CHAPTER - III

DESIGN AND PROCEDURE

After review and careful study of the related literature discussed in Chapter II, design and procedure of the present study has been prepared and has been presented in this chapter. The design implies samples selected, procedure adopted for data collection, tools and statistical techniques used in the present study.

3.1 DESIGN OF THE STUDY

The proposed study has attempted to explore the impact of CAI on the development of motor, academic and communication skills in mentally challenged children in Haryana State. In the present study pre-test, post-test design was used.

The present research was carried out in four stages. At the pre-testing stage, current level of motor functioning, academic level and communication skill were assessed in mentally challenged children of both the groups i.e. experimental and control groups with the help of Behavioural Assessment Scale for Indian Children with Mental Retardation (BASIC-MR).

At the second stage, training was given with the help of CAI to every mentally challenged children of experimental group only and the same was implemented by researcher for three months. In which Computer Assisted Instruction was used to teach them academic skills viz. colour concept, size concept, addition, alphabets, reading and writing to the experimental group. No computer assisted instruction was used to teach the control group. Control group has attended the formal traditional classes only.

At the third stage, level of motor functioning, academic level and communication skill of both the groups viz., experimental and control groups were evaluated as post-test with the help of Behavioural Assessment Scale for Indian Children with Mental Retardation (BASIC-MR).

At the fourth stage, again a post-test II was taken. After the evaluation at third stage the experimental group was free and both experimental and control group were following formal traditional class routine. After one month of third stage again a post-test II was taken to evaluate level of motor functioning, academic level and communication skill of both the groups viz., experimental and control groups. All these four stages are also being presented in Table - 3.1.

TABLE - 3.1 Design of the Study

Stages	Experimental Group	Control Group
Pre-testing Stage	Assessment of level of motor functioning, academic level and communication skill of every child.	Assessment of level of motor functioning, academic level and communication skill of every child.
Experimental Stage	Computer Assisted Instruction was used to teach the academic skills viz. colour concept, size concept, addition, alphabets, reading and writing to the experimental group for three months	No computer assisted instruction was used to teach the control group. The group has attended the formal traditional classes only.
Post-testing Stage	Evaluation of motor functioning, academic level and communication skill of every child of experimental group.	Evaluation of motor functioning, academic level and communication skill of every child of control group.
Post-testing II Stage	Evaluation of motor functioning, academic level and communication skill of every child of experimental group.	Evaluation of motor functioning, academic level and communication skill of every child of control group.

3.2 VARIABLES INVOLVED

In the present research, Computer Assisted Instruction constituted independent variable while motor functioning level, academic level and communication level of mentally challenged children constituted dependent variables.

3.3 SAMPLE OF THE STUDY

The sample of the present study comprised of 38 mentally challenged children with I.Q. range of 35 to 69 and with age group 06 to 14 years, who were selected from various special schools located at Rohtak and Narnoul in Haryana State by using purposive sampling technique. Out of these 38 mentally challenged children, 19 formed the control group and 19 formed the experimental group. The details of the samples are showing in table. 3.2

Table 3.2: Detail of the Samples

Samples	Experimental Group N = 19		Control Group N = 19	
Total N = 38	Male	15	Male	14
	Female	04	Female	05
	Mild	01	Mild	02
	Moderate	18	Moderate	17

Table 3.3: Grouping of the Samples

Samples	Experimental Group			Control Group		
	I.Q.	Age	Condition	I.Q.	Age	Condition
1	35	09	MR with Speech Problem	35	08	MR with Speech Problem
2	41	11	MR with Speech Problem	38	09	MR with Speech Problem
3	37	06	MR	36	09	MR with Speech Problem

4	48	06	MR with Speech Problem	51	07	MR
5	40	12	MR	37	13	MR with Speech Problem
6	43	13	MR	46	12	MR
7	45	13	MR	48	13	MR
8	35	13	MR	35	09	MR
9	36	06	MR with Speech Problem	37	09	MR
10	55	12	MR with Behaviour Problem	57	13	MR
11	43	09	MR	48	08	MR with Speech Problem
12	40	13	MR with Speech Problem	38	14	MR with Speech Problem
13	45	13	MR with Speech Problem	41	06	MR with Speech Problem
14	48	12	MR	45	12	MR
15	35	08	MR	31	11	MR
16	32	13	MR with Speech Problem	34	12	MR
17	34	07	MR with Speech Problem	38	07	MR with Speech Problem
18	33	08	MR with Speech Problem	35	07	MR with Speech Problem
19	41	14	MR with Speech Problem	39	14	MR

3.4 TOOLS USED

The following tools were used to collect data in the present study:

3.4.1. Case History Performa developed by the researcher himself.

3.4.2. Behavioural Assessment Scale for Indian Children with Mental Retardation (BASIC - MR) by Peshawariya and Venkatesan.

3.4.3. Computer Assisted Instruction Software developed by NIMH.

3.4.1. Case History Performa

The General Background Information about the subject was collected and recorded on a Case History Performa, which was developed by the researcher. A copy of Case History Performa has been given in **Appendix - A.** The contents of the Performa are given below:

I. **Identification Data:** Name, Date of Birth, Age, Sex of the Child, Education.

II. **Demographic Data:** Parents' Name, Education, Occupation, Address, Income of Parents, Socio-Economic Status, Locality, Language, Religion, Caste, etc.

III. **Family History:** Joint / Nuclear / Intact family, Status of the family, Incidence in family tree etc.

IV. **Medical/Motor Behaviour History:** Injury, Convulsions, Ear Aches, Visual Problem, Hearing Problem, Speech & Language Problem, Muscle Tone, Muscle control, Involuntary Movements etc.

V. **Home/Social Environment:** Family involvement in personal needs of the case, Interpersonal relationship of family member with the case, Physical Environment Neighborhood-interaction, Participation in socio religious activities, Support of extended family etc.

3.4.2 Behavioural Assessment Scale for Indian Children with Mental Retardation (Basic- MR)

In the present study, Behavioural Assessment Scale for Indian Children with Mental Retardation (BASIC-MR) developed by Peshawariya and Venkatesan was used by the researcher for assessing the current level of motor functioning, academic communication and language in the child. It has been designed to elicit systematic information on the current level in school going children with mental handicap. The scale has been field tested on a select sample population. The scale is the most suitable for mentally challenged children between 3 to 16 (or 18 years). However, the teacher may find the scale useful for even older severely retarded individuals.

The BASIC-MR has been developed in two parts:.

1. Part A: The items included in Part A of the Scale helps to assess the current level of skill behaviours in the child.

2. Part B: The items included in Part B of the Scale helps to assess the current level of problem behaviours in the child.

The BASIC-MR, Part A, consists of 280 items grouped under the following seven domains:

1. Motor

2. Activities of daily living (ADL)

3. Language

4. Reading-Writing

5. Number-Time

6. Domestic-Social

7. Prevocational-Money

The number of items within each domain varies. There are specific quantitative scoring procedures, profile sheets, record booklet and a report card included in the scale. There are provisions for periodic assessment of each child for three months and to calculate raw score, which can be converted into cumulative percentages and graphic profiles.

Administration

While administering the scale, each item within every domain in the scale was read and assessed carefully whether the given child with mental handicap has or does not have, the stated behavioural skill. Direct observation techniques rather than interview techniques were used to determine if the child have or does not have the stated behavioural skill. Depending on the nature of behaviour observed or reported, children were assessed over few sessions of observation. A record booklet was used while administering the scale for each child. The performance of the child was entered and the score obtained to evaluate the child on two sessions of observation. In some cases, where direct observation was not possible, the information was got elicited and supplemented from parents/teacher.

Scoring

Scoring process of this tool is too simple and saves time. All items of the scale were checked and rated along a six point rating scale, viz. 0 (not applicable), 1 (totally dependent), 2 (physical prompting), 3 (verbal prompting), 5 (totally independent) respectively given in the record booklet against each item on the scale. Thus, the maximum score possible for a child within each domain and all the seven domains are fixed. If the stated behaviour skill was not present in the child, "totally dependent" was marked and given a score of one. If the stated behavioural skill is present and child is performing independently without any problem "totally independent" was marked and

given a score of five. There were some items which were depended on the individual like in motor skills and grooming related items. If the stated behaviour skill is not related to the individual or not applicable on the individual, "not applicable" was marked and given a score of zero.

Thus, for each item on the BASIC-MR, Part A, child with mental handicap got any score ranging from zero to five depending on the functioning level of that skill. Appropriate score obtained by the child for each item was entered in the record booklet. The maximum possible score for a child was 1520. The individual scores of the child on each item within a domain were added and expressed it as 'Raw score' (RS) for that domain. Then it was converted into percentage for each domain by dividing the obtained raw score (RS) with maximum score for that particular domain and multiplied by 100.

Total 'Raw score' for all the ten domains was calculated and expressed as Total 'Raw score' (RS) for BASIC-MR. A lower score indicated fewer behaviour skill. According to the above procedure the BASIC-MR Part A was administered on two occasions. The first or initial assessment of the child was done before starting training programme. That was called as baseline assessment. Repeated the next assessments at the end of training. Entered the Raw Scores, percentages, total Raw scores and cumulative percentages at the end of each quarter in the appropriate columns and plotted the graph under "graphic profile".

3.4.3 Computer Assisted Instruction Software developed by NIMH

This software offers 100 objects to work with, divided into 17 categories. The software first shows the names of the contributors to the software and then asks for the name of the student operating the software. This name is used to generate a report file of the same name which stores the student's performance record.

The 17 categories are divided into 5 Selection Screens. One can flip through these Screens by using <PgUp> and <PgDn> keys.

Selection of a category is done either by taking the mouse cursor to the category and clicking its left button or by moving the star-shaped cursor to the required category and then pressing

<ENTER>.

Once a category is selected, it shows the category's front screen. The picture selection from that category is done in one of the following three ways:

1. Sequential Selection

2. Random Selection

3. Selection by Choice

The decision on the selection method is based on the setting stores in the configuration file. One can change the setting by pressing <F2> and then changing the appropriate parameters.

If the selection method is either Sequential or Random, the front screen will be cleared in a couple of seconds. If the selection method is `By Choice', the front screen stays and one can select the required picture with the mouse or the arrow keys.

The selection picture will appear in the centre of the screen. For each picture, there are 5 exercises.

Matching,

1. Picture + Word with Picture

2. Picture + Word with Picture + Word

3. Word with Word

4. Word with Picture

5. Picture with selection of the correct word from a group of words

The correct picture/word is to be selected from the distractors. Again, the selection can be done by the left button of the mouse or by moving the enclosing square to the correct answer and pressing <ENTER>.

In the case of the 5th exercise, the correct word for the picture is selected by pointing the screen finger to the correct word and pressing <ENTER> of with the help of the mouse.

The student's performance is recorded in a file which is named after the name entered at the beginning of the session. The file extension is numeric, depending on the number of earlier sessions. Examples of record file names are:

reshma.001   karan.001
reshma.002   karan.002
reshma.003
Pressing <ESC> will take the user back to the category selection screen and pressing <ESC> once again will end the session.

ANIMALS   **CLOTHING**

   Dog   Shirt

   Cat   Pant

   Cow   Kurta

   Rat   Sari

   Horse   Frock

                     Salwar

KITCHEN ITEMS   **HOUSEHOLD ITEMS**

   Cup   Cup

   Plate/Thali   Plate/Thali

   Spoon   Spoon

   Glass   Glass

Stove   Stove

BODY PARTS   **COMMON OBJECTS**

Mouth   Book

Nose   Pen

Eye   Bag

Ear   Box

Teeth   Toothbrush

FOOD ITEMS   **COMMON SIGNS**

Rice   Danger

Chapati   Poison

Dal   Ladies

Vegetable   Gents

Fruit   In

Milk   Out

Egg

OUTSIDE THINGS   **COMMON TOOLS**

Tree   Scissors

Flower   Knife

Road   Hammer

Bus stop   Screwdriver

School   Needle

Sun

Moon

PEOPLE

Mother

Father

Brother

Sister

Teacher

COLOURS

Red

Yellow

Green

Blue

White

Black

TOYS

Ball

Bat

Doll

Top

Drum

VEHICLES

Car

Bus

Train

Aeroplane

Cart

Boat

ACTION WORDS

Eat

Sleep

Sit

Walk

Wash

Write

Play

DESCRIPTIVE

Big

Small

Many

Few

Up

Down

EMOTIONS

Run

Drink

Happy

Sad

Come   Angry

Go   Afraid

Arithmetic Software

The counting package helps any student to learn numerals from one to ten. The package teaches numbers with the help of objects, which interests a young learner especially a mentally handicapped child.

The package operates in two stages. First a minor stage, in which the concept of a number is introduced. Second a major stage, involving identification of the taught numeral with different steps in which a student has to match objects with the like number of objects placed in a straight line (straight line counting), numerals matched with objects placed in straight line, objects placed in straight line to be matched with a numeral and the same three steps are repeated with objects placed in a cluster (Cluster counting). To express the correctness of an answer selected by the student, an animated figure (Incentive Man) is also provided. If the answer selected is correct, the incentive man appears on top right corner of the screen with a happy expression moving his eyeballs. If not the incentive man appears with a crying look. The progress of a student is also expressed through an animated car.

The package keeps tract of the continue evaluation of the student being trained on the package. Option of taking a hard copy (printout) of the reports is also provided.

3.5   PROCEDURE OF EXPERIMENTAL RESEARCH

Collection of data is must in any type of research so that hypothesis formulated at planning stage may be tested. Collection of factual information or data required adaptation of a systematic procedure, because as per Whittery (1950), 'Data are the things we think with. They are the raw material of reflection until by comparison, combination and evaluation they are stepped up to higher levels of generalization,

where again they serve as basic material for further and higher thinking'. Further, collection of relevant data must be adequate in quality and quantity and as reliable and valid as possible. The present study was conducted in four stages, detail of which is given below.

3.5.1 Pre-testing stage

In the beginning stage, the general background information of all the 38 mentally challenged children was collected. The general background information obtained from the parents and class teacher on a Case History Performa. To maintain ethical norms, permission before collect the data was taken from the Heads of concerned schools as well as the parents of the subjects. Special carefulness had also been taken so that the emotions of the subjects and their parents are not hurt. During the pre-testing stage, Behavioural Assessment Scale for Indian Children with Mental Retardation (BASIC-MR) as assessment tool was administered on all the 38 mentally challenged children to assess their motor functioning level, academic level and communication level. The scores, thus, obtained for each skill of every subject was recorded both graphically and numerically in Behavioural Profile of BASIC-MR.

All the 38 mentally challenged children were further equally divided in two groups i.e. experimental group and control group. The subjects of both the groups have been taken from the separate special school intentionally so that the subjects belonging to control group may not feel ignored as no special teaching technique was being used for them.

3.5.2 Experimental Stage

At this stage, training was given with the help of CAI to every mentally challenged children of experimental group only and same was implemented by researcher for three months. In which Computer Assisted Instruction was used to teach the academic skills viz. colour concept, size concept, addition, alphabets, reading and

writing, to the experimental group. No computer assisted instruction was used to teach the control group. Control group has attended the formal traditional classes only.

The needs, requirements, priority of each subject were also taken into consideration during experimental stage. All the special educators of the concerned school where the experimental training was carried out, were made aware of the objectives and nature of the experimental training to be conducted. These special educators were also given special instructions and guidance for implementing the Computer Assisted Instruction (CAI) in teaching and it was implemented on the experimental group for 3 months. Objectives were evaluated to see the progress of subjects.

No special instruction or teaching method or CAI was used for the subjects of control group. Subjects of control group has attended formal class in routine and teacher has taken traditional class.

The medium of training was Hindi. Training was given to each subject of experimental group for one hour daily. Appropriate and accurate instructional materials were prepared and used for training according to the subjects.

3.5.3 Post-testing Stage

After the training of three months each subject of both the groups i.e., experimental and control groups were again evaluated individually to record their progress in their motor functioning level, academic level and communication skills with the help of Behavioural Assessment Scale for Indian Children with Mental Retardation (BASIC-MR). It was recorded numerically and graphically to check whether the subjects of experimental group have achieved the predetermined set of objective of research or not. The mean gain scores were also recorded for both the experimental and control groups of the subjects.

3.5.6 Post-testing II Stage

At the fourth stage, again a post-test was taken. After the evaluation at third stage the experimental group was free and both experimental and control group were following formal traditional class routine. No special instruction or technique was used to teach experimental or control group by the class teacher or researcher. Teacher has followed regular teaching method during this period. After one month of third stage again a post-test II was taken to evaluate level of motor functioning, academic level and communication skill with the help of BASIC-MR of both the groups viz., experimental and control groups.

3.6   STATISTICAL TECHNIQUES USED

Raw scores carry no weight and meaning by themselves, unless statistical techniques are employed to test the significance of the scores. In order of fulfill the objectives of the study, the following statistical techniques were employed for data analysis:

Mean, Standard Deviation and t-test.

As the hypothesis of the present study were null, two tailed test were employed for testing the significance of difference between the mean scores of behaviour problems and all the four functional skills viz. Personal, Social Academic and Occupational.

Arithmetic Mean

Arithmetic Mean $(\bar{X})$ was obtained by adding together all the items (X) and by dividing this total by the number of items (N).

Symbolically:

$$\bar{X} = \frac{\sum X}{N}$$

$\bar{X}$ = Arithmetic Mean

$\sum X$ = Sum of all the values of variables X

N = number of observations

Standard Deviation

The standard deviation was computed by applying the following method

$$S = \sqrt{\frac{\sum X^2}{N}}$$

Where:

S = Standard Deviation

X= the deviations of the items from the mean $(X - \bar{X})$

t-test

As the hypotheses of the present study were null, two-tailed test was employed for testing the significance of difference between the mean scores of all the functional skills (Personal, Social, Academic and Occupational skills).

't value' was calculated by using the following formula:

$$t = \frac{\bar{X}_1 - \bar{X}_2}{S} \times \sqrt{\frac{n_1 \times n_2}{n_1 + n_2}}$$

$$S = \sqrt{\frac{(n_1 - 1)S_1^2 + (n_2 - 1)S_2^2}{n_1 + n_2 - 2}}$$

Where:

$\bar{X}_1$ = mean of the first sample

$\bar{X}_2$ = mean of the second sample

n_1 = number of observations in the first sample

n_2 = number of observations in the second sample

S_1^2 = Standard Deviation of the first Sample

S_2^2 = Standard Deviation of the second Sample

S = Combined standard deviation

If the $t_{cal} > t$ tabulated at dt ($n_1 + n_2 - 2$) and $\alpha\%$ level of significance, the difference

between the two groups is said to be significant at $\alpha\%$ level of significance.

Otherwise the data is said to be consistent with the hypotheses at $\alpha\%$ level.

On the basis of these tools, procedures, methods, and statistical calculations, the

analysis of the results has been given in the next chapter.