CHAPTER - III

METHOD

3.0 Introduction

The Rationale of the present study along with its Objectives and Hypotheses has been given in Chapter I. The Second Chapter deals with the review of studies related to the work. The present chapter is devoted to the description of site, selection of the sample, design, tools, procedure of data collection and data analysis. The details in respect of each of them are given in different captions.

3.1 Site Description

The study was conducted in 10 Higher Secondary schools implementing Inclusive Programme in four districts of Tamil Nadu which include:

1. Kancheepuram
2. Cuddalore
3. Thiruvanamalai

} North Eastern Districts of Tamil Nadu

4. Coimbatore - Western Districts of Tamil Nadu

Table 3.1: Grade and Gender-wise distribution of sample

S. No	District	Grade																Total				Percentage			
		IX				X				XI				XII											
		Blind		Low vision		Blind		Low vision		Blind		Low vision		Blind		Low vision		Blind		Low vision		Blind		Low vision	
		B	G	B	G	B	G	B	G	B	G	B	G	B	G	B	G	B	G	B	G	B	G	B	G
1.	Coimbatore	2	1	1	1	-	1	-	3	2	-	3	2	5	-	2	2	9	2	6	8	82	18	43	57
2.	Kancheepuram	-	1	-	1	2	1	2	3	2	-	-	-	5	1	1	-	9	3	3	4	75	25	43	57
3.	Thiruvanamalai	2	-	2	1	3	-	-	-	7	5	2	-	8	4	2	-	20	9	6	1	69	31	86	14
4.	Cuddalore	2	1	3	1	2	1	4	-	7	2	6	-	3	-	8	-	14	4	21	1	78	22	95	5
Total		6	3	6	4	7	3	6	6	18	7	11	2	21	5	13	2	52	18	36	14	74	26	72	28
Grand Total 120																									

Among the category of Blind students, there were 70 students; of them 74% and 26% were boys and girls respectively. The Low vision category comprised of 50 students, of these 72% were boys and 28% girls.

3.2 Selection of the Sample

The present study was descriptive in nature. The sample comprised of 120 students, both boys and girls belonging to class IX to XII. The nature of visual impairment includes blind and low vision. The students belonging to class IX and X were considered as Secondary Grade level and XI and XII as Higher Secondary Grade level. Purposive sampling technique was used to select the sample. The Higher Secondary Grade group consisted of 79 students; of them 63and 16 were boys and girls respectively. The Secondary Grade group comprised of 41students, of these 25 were boys and 16 girls.

The sample was further classified on the basis of their category namely Blind and Low vision. There were 70 students with Blindness and 50 were in the category of Low vision.

3.3 Design of the Study

The present study adopted Descriptive survey method and survey has been employed for the data collection. The study at hand focused the existing conditions with regard to acquisition of expanded core curricular skills in major 5 areas namely i) Academic Skills, ii) Career Education, iii) Independent Living Skills, iv) Orientation and Mobility Skills and v) Application of Technology.

3.4 Variables

The variables selected for the study and the levels are given below:

Table 3.2 Variables Selected for the Study

Variables	Levels
Independent variable	
Nature of Visual Impairment	i) Blind ii) Low vision
Gender	i) Boys ii) Girls
Grade	i) IX - X ii) XI - XII
Dependent variable	i) Acquisition of Expanded Core Curricular Skills ii) Academic Achievement

3.5 Tools Selected for the Study

The investigator developed tools to assess the Expanded Core Curricular Skills. The below mentioned are the details of the tools:

i) **Personal Data Sheet:** This includes the demographic details of the samples such as Gender, Grade and Nature of Visual Impairment. The General information Proforma used for collecting Personal Data is given in ***Appendix I***.

ii) **Expanded Core Curricular Skills Assessment**: Expanded Core Curricular Skills assessment tool developed by Wendy Sapp & Iowa ECC Resource Team and Revised by Karen Blankenship, 2009 has been adapted for the study suiting to the Indian Context. Some of the skills have been changed and some have been either modified or removed. The tool is appended in ***Appendix - II***

The major areas of Expanded Core Curricular Skills for blind students are: i) Academic Skills, ii) Career Education, iii) Independent Living Skills, iv) Orientation and Mobility Skills and v) Application of Technology.

There are sub skills in each major area. These sub skills were measured and assessed by the investigator with the help of specific devices and techniques. For each sub skill, five questions were asked to test their level of acquisition of the skill. The investigator developed assessment package for each component skill to measure the level of acquisition of Expanded Core Curricular Skills. The details of sub skills are stated below:

1. Academic Skills

There are seven sub skills selected for blind students. i) Braille Reading Skills & Fluency, ii) Use of Slate & Stylus and Braille writing, iii) Application of Nemeth Code, iv) Abacus Usage, v) Study & Reference skills, vi) Use of Tactile Charts, Graphs & Maps and vii) Use of Scientific Notation.

There are four sub skills selected for Low vision: i) Type of Learning Medium, ii) Ability in Mathematical Calculations, iii) Study and Reference Skills, and iv) Use of either Tactile or Printed Charts, Graphs and Maps.

2. **Career Education**

There are four sub skills. They include: i) Follows simple/complex classroom & school rules, ii) Initiates & completes school assignments on time, iii) Assumes responsibility for obtaining supplies, resources & leisure activities and iv) Explore realistic options for future education/career programming. The sub skills were mainly assessed by interacting with teachers, care takers and the students themselves.

3. **Independent Living Skills**

There are three sub skills. These skills were assessed by creating a situation or probing answers by a series of questions. They include: i) Dressing/clothing management, ii) Personal hygiene/Grooming/Toileting, and iii) Concept of currency (Indian coins and rupees).

4. **Orientation and Mobility Skills**

In this area, the following skills were assessed. i) Protective techniques, ii) Sighted guide techniques and iii) Cane techniques. These skills were assessed by directing the students to perform the skills. However, the Orientation and Mobility Skills were exempted for students with low vision. The tool is appended in ***Appendix - III***.

5. **Application of Technology**

There are three sub skills. They include: i) Use of Tape recorder for learning, ii) Keyboarding and iii) Computer operation. These skills were assessed by asking simple questions like the parts of the computer system and also by providing either computer or laptop to perform a certain basic functions.

Academic Achievement: For academic achievement, the Quarterly and Half yearly mark statement were collected for each sample to find out the relationship between their acquisition of Expanded Core Curricular Skills and Academic Achievement.

6. Scoring

For each sub skill assessment, the assessment components are prepared in such a way that can be completed in 3 minutes time. But duration of 5 minute was provided for each assessment component and the scoring was done as: a) Completing the task b) Partial completion of task and c) Non performance and the corresponding score was ‘2’, ‘1’ & ‘0’ respectively.

3.6 Pilot Study

To check for Reliability and Validity of the assessment tool, Pilot study was conducted. For the Pilot study, 30 samples were selected from two schools in Coimbatore District. Samples include Blind and Low vision students studying from IX to XII Standard.

3.7 Reliability of the tool

In the present study, Cronbach’s alpha coefficient was calculated to establish the reliability of the tool. Cronbach’s alpha is mathematically equivalent to the average of all possible split-half estimates. The reliability of the test Cronbach’s Alpha used in the study is 0.82. It reveals the results and was found reliable.

3.8 Validity of the tool

To establish the validity, the tool was given to subject experts in the field of Special Education to assess each item in the check list with a purpose to determine the accuracy and relevance of the selected items. The experts’ opinion was taken into consideration and the tool was modified and finalized.

3.9 Data Collection Procedure

The data was collected in three phases.

Phase I: Identification of the Sample and Development of Assessment Package

A survey was conducted to identify visually impaired students studying at Inclusive Education for the Disabled at Secondary stage by administering the Personal Data Bank. In this phase, assessment package which includes unique devices, materials and techniques was developed for assessment of each Compensatory skill. This phase stretched up to 6 month duration. A brief outline is given below on the procedure of developing the package.

a) Development of Package for Blind students

I. Academic Skills

Compensatory skills are those skills needed by students who are blind or visually impaired to access all areas of the general curriculum. There are seven sub skills. The assessment for each sub skills are described as follows:

a. Braille Reading Skills & Fluency

Plate 3.1: Finger position while reading braille

Source: ***latimesblogs.latimes.com***

Braille is a code used by people who are blind or visually impaired to read and write. It is a tactile system through which letters and words are represented using raised dots, and it is not a separate language.

For assessing hand movements, if the students were able to read by using forefinger of both the hands, fingers kept at an angle to the Braille line and identified next line without difficulty, a score of 2 was given for completion of the task. If they were not able to use correct finger to read Braille or not able to identify next line, score 1 was given. For non performance of the skill, score 0 was given.

Basic skills in Braille reading like hand movements in reading Braille and identifying next line and next paragraph, reading fluency without leaving word or sentence and Recognition of next paragraph or next page were assessed by giving the students typed Braille material taken from 8th Standard Tamil language and English textbook. The passage has 75 words with 10 lines. A 5 minute time was provided to assess their skill. Assessment is appended in ***Appendix - IV a and b***

Scoring was done as mentioned below: For assessing their reading fluency in Braille, if the students were able to read atleast 50 words in 5 minutes, a score of 2 was given. If they were able to read at least 20 words, one score was given. For non readers, zero score was given.

For students who recognise next paragraph/next page, score 2 was given and those who have difficulty in recognising, score of 1 was given and for inability in recognition, score 0 was given.

b. Use of Slate & Stylus and Braille writing

Plate 3.2: Punching dots in braille cells

Source: ***www.brailleworks.com***

A slate and stylus is a small, mechanical device used for writing braille by hand. Typically, a braille slate is a pocket-sized or desktop two-part hinged device. The top part contains rows of rectangular openings corresponding to individual braille cells which guide the stylus while the bottom part has rows of indentations arranged in cells allowing the stylus to emboss dots on paper. A stylus consists of a small handle made of wood or plastic with a sharp metal point. Writing on a braille slate is done by inserting paper between the top and bottom parts of the slate and inserting the point of the stylus through the openings in the top part, pressing the paper into the depressions below.

To assess the skills in usage of slate and stylus and Braille writing, Braille slate and stylus with Braille sheet was given to assess students holding position of stylus, recognition of cell configuration, punching dots in appropriate cell without omission and identifying next line without difficulty. For assessing their Braille writing skill, 5 sentences taken from 8^{th} Standard Tamil text book was dictated to the students. Assessment is appended in **Appendix - IV c.** If the students were able to write 5 sentences in 5 minutes, a score of 2 was given. If they were able to write 2 sentences, one score was given. For non writers, zero score was given.

c. Application of Nemeth Code

The Nemeth Braille Code for Mathematics is a Braille code for encoding mathematical and scientific notation linearly using standard six-dot Braille cells for tactile reading by the visually impaired.

To assess the skill of using nemeth code for doing mathematical calculations, 5 problems was given which included to test the code for brackets [( )], union [$\cup$], intersection [$\cap$], power [$\wedge$], square root [$\surd$], angle [$\llcorner$], degree [$^{\circ}$], and mathematical operations [+, -, /, * and =]. The problems were said orally and the students were asked to solve the problem by typing in Braille slate and stylus. Scoring was given based on their performance in solving the problems.

d. Abacus Usage

Plate 3.3: Place value in Abacus

Source: ***blennzonlinelearninglibrary.edublogs.org***

The Cranmer Abacus was especially adapted for individuals who are blind to complete math operations. For assessing mathematical calculations in abacus, Cranmer abacus was given to visually impaired students. Five problems were given to test addition, subtraction, multiplication, division and decimal operations. Scoring was given as per their response.

e. Study and Reference skills

This skill was assessed to find out the type of devices/materials used by the visually impaired students for their studies. The type of material included Braille, tape recorder, reader service. Notes taken during class hours and referring other study materials were also assessed. Scoring was done based on their effectiveness of using the study material and referring other materials for study.

f. Use of Tactile Charts, Graphs and Maps

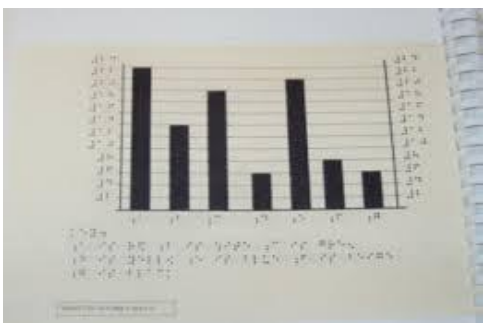

Plate 3.4: Tactile graph

Source*: www.dcs.gla.ac.uk*

Plate 3.5: Tactile map

www.teachingvisuallyimpaired.com

The skill in using charts, graphs and maps were assessed by giving tactual maps, tactual graphs and tactual charts and Science diagram. Scoring was done based on students' skill in identifying the content tactually using their forefingers.

g. Use of Scientific Notation

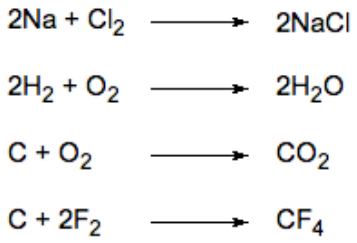

Plate 3.6: Chemical Equations

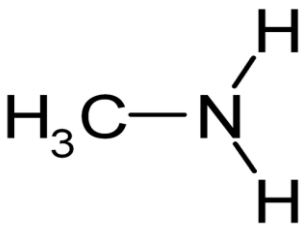

Plate 3.7: Chemical Bond

Nemeth Braille code for encoding scientific notation was assessed by giving 5 equations which included coding for chemical bond [—, ≡], arrow [→]and electron [ē] using Braille slate and stylus. Scoring was done based on their response (correct, partially correct and non performance).

II. Career Education

Students with vision loss benefit most from an experiential learning approach. Structured visits to community sites and discussions with people who perform various jobs, enable them to understand concepts and specific skills that are needed to be successful in those jobs.

The assessment procedures for the four sub skills in Career Education are described as follows:

a. Follows Simple/Complex Classroom & School Rules

Following classroom and school rules were assessed by interacting with class teachers about students' punctuality, discipline, cleanliness and attendance.

b. Initiates and Completes School Assignments on Time

The initiative taken by visually impaired students to complete school assignments on time was assessed by asking questions to teachers about their interest and regularity in completion of assignments in spite of their eye condition.

c. Assumes Responsibility for Obtaining Supplies, Resources & Leisure Activities

With regard to the assessment of knowing supplies, resources and leisure activities, visually impaired students were asked orally about availability of welfare schemes, agencies supplying Braille books, assistive devices provided by the Government, clubs providing resource materials and their interest in leisure activities. Scoring was done based on their response.

d. Explore Realistic Options for Future Education/Career Programming

Visually impaired students were assessed by asking questions about availability of Higher Education courses, career plan, job opportunities, eligibility criteria for admission to courses and exams for teaching profession.

III. Independent Living Skills:

Independent living skills are the activities which people perform, according to their abilities, which enable them to manage their homes and personal lives.

The three sub skills assessment is described as follows:

a. Dressing/Clothing Management

Dressing/clothing management skill were assessed by probing answers with a series of questions on how to wear clothes, washing clothes, ironing and appropriate dress for different seasons.

b. Personal Hygiene/Grooming/Toileting

For assessing in this skill, questions were asked to care takers and students. Materials such as paste and brush, model hair and comb, powder were given to students to assess their personal hygiene and grooming. The skill of taking bath and toileting were assessed by seeking answers from parents and care takers.

c. Concept of currency (Indian coins and rupees)

Skill of obtaining and using money was assessed by giving coins and rupees to students to explore and identify them. The skill of shopping was assessed by creating a situation to bargain and buy things from shop.

IV. Orientation and Mobility:

i. Protective techniques

Plate 3.8: Upper body protective technique
Source: ***nationaldb.org***

Plate 3.9: Lower body protective technique
nationaldb.org

ii. Sighted guide techniques

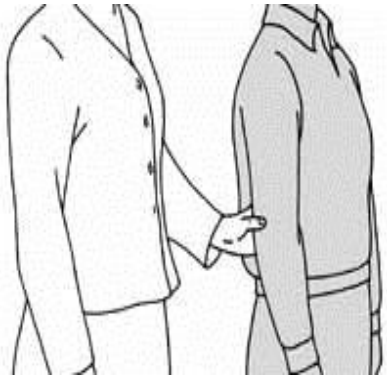

Plate 3.10: Holding sighted person for mobility
Source: ***www.visionaustralia.org***

iii. Cane techniques

Plate 3.11: Use of cane for mobility
www.pinterest.com

Orientation and Mobility is the systematic way in which children and youth with visual impairments orient themselves to their environments and move as safely, efficiently, and independently as possible in those environments.

Skill of using upper arm and lower arm technique under Protective technique was assessed by asking the students to move around the obstacles in front of them. The position of holding the sighted and seeking for help were assessed with the help of peers. The skill of moving around the environment independently was assessed using long cane. Scoring was done based on the performance of each technique.

V. Application of Technology

Plate 3.12: Keyboard use with screen reader software

Source*: www.causes.com*

Assistive technology helps students who are visually impaired increase their access to the general curriculum and improve their academic performance. The applications of assistive technology by the visually impaired students are:

a. Use of Tape Recorder for Learning

A recording device allows a student to record an instructional lesson for studying, write assignments and for note taking purposes. Some of the same devices that students use to listen to recorded texts such as tape recorders, CD players, MP3 players, iPads and iPhones.

The skill of using tape recorder for listening to study material, recording and for note taking purpose independently was assessed by giving a tape recorder to students.

b. Keyboarding

First step in becoming proficient in technology and computer skills is to learn how to type on the QWERTY keyboard. Learning tactile keyboarding skills (typing without looking at the keys) will not only improve the student's speed and accuracy but will also minimize the need for the student to shift their gaze between the source. Keyboarding skill was assessed by seeing students fingering in identifying and typing a document independently.

c. Computer Operation

By giving laptop to students, operating computer independently, typing documents for material preparation without errors were assessed by use of screen reader. A passage in English was given to type for 5 minutes. Errors were calculated and scored accordingly.

d. Development of Package for Low vision Students

1. Academic Skills

There are four sub skills. The assessment for each sub skills are described as follows:

i) Type of Learning Medium

Learning medium was assessed by giving print material of different font size like 12, 16, 22, 36 and 48 from 8th Standard English and Tamil textbook and Braille book. Their medium of learning in print/Braille/audio cassettes or dual media was assessed and scored. A 5 minute time for reading the passage each in English and Tamil language was given.

ii) Ability in Mathematical Calculations

For assessing the Mathematical Calculations of low vision children, 5 problems from 8th Standard Maths textbook was dictated. The skill of solving

the problems independently was assessed by asking them to solve in a paper. For students who are not able to write, scribe was arranged to do the mathematical calculations.

Phase II: Assessment of Expanded Core Curricular Skills

In the second phase, the level of Expanded Core Curricular Skills acquisition was assessed administering the Expanded Core Curricular Skills assessment tool in the selected districts. This phase was stretched up to 6 month duration.

Phase III: Collection of Mark Statements

In the third phase, the mark statement was collected for the selected samples using the mark register in the school office in the selected districts.

Quarterly and Half yearly marks were collected from five major subjects such as Tamil, English, Maths, Science and Social for IX and X Standard students. For XI and XII Standard students, marks from Tamil, English, History, Commerce and Accountancy subjects were taken for finding out students' academic achievement. This phase was stretched to one full month.

3.10 Data Analysis Procedure

For analyzing the data, the following statistical techniques were used.

1. To find out the level of acquisition of Expanded Core Curricular Skills, Mean ± 0.5SD classification procedure was followed.
2. For studying the effect of Expanded Core Curricular Skills on Academic Achievement with respect to Gender and Grade among blind and low vision students separately, t-test was used.
3. For studying the influence of Expanded Core Curricular Skills on Academic Achievement by considering Grade as covariate among blind and low vision students separately, ANCOVA was used.

4. For studying the relationship between Expanded Core Curricular Skills and Academic Achievement among blind and low vision students separately, Correlation Coefficient was used.
5. For analysing the correlation between Academic Achievement and Expanded Core Curricular Skills among blind and low vision students separately, Regression was used.

3.11 Conclusion

In this chapter the methodology of present investigation is enumerated. The data pertaining to the study are presented in the form of tables and interpreted in the next chapter.