity is not a vital part of the process. It merely lays out an organisational framework that provides a means for enhanced, successful, and efficient learning.

Over the past twenty years, a number of specific strategies have been developed and implemented in improving the performance of students with learning disabilities and other students performing poorly in school. Though the translation between research and practice remains poor, the Strategy Intervention Model, developed by the University of Kansas Institute for Research in Learning Disabilities, the Content Enhancement Model, (Lenz, Bulgren and Hudson, 1990) and Interactive Instructional Model for Text Comprehension and Content Learning (Bos and Anders, 1990) are widely acclaimed as good models. But they are very much sophisticated and require special facilities like the consultant for learning disabled apart from the regular classroom teachers. The investigator therefore is on the lookout of strategies that can be used in the regular classes in India where facilities are limited.

Once the pupil is identified as learning disabled he needs to be given special help. It will help him to benefit from the normal activities of the school if the learning disability is mild. One of the widely accepted facts is that individualized instruction is of much use to the learning disabled. Numerous instructional plans that attempted to introduce flexible groupings and
individualized instruction have been proposed and instituted. Individualized instruction uses several materials like printed materials, films, programmed learning modules, teaching machine, etc. These materials can be developed into small learning units. Such learning units are called modules. A modular approach is involved in individualized instruction. It allows the individual to learn on his own accord.

The Dalton Plan, instituted in some schools in the last century used a highly individualized contract plan for students in academic subjects and used class groups largely for social and physical activities. A child could proceed from contract to contract at his own pace. With some modifications, the plan is still used by some instructors.

The Instructional Module - A Brief Outlook

The philosophy behind instructional modules is based on the generally accepted fact that each learner is unique and different from others in background, experience, inherent qualities, habits and learning styles and as such should be allowed to grow and develop to the fullest potential. Modular approach is an attempt to make the instruction individualized so that the student learns at his own pace according to his interest, capabilities and capacities. The investigator considers that modular approach is a comprehensive self-study device for the children with learning disabilities.
Programmed Instruction

New methods and techniques in education are having an increasing effect on the traditional approach to teaching and learning. Among the new approaches and innovations that have gained acceptance in recent years is programmed instruction. It is a distinct strategy of instruction based upon the principles of efficient learning evolved by Psychologists under controlled laboratory conditions. These principles emphasize the need to specify the terminal behaviour to be developed in the learner and then design the instructional process so as to maximize the rate or acquisition and maintenance of terminal behaviour. The application of active responding, reinforcement, gradual and successive progression and empirical validation achieve this. A learner can learn only if he actively responds in a learning situation. In programmed instruction active responding is arranged with a limited amount of learning material with which he is ready to interact (Chauhan, 1978).

Programmed instruction received its major impetus from the work of the American psychologist B. F. Skinner, who, in 1954, described how programmes could be developed scientifically. By late 1950 programmes had been developed for use in all levels of teaching, from grade school to graduate school. Most early programmes presented information in small steps. Students read a sentence or two and then responded to a question by filling in a blank or choosing from a set of alternative answers. Then they viewed the correct answer and checked the accuracy of their own responses. Such formats, which seem impoverished in
comparison to the variety of programs now available, usually addressed only trivial instructional goals. Intellectual skills such as problem solving, the formulation and expression of new ideas, and the exploration of new fields, can now be taught with carefully designed programmes (Markle & Tiemann, 2000).

The most important feature of programmed instruction is its empirical validation. Every learning step in programmed instruction assumes an appropriate shape solely to suit the needs and abilities of the intended learners. In Programmed learning the student is an active thinker. He or she responds at every step. So this method is likely to be beneficial to the learning disabled students, if it is presented conceding their limited abilities.

**Guided Inductive Inquiry Model**

Inquiry is a technique that involves students in questioning to explore an area of study. It is a process which students engage in to investigate and to explain problems. Students collect and test data logically in order to discover why things happen the way they do. Inquiry is not just a matter of asking questions but is a process of conducting a thorough investigation. The inquiry process can be practised and learned in a systematic way. The purpose of inquiry is to experience the process rather than to memorise the process or product.

John Dewey (1958) described inquiry as a dialectical relationship between the inquirer and the inquired. Evelyn Keller (1985) described this relationship as "dynamic objectivity." Research on teaching through inquiry reflects the dynamic
and multifaceted nature of this construct. Inquiry involves the development and use of higher-order thinking to address open-ended problems. Resnick (1987) describes higher order thinking as non-algorithmic and complex. The path to a solution is not discernible from a single point of vantage. Multiple solutions are possible, and the inquirer may have to use multiple, sometimes conflicting, criteria to evaluate his or her options. Inquiry is characterised by a degree of uncertainty about outcomes. True inquiry ends with an elaboration and judgement that depends upon the previous reasoning process.

Traditionally, critical thinking has been embedded in the application of various science processes. Schwab (1962) proposed that teachers present lab problems at three levels for the purpose of developing an orientation to inquiry. At the first level, teachers present problems not discussed in the text, with descriptions of different ways to approach the solution. At the second level, teachers pose problems without methodological suggestions. At the third level, present the phenomena designed to stimulate problem identification. Each level requires more facility in using process skills than the previous level.

Trowbridge & Bybee (1990) also discuss three levels inquiry, beginning with discovery learning, in which the teacher sets up the problem and processes but allows the students to identify alternative outcomes. The next level of complexity is guided inquiry, in which the teacher poses the problem and the students determine both processes and solutions. The third, and most demanding level is
open inquiry, in which the teacher merely provides the context for solving problems that students then identify and solve.

Questions that promote inquiry and lead to conceptual discussion are important for the success of inquiry teaching and learning (Dantonio, 1987). More recently, inquiry has been viewed as having a discursive and relational dimension (Klaassen & Lijnse, 1996, Tobin & Anderson, 1997) that complements the dimensions of critical thinking and individual skill with science processes. These effects most likely result from the increased engagement and higher level of discourse among all students resulting from the assigned roles of particular students. At the heart of inquiry is the ability to ask questions and identify solvable problems. To implement an guided inquiry approach a teacher may consider the following (i) present a problem or a puzzling event or situation which stimulates interest, (ii) check with students to ensure that they understand the problem or situation,(iii)either structure the lesson to develop specific predetermined generalizations, thereby limiting the number of generalizations developed,(iv) provide instructions about whether students work alone or in group,(v)either act as class leader throughout the lesson and ask questions and suggest activities which will lead students to desired generalizations, and (vi) observe and listen to students throughout the lesson: note students activities, questions and hypothesis, note processes which lead students to specific conclusions. In guided, inductive inquiry teachers ask questions but do not answer them but prompts students, structure materials and simulates and in general organise the learning. The teacher's role becomes minimised as the student takes
more responsibility for examining problems, opportunities and ideas for processing information

Today there are several instructional strategies developed on the principles of scientific thinking and cognitive abilities. But they are practised in the classrooms assuming that all students are non-disabled. The investigator would like to test whether they can be equally applicable with the learning disabled and non-disabled, if they are modified to suit both the groups.

Traditionally, teachers at all levels use lecture method in imparting information to students. Findings of researches have a direct influence on the classroom environment and thereby the behaviour of the teacher and the students. The traditional teacher-centred approach makes learning passive and non-productive.

Guided inductive inquiry, on the other hand, offers a model, which puts the students at the level of a discoverer of knowledge. The basic processes of inquiry are observing, classifying, using space-time relationship, drawing inferences, formulating hypotheses, interpreting data and drawing conclusion on the basis of the data obtained. In this way they are acquainted with the process of scientific inquiry. Self-learning involving acquisition of knowledge through observation of phenomenon and creative thinking are also encouraged through the use of guided inductive inquiry (Arora & Narang, 1996).

Self-instruction was used to assist Kindergarteners to acquire handwriting skills (Goodman, 1990). Self-instructional strategies developed by researchers at
the Learning Disabilities Institute of Kansas as cited by Goodman (1990) that are the focus of an entire curriculum for the secondary school learning disabled adolescents. They seek to teach the disabled adolescents principles and rules for problem solving, completion of tasks and independent work.

It is with the same intention of helping the learning disabled adolescents in secondary schools to work independently, to acquire scientific knowledge and problem solving ability that the investigator conducted the present study to test the effectiveness of self-study approach and modern instructional strategies in minimising learning disabilities.
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