



CHAPTER I

INTRODUCTION

Need and Significance of the Study

Statement of the Problem

Definition of Terms

Hypotheses of the Study

Objectives of the Study

Methodology in Brief

Scope and Limitations of the Study

Organisation of the Report

CHAPTER I

INTRODUCTION

The development of a nation primarily depends on the nature and kinds of its human resources. All individuals, regardless of their assets and liabilities of personality and potentiality, contribute towards national development. Exceptional children, too, cannot be excluded from this.

The term 'learning disability' is used to describe a specific group of children, adolescents and adults who have problems in learning in the academic side. These problems are generally in the areas of reading, writing, spellings and mathematics. Parents and teachers usually discover the problem when the child fails to cope with school work.

The National Policy on Education (NPE, 1986) has recommended education for children with disability as far as possible, together with others in general schools. The implication is that more and more children with disability will join general schools. The fact is that a large number of children with mild disabilities do enter the school system, but many drop out due to the lack of sensitivity to their educational needs in the system. To achieve the goal of 'education for all', the school system needs to be adequately prepared and identification, diagnosis and assessment of the learning disabilities are necessary for their proper development.

Special consideration in education for learning disabled children in education is justified on several grounds as mentioned below:

- a. Humanitarian - As human beings, learning disabled children are entitled to humane treatment and education.
- b. Democratic- As members of a democratic set up, learning disabled children have the basic right to education.
- c. Economic- If learning disabled children are educated properly, they can contribute, within their limitations, towards the economy of a country.
- d. Helping parents- Parents of learning disabled children face a number of problems due to the disabilities of their child. Special education goes a long way in helping such parents manage learning disabled children effectively and easily.
- e. By providing suitable education to learning disabled children, it is possible to bring out the creative potentialities in them. At the same time, society will be profited by them.

Our society has become quite complex. We now recognise the fact that success in school has become more and more important. For the school-age child success or failure in mastering skills and education frequently will determine his future career as well as his role in society. Therefore, school failure due to learning disability can represent a major catastrophe affecting both the child and his family. At present, the child with learning problems may be seen and evaluated by one or all of the following:

classroom teacher, psychologist, special resource teacher, social worker, physician, nurse, occupational therapist and the like.

It is assumed that children come to school already knowing how to listen. Some teachers feel that it is more important to spend the limited instructional time available on reading and writing instruction. Despite these concerns about teaching and listening in the elementary grades, most teachers agree that students need to know how to listen because it is the most used language art. Listening is a complex multi-step process by which spoken language is connected to meaning in the mind. As this definition suggests, listening is more than just hearing, even though children and adults often use the two terms hearing and listening synonymously. The crucial part is thinking or converting into meaning what one has heard.

Imagine having important needs and ideas to communicate, but being unable to express them, feeling bombarded by sights and sounds, unable to focus your attention. Or trying to read or add but not being able to make sense of the letters or numbers.

Although different from person to person, these difficulties make up the common daily experiences of many learning disabled children, adolescents, and adults. A person with a learning disability may experience a cycle of academic failure and lowered self-esteem. Having these handicaps--or living with someone who has them--can bring overwhelming frustration.

But the prospects are hopeful. It is important to remember that a person with a learning disability can learn. The disability usually affects only

certain limited areas of a child's development. In fact, rarely are learning disabilities severe enough to impair a person's potential to live a happy, normal life.

Unlike other disabilities, such as paralysis or blindness, a learning disability (LD) is a hidden handicap. A learning disability doesn't disfigure or leave visible signs that would invite others to be understanding or offer support. LD is a disorder that affects people's ability to either interpret what they see and hear or to link information from different parts of the brain. These limitations can show up in many ways--as specific difficulties with spoken and written language, coordination, self-control, or attention. Such difficulties extend to schoolwork and can impede learning to read or write, or to do mathematics.

Learning disabilities can be lifelong conditions that, in some cases, affect many parts of a person's life: school or work, daily routines, family life, and sometimes even friendships and play. In some people, many overlapping learning disabilities may be apparent. Other people may have a single, isolated learning problem that has little impact on other areas of their lives.

Although many students are able to learn to study on their own, this is not true for those with learning disabilities. Yet students with learning disabilities rarely receive instruction in how to study. Most teachers who work with students with learning disabilities quickly realise that the students have little idea of what to study, when to study or how to study. To be successful in

school, these students must be aware of their difficulties, what they must study, develop a plan for using their time effectively and apply a number of study strategies. A major goal of teachers of children with learning disabilities is to assist these students to become independent learners. To achieve this goal, teachers must provide these students with strategies they can use on their own to master a variety of learning tasks across a range of instructional settings. Teaching the learning disabled to use study strategies effectively is an important step in transforming dependent learners into independent learners. There are differences in study strategies between successful students and students with L.D. When the teacher lectures, successful students listen, take notes, ask questions, answer questions and contribute to discussions. Given an assignment, successful students make efficient use of class time, use textbooks and other resources to answer questions and complete the assignment by the end of the class. In contrast, students with learning disabilities attend only part of the teacher lectures, write down only one word or two and rarely contribute in the discussion. When given assignments, these students lack the self-direction and strategies needed for finding information in textbooks, looking up words in the glossary, interpreting maps, answering questions or asking the teacher for appropriate assistance. At the end of the class, they often have not finished the assignment. Therefore they should be assisted to develop proper study strategy. It is only very recently, due to the influence of humanism, liberalism, compassion and the latest discoveries of science, the view prevailed that the learning disabled

should also be taken care of and educated and opportunities provided for the enrichment of their lives. The need to make them achieve to the maximum of their capabilities and the need to help them overcome their difficulties to the extent possible arise not only from the acceptance of the learning disabled as individuals but also from their potential as human resources.

1.1 NEED AND SIGNIFICANCE OF THE STUDY

The learning disabled find it difficult to keep pace with normal children. The educational programme for the learning disabled should be in accordance with their level of capability. When one finds difficulty in an area, it demands more effort to ensure proper balance. There is always a wide gap between one's potential and the level of achievement expressed through performance. In learning disabled students the gap in the scientific skills is wider than in the normal students due to their deformities. This study aims at the deficits (gaps) in the scientific skills which will affect the level of achievement both for the normal and for the learning disabled.

At present, achievement is generally taken as 'achievement in science'. The intense focussing on science teaching and learning is the consequence of the advancement in science and technology.

Achievement in science is not uniform in the student body. Different sections among students categorised on the basis of limiting conditions of geographical area and caste may exhibit differential pattern of achievement. This situation can also exist with reference to scientific skills.

The present study is concerned with the assessment of the attainment of scientific skills by the learning disabled among primary schools students.

According to Hurd (1971), science is an intellectual activity which arises from personal experience and takes place in the mind of man. There are certain operational schemes in the field of science, characterising its investigative nature, e.g. inquiry skills or process of science. The process represents the intellectual means by which man inquires into nature, organises his observations, establishes data, focuses it on a problem and then seeks to interpret or explain the rational event.

The recent trend is to reconceptualise the achievement in science in terms of higher level cognitive entities contrary to the traditional mode of assessing achievement in terms of lower level cognitive entities. The scientific skills in science belong to the category of higher level cognitive entities. Modern science educators recognise scientific skills as one of the most dominant objectives of teaching science in schools. Scientific skills are particularly relevant because of the very nature of science itself. They get special emphasis in science education as science is made up of a series of processes. Hence the desired outcome in science teaching should include, among other things, a mastery of important processes that are used in generating new knowledge in science.

However, studies on achievement in science have shown that mastery of information and mastery of scientific skills are both inadequate. Attempts are now being made to improve the learning process and

achievement in science. It is important that the improvement in achievement is made only through the mastery of scientific skills. The inadequacy in scientific skills surely affects achievement in science.

Educationalists have already conducted experiments to measure the nature and extent of the relationship of scientific skills to achievement in science among normal students. But in the area of learning disabilities the studies are few. This study therefore aims at providing insight on the strengths and weaknesses of the different categories of learning disabled students with reference to attainment of scientific skills and the nature and extent of the relationship of scientific skills to achievement in science.

1.2 STATEMENT OF THE PROBLEM

The present study is entitled ***EFFECTS OF DEFICITS IN SCIENTIFIC SKILLS ON ACHIEVEMENT IN SCIENCE OF THE LEARNING DISABLED AT THE PRIMARY SCHOOL LEVEL.***

The investigator aims at the identification of the deficits (gaps) in the scientific skills and at showing how these gaps affect the level of achievement in science of learning disabled students. Different types of learning disabled students can be expected to differ in the nature and extent of these gaps because of the nature of the learning disability.

1.3 DEFINITION OF TERMS

Effect

According to Good (1945), Effect is the result or product of some efficient cause of agency. Something that inevitably follows an antecedent

(as a cause or agent) (Webster's Dictionary, 2000). In this study, effect is the result or outcome.

Deficits

Deficiency in amount or quality (Webster's Dictionary, 2000).

Here, deficits mean the identifying characteristics which prevents the children from attaining the skills or abilities in the learning process of science. These deficits may be referred as 'gaps' in the learning process of science.

Scientific Skills

According to Tobin and Capie (1982) science processes are intellectual skills used in collecting and analysing data to solve problems.

Doran (1974) defines the processes of science as: observation, measurement, classification, experiment, communication, prediction and formulation of hypothesis, theories, laws and models.

Scientific skills mean the systematic and co-ordinated pattern of mental and physical activity usually involving both receptor processes (senses which receive stimuli) and effector processes (muscles and glands which provide responses). Skills may be perceptual, motor, manual, intellectual, social, etc. according to context or dominant aspect of skills pattern. Skills in science denote the techniques students learn in science classrooms. Examples include reading meters, taking measurements, conducting experiments, as well as those behaviours exhibited by students after they leave school.

The American association for the Advancement of Science (1968) present thirteen scientific skills together with a brief definition of each.

They are as follows:

I. Basic Process

- (1) **Observing:** Using the five senses to obtain information.
- (2) **Using space / time relationship:** Describing spatial relationships and their change with time.
- (3) **Classifying:** Imposing order and collecting of objects or events.
- (4) **Using numbers:** Identifying quantitative relationships in nature.
- (5) **Measuring:** Measuring length, area, volume, weight, temperature, force and speed.
- (6) **Communicating:** Expressing ideas with oral and written words, diagrams, maps, graphs, mathematical equations and various kinds of visual demonstrations.
- (7) **Predicting:** Making specific forecasts of what a future observation will be.
- (8) **Inferring:** An explanation of an observation.

II. Integrated process

- (9) **Controlling variables:** Study the influence of changing variables, the factors which influence one another.
- (10) **Interpreting data:** Using data to make inferences, predictions and hypotheses, the statistical treatments given to such interpretation and the study of probability.

- (11) **Formulating hypothesis:** Making generalised statements of explanations.
- (12) **Defining operationally:** Defining terms in the context of experience.
- (13) **Experimenting:** Larger process of using basic and integrated process.

Achievement in Science

Good (1945) says achievement refers to the standard performance of students in the group under consideration for a test developed to measure curricular outcomes. The achievement of a group of learners is expected to be scattered over a wide range from very low to very high. Achievement is the knowledge attained or skills developed and it is represented in the form of test scores.

Science is defined as “the state of knowing: Knowledge as distinguished from ignorance or misunderstanding”.

“A knowledge or a system of knowledge covering general truths or the operation of general laws especially as obtained and tested through scientific method” (Webster's Dictionary, 2002).

Encarta World English Dictionary (2004) defines science as the study of the physical world and its manifestations, especially by using systematic observation and experiment.

Achievement in science here means the success in science subject measured using a standardised test.

Learning Disabled

"The term learning disability is used to describe a specific group of children, adolescents and adults who have problems in learning. These problems are generally in the areas of reading, writing, spellings and mathematics" (Nakra, 1997).

The term learning disabilities was first introduced in 1963 by the Association for Children and Adults with Learning Disabilities (ACLD). Although the term learning disabilities had immediate appeal and acceptance, the task of developing a definition of learning disabilities proved to be a challenge. Thus, defining learning disabilities in a way acceptable to all has continued as a debatable issue, since the inception of the field. Although a number of definitions have been generated and used over the years, each has been judged by some to have certain shortcomings.

Probably the most widely used definition is the one incorporated in Public Law 94-142, or the Education for All Handicapped Children Act, 1975 and the reauthorisation of the Education of the Handicapped Act in the U.S.A. (1986). There are actually two parts to this American definition. The first part appears in the major body of the rules and regulations of PL. 94-142 and was adapted from a 1968 Report to the Congress of the National Advisory Committee on Handicapped Children. This definition reads: "Specific learning disabilities means a disorder in one or more of the basic psychological processes involved in understanding or in using language spoken or written, which may manifest itself in an imperfect ability to listen,

think, speak, read, write, spell or to do mathematical calculations. The term includes such conditions as perceptual handicaps, brain injury, minimal brain dysfunction, dyslexia and developmental aphasia. The term does not include children who have learning problems which are primarily the result of visual, hearing or motor handicaps, of mental retardation, of emotional disturbance or of environmental cultural or economic disadvantages" (Federal Register, 1977, p. 65083).

The second part of the federal definition is considered operational and appears in a separate set of regulations applying to P.L. 94-142 concerned in the learning disabilities (U.S Office of Education, December 29, 1977). It states that a student has specific learning disabilities if:

1. The student does not achieve of the proper age and ability levels in one or more of several specific areas when provided with appropriate learning experiences and
2. The student has a severe discrepancy between achievement and intellectual ability in one or more of these several areas (a) oral expression (b) listening comprehension (c) written expression (d) basic reading skill (e) reading comprehension (f) basic reading skill and (g) mathematics reasoning.

To summarise, the federal definition of learning disabilities in P.L. 94-142 contains the following major concepts:

1. The individual has a disorder in one or more of the basic psychological processes (These processes refer to intrinsic prerequisite abilities such as memory, auditory perception, visual perception and oral language)
2. The individual has difficulty in learning, specifically in speaking, listening, writing, reading (word recognition skills and comprehension) and mathematics (calculation and reasoning).
3. The problem is not primarily due to other causes, such as visual or hearing impairments, motor handicaps, mental retardation, emotional disturbance or economic, environmental or cultural disadvantages.
4. A severe discrepancy exists between the student's apparent potential for learning and low level of achievement.

Other Definitions

Since the definition within P.L 94-142 was formulated, many other definitions have been proposed by various groups and organisations. Some highlight the social problems found in many children and the life long nature of the condition (ACLD Board of Directors, 1986). A definition that is becoming influential was proposed by the National Joint Committee for Learning Disabilities (NJCLD, U.S.A), 1987, a body of representatives from several organizations and disciplines involved in learning disabilities. The NJCLD definition states: "Learning disabilities is a general 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. These disorders are intrinsic to the individual and

presumed to be due to central nervous system dysfunction and may occur across the life span".

Primary School Level

Primary school level, i.e., from the first standard to fourth standard is the entry level in school.

1.4 HYPOTHESES OF THE STUDY

The following are the hypotheses formulated for the present study:

- (1) Nearly 1/5 of the total population are learning disabled at the primary level.
- (2) There is significant variation in the in science process skills among the normal and learning disabled as well as language disabled and mathematical disabled.
- (3) Learning disabled students will exhibit certain gaps in science process skills which will affect their achievement in science.
- (4) There is significant variation in the levels of achievement in science of normal and learning disabled students.
- (5) There is significant variation in the levels of intelligence of normal and learning disabled students
- (6) There is significant difference between boys and girls of normal and learning disabled children with respect to their science process skills, achievement in science and intelligence.

1.5 OBJECTIVES OF THE STUDY

The following are the specific objectives of the study:

- (1) To find the learning disabled (total) as well as language learning disabled and mathematical learning disabled at the primary school level.
- (2) To study the difference between the normal and learning disabled children as well as language learning disabled and mathematical learning disabled with respect to their Science Process Skills.
- (3) To study the effect of the deficit in Science Process Skills on achievement in science of the normal and learning disabled children as well as language learning disabled and mathematical learning disabled.
- (4) To study the difference between normal and learning disabled children as well as language learning disabled and mathematical learning disabled with respect to their achievement in science.
- (5) To study the difference between normal and learning disabled children as well as language learning disabled and mathematical learning disabled with respect to their intelligence.
- (6) To study the difference between boys and girls of the normal and learning disabled with respect to their science process skills, achievement in science and intelligence.

1.6 METHODOLOGY IN BRIEF

Normative survey method was adopted for the study. The sample for the study consists of 614 primary school children from Alappuzha and Kottayam districts in Kerala. The tools used for the study are:

1. Science Process Skill Test
2. Test of Achievement in Science
3. Diagnostic Test to identify the disorders of Reading and Writing
4. Diagnostic Test to identify Mathematical Disabilities
5. Raven's Coloured Progressive Matrices Sets A, Ab, B.

1.7 SCOPE AND LIMITATIONS OF THE STUDY

This investigation is aimed at studying the effects of deficits in scientific skills on achievement in science of the learning disabled at the primary school level. The tools used for the present study are all very valid moreover reliable tools as the contents for preparing the tests were taken from the textbooks prescribed for study in primary schools of Kerala. The Group Test of Intelligence used to measure the intelligence is a well known test for its reliability. It is hoped that the results of the study would be helpful to parents and teachers in adopting suitable techniques to take necessary steps in rectifying the deficit in scientific skills in learning disabled children.

Though every possible effort has been taken to make this study as precise and objective as possible, certain limitations have crept into the study. Most of these limitations are inherent in all forms of social science

research of the present kind. Certain limitations of the study as identified by the investigator are the following:

The study was confined to only standard IV pupils of primary schools. Confining the study to the schools of Alappuzha and Kottayam Districts may be looked upon as another limitation of the study.

Learning disabilities in reading, writing and mathematics alone is taken for the study. The influence of other factors on learning disability is not taken into consideration.

While conducting a comprehensive research of the present kind, the above mentioned limitations are difficult to overcome. In spite of the above limitations, it is hoped that this study would serve as the basis for further research in this area.

It is hoped that the findings of the study are valid and may be generalised to a great extent, and that the results of the study would be helpful to parents, teachers, educational experts, administrators / policy makers as well as social reformers in developing constructive programmes which aim at the rectification of deficits in scientific skills among primary level learning disabled children.

1.8 ORGANISATION OF THE REPORT

The report has been presented in five chapters.

The introductory chapter (chapter I) presents a foundation for selecting the present problem, its significance, statement of the problem,

definition of terms, statement of hypotheses, objectives of the study and a brief description of the scope and limitations of the study.

Chapter II gives a theoretical background of the learning disability in children.

Chapter III presents a detailed review of selected literature from the areas of academic achievement and process outcomes in science.

Chapter IV describes the methodology of the study. Under this chapter measuring tools, sample, collection of data and statistical techniques used have been presented.

Chapter V represents details regarding analysis of data. The analysis has been followed by interpretation of the major findings.

The last chapter (chapter VI) presents a retrospective of the study, major conclusions, educational implications of findings and suggestions for further research.

The conclusion is followed by a bibliography and appendices.

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