CHAPTER III

DESIGN AND PROCEDURE

On the basis of review of the related literature in chapter II, design and procedure of the present study has been presented in this chapter. The chapter deals with the description of the design employed, variables involved, sample selected, tools used, procedure adopted for data collection and statistical techniques used in the present study.

3.1 DESIGN OF THE STUDY

The purpose of the present study is an attempt to assess the effect of Individualized Educational Programme (IEP) in group setting on learning of adaptive behaviour skills viz. Motor Skills, Self-help Skills, Communication Skills, Social Interaction, Functional Academics, Domestic Behaviour, Community Orientation, Recreation & Leisure Time activities, and Vocational activities regarding mentally challenged children in Haryana. In this study, both the pre-test and post-test design was used and this was carried out in the following three stages.

At the first stage, current level of all the above stated adaptive behaviour skills in mentally challenged children of both the groups i.e., experimental and control groups, was assessed with the help of Madras Developmental Programming System (MDPS) - Behavioural Scale.

At the second stage, on the basis of assessment of the current level, Individualized Educational Programme (IEP) of each and every mentally challenged child of experimental group was developed in all adaptive behaviour skills as per their unique needs. Based on Individualized Educational Programmes of ten students of one group, lesson plans in group setting (Group Teaching Lesson Plan) for each skill area were developed and implemented on the group for a period of six months. In this way, 90 Group Teaching Lesson Plans on 18 skill areas were developed for all the five groups (10 subjects in each group) for 3 months and these were reviewed quarterly for next 90 Group Teaching Lesson Plans for next 3 months. No
Individualized Educational Programme and lesson plan for group setting was developed for the mentally challenged children of control group.

At the third stage, all the adaptive behaviour skills in mentally challenged children of both the groups i.e., experimental and control groups, were evaluated with the help of Madras Developmental Programming System (MDPS). All these three stages are also being presented in Table 3.1.

**TABLE - 3.1**

**Design of the Study**

<table>
<thead>
<tr>
<th>Stages</th>
<th>Experimental Group</th>
<th>Control Group</th>
</tr>
</thead>
<tbody>
<tr>
<td>Experimental Stage</td>
<td>Individualized Educational Programme was developed of each subject and based on Individualized Educational Programmes of ten students of one group, lesson plans in group setting (Group Teaching Lesson Plan) for each skill area were developed and implemented on the group for a period of six months.</td>
<td>No Individualized Educational Programme and Lesson Plan in group setting (Group Teaching Lesson Plan) were developed and implemented on group.</td>
</tr>
</tbody>
</table>

For developing an appropriate Individualized Educational Programme (IEP), it was kept in mind that it explored each student’s needs diagnostically so that an appropriate programme could be developed. In the present study, the diagnostic process was followed as presented in Figure-3.1 to develop appropriate Individualized Educational Programmes (IEPs) and Group Teaching Lesson Plan to implement in group setting.
Identification & Screening

Moderate Mental Retardation

Behavioural assessment

Evaluation & Review

General Background Information

Assessment of Current Level of Functioning

Setting Behavioural Objective

Setting Annual Goal

Evaluation of objectives

General Objective of the Group

Current level of Functioning in Specified Skill of each Child

Specific Behavioural Objective of Each Child

Procedure

Evaluation

Fig. 3.1: The Diagnostic Process
3.2 VARIABLES INVOLVED

In the present study, Individualized Educational Programme in group setting constituted the independent variables, whereas adaptive behavioural skills viz. Motor Skills, Self-help Skills, Communication Skills, Social Interaction, Functional Academics, Domestic Behaviour, Community Orientation, Recreation & Leisure Time activities, and Vocational activities constituted the dependent variables.

3.3 SAMPLE OF THE STUDY

The sample of the study comprised 100 mentally challenged children of age group 7 to 10 years and having IQ 35-49, who were selected out of approximate 600 mentally challenged children enrolled in various institutions of mentally challenged located in Haryana state through purposive sampling technique. Out of these 100 mentally challenged children, 50 children formed the control group and 50 children formed the experimental group. However, the sample was equated on the basis of a few variables of the subjects such as IQ (35 -49), level of mental retardation (moderate), and age (7 to 10 years).

3.4 TOOLS USED

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

3.4.1 Seguin Form Board Test (SFBT) by Edward Seguin
3.4.2 Vineland Social Maturity Scale (VSMS) by Malin (Indian Adaptation)
3.4.3 Madras Developmental Programming System (MDPS) - Behavioural Scale by Jeyachandran & Vimala.
3.4.4 Case History Performa developed by the investigator itself.
3.4.5 Individualized Educational Programme (IEP) developed by the investigator herself.
3.4.6 Group Teaching Lesson Plan developed by the investigator herself.

3.4.1 Seguin Form Board Test (SFBT)

The Seguin Form Board Test (SFBT) has been developed by Edward Seguin and it is the most commonly used performance test for measuring psychomotor and
visuo-perceptual abilities for children between four to twenty years age group. It is also used as a quick measure of general intelligence in children between 3 to 11 years age and for mentally retarded adults. It has also been used as supplementary test to verify the outcome of the Draw-A-Man test. This is one of the earliest instruments for measuring the intelligence level of the feeble minded.

**Administration**

The Seguin Form Board Test (SFBT) contains 10 pieces of wooden figures of different shapes and sizes in a wooden box as shown in Figure 3.2.

![Fig. 3.2: Seguin Form Board](image)

While administering, the board’s position is so placed that the star is toward the examiner. With the subject watching, the ten pieces are stacked in three piles, starting with the rectangle, in the order shown by the numbers in Table 3.2.

**TABLE - 3.2**

**Stacking of Pieces**

<table>
<thead>
<tr>
<th></th>
<th>Examiners Left</th>
<th>Middle</th>
<th>Examiners Right</th>
</tr>
</thead>
<tbody>
<tr>
<td>Top</td>
<td>Hexagon (3)</td>
<td>Triangle (7)</td>
<td>Diamond (10)</td>
</tr>
<tr>
<td></td>
<td>Oval (2)</td>
<td>Cross (6)</td>
<td>Circle (9)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Square (5)</td>
<td></td>
</tr>
<tr>
<td>Bottom</td>
<td>Rectangle (1)</td>
<td>Half-Circle (4)</td>
<td>Star (8)</td>
</tr>
</tbody>
</table>
The examiner gives the command to the subjects “PUT THESE BACK AS FAST AS YOU CAN, READY, GO.” When this command is given stop watch can be started. Any fraction of second may be counted, as a whole second. If any block is left partly outside, resting on the edge instead of fitting into the recess, do not record the time but treat trial as incomplete. Call the subject’s attention to the fact that the block or blocks are not complete in place.

The examiner should stack blocks rapidly, but without any suggestion of nervous haste; memorize the bottom to top order; to avoid any hesitation. Say nothing during the progress of a trial. Make sure that the subject does not start before the signal is given. The test consists of three trials, including any trial marked incomplete.

**Scoring**

The score is the shortest time in seconds out of the three trials. The score is converted into Mental Age (MA) by referring to the norms. Intelligence Quotient (IQ) is computed by using the formula IQ = (MA / CA) x 100 where CA is Chronological Age.

This form board has subsequently been incorporated into a number of performance scales. The Indian norms for the test are also available.

3.4.2 **Vineland Social Maturity Scale (VSMS)**

Vineland Social Maturity Scale (VSMS) has been developed by Malin and has been adapted for Indian population. This scale is useful in the assessment of severely mentally retarded persons who cannot cope with formal testing procedures. The data is elicited by means of semi structured interviews with the child or guardian / caretakers. It gives a profile on development in eight social areas viz. Self-help General (SHG), Self-help Eating (SHE), Self-help Dressing (SHD), Self Direction (SD), Socialization (SOC), Occupation (OCC), Communication (COM) and Locomotion (LOM). The Social Age (SA) and Social Quotient (SQ) can be computed from the person’s scores.
**Recording**

Record sheet is used for noting the child’s responses. The item is marked pass (\(\checkmark\)) if the child is able to perform correct and marked fail (\(x\)) if otherwise. Half credits may be given if it can be presumed that the child could pass the item if the opportunity was presented. These half credits receive full credit if they lie between two passed items.

**Scoring**

To get the scores, the pass scores (full and half) are added up. The Social Age (SA) is found out from Vineland Social Maturity Scale (VSMS) manual. Social Quotient (SQ) is computed by dividing Social Age (SA) by Chronological Age (CA) and multiplying it by 100. Maturity levels both in terms of SA and SQ for each of the eight social areas given above are assessed by referring VSMS norms and it is entered in the columns of Social Maturity Constellation Record Sheet.

The copy of the Indian adaptation of Vineland Social Maturity Scale by Malin has been given in Appendix – I.

Identification and screening was made by the school authorities with the help of Seguin Form Board Test (SFBT) and Vineland Social Maturity Scale (VSMS) to diagnose the subjects as moderate mentally challenged children. Identification was made to recognize a student’s school difficulties that may include problems related to learning, behaviour, speech / language or physical / health factor. This was followed by screening which was done to determine their special services.

**3.4.3 Madras Developmental Programming System (MDPS)-Behavioural Scale**

In the study, Madras Developmental Programming System (MDPS) – Behavioural Scale designed by Jeyachandran and Vimala was used by the investigator to assess the current level of all the adaptive behavioural skills of the subjects. It is a sequential process by which decisions are made for the management programming for persons with mental retardation. This instrument is used for the adaptive behavioural assessment. This instrument provides a comprehensive quantitative picture of the strengths and needs regarding the adaptive behaviour level of the persons with mental retardation. It also provides for an inbuilt system, for
periodic assessments and evaluations. This criterion-referenced assessment information is very important for programme planning. The entire system is based on the principle that assessment is the first and a necessary step in programme planning. A behavioural assessment provides descriptive information about the functional abilities of an individual by "assessing" his / her adaptive behaviours.

The salient features of the MDPS Behavioural Scale areas under:-


- These domains are evolved based on the developmental stages and the persistent life situations of an individual.

- These 18 domains themselves are arranged in a developmental sequence wherein the initial domains contain the most elementary items.

- The items under each domain are developmentally sequenced.

- All the 360 items are positive statements which are observable and measurable.

- All the items focus on functional behaviours (activities) which normally occur in the routine daily life of an individual (activities of daily living).

- They move along dependence – independence continuum.

- The scales is so constructed that the initial items involve the simplest activities and the later items progress towards more complex ones.

- The scale is so designed that both manual and computer assisted collection and analysis of assessment information can be done.

- The scale represents a compromise between comprehensiveness (addressing all functional areas) and brevity.
The MDPS Behavioural Scale serves not only as an assessment tool, but also as an instrumental and a communication tool.

As an instructional tool, the MDPS Behavioural Scale aids the special educator and the members of the interdisciplinary team in developing individualized and appropriate objectives for each individual.

As a communication tool, it offers a recording device which can be used throughout the schooling of the individual. It helps to display his progress and communicate this information to all those concerned with the Individualized Educational Programme (IEP).

In some instances, the individual may be transferred to another school or the teacher working with the individual may discontinue his / her services. In such cases, the assessment information provided by this tool will indicate to the new programmer concerned to continue with the programme without break. The MDPS Behavioural Scale was developed to meet the following objectives:

• To provide a quality tool to assess the adaptive behaviour skills of the persons with mental retardation.

• To provide a basis for planning programmes to increase the adaptive behaviour skills and consequently the independence of the person with mental retardation.

The entire process of programme planning can be visualized in the flow chart (Bock and Jeyachandran, 1975) shown in Figure-3.3.

The initial inventory of items was revised and reviewed extensively. The revision process included data collection from three pilot studies. The review was done by a technical panel consisting of an interdisciplinary team of experts. Items were selected after an extensive review of a number of behavioural scales. An advisory committee of various professional with sufficient experience in the field provided assistance. A significant feature of the scale is the sequencing of item along dependence – independence continuum. This was accomplished by the computation of the percentage of individuals who could perform each item domain and also by
computation of Guttmann scaling and co-efficient of reproducibility. (Bock and Jeyachandran et.al, 1975).

![Diagram of Programme Planning Process]

Key: 
- Represents milestones events.
- Represents "tools" or "instruments" to complete each event.
- Represents the people responsible for implementing the process

**Fig. 3.3: Process of Programme Planning**

The reliability and validity of this scale was also established. The different raters observed and record their observations on 70 individuals. This was done to estimate the inter rater reliability. The scores were corrected using the Person Product – (Moment correlation co-efficient (Garrett, 1965). This showed from 0.788 to 0.935 with a medium of 0.86. Estimate of test-retest reliability was produced when 37 clients were observed and observations recorded twice by the same rater within a duration of 10 days. The correlation between ratings was high, ranging from 0.760 to
0.981 with a medium of 0.94. Several measures of internal consistency were got by subjecting the scale and total scores to the Scott Scale Analysis Programme. Cronbach’s co-efficient alpha for each scale and full scale ranged from 0.808 to 0.965 with a medium of 0.94 (Bock, Jeyachandran et.al, 1975). In the early stages of development, the scale was given to a panel of 12 persons with extensive experience in the field of developmental disabilities to establish content and face validity. The panel evaluated the scale and agreed that the:

- 18 domains were sufficient for assessment and programme planning.
- Items were worded appropriately and clearly.
- Items measured the class of behaviour named in each domain.
- Behaviours in the items were observable and objective.
- Items were developmentally in each domain.

**Scoring**

Assessment data is recorded both graphically and numerically on the Behavioural Profile. Initial Assessment and the quarterly programme progress and the identifying information on the reverse side are recorded in the profile. Scoring process of this tool is too simple and also save time. The information, what skill behaviours the subject could or couldn’t do, is derived by direct observation of the subject, parent / caretaker, interviews or by means of testing during assessment. The subjects’ performance on each item is rated along two discretion. When the subject performs the activity, mark ‘A’ and shade ‘Blue’ in the graph of profile form. When the subject is yet to perform the activity, mark ‘B’ and shad ‘Red’ in the graph of profile form. Items mark ‘A’ and shade ‘Blue’ are counted as a point for quantifying into scores and recorded numerically in the profile in the columns of ‘As’ of 1st Assessment, I Quarter, II Quarter, III Quarter and IV Quarter. Items mark ‘B’ and shade red are counted as a point of yet to perform the activity and recorded numerically in the profile in the columns of ‘Bs’ of 1st Assessment, I Quarter, II Quarter, III Quarter and IV Quarter.

A copy of Madras Developmental Programming System (MDPS) - Behavioural Scale along with Behavioural Profile has been given in Appendix-II.
3.4.4. Case History Performa

The general background information about the subjects was collected and recorded on a Case History Performa which was prepared by the investigator. A copy of Case History Performa has been given in Appendix-III. The contents of the performa are given below:

**Identification Data:** Name, Date of Birth, Age, Sex of the child, Education and Occupation of the child etc.

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

**Family History:** Joint / Nuclear / Intact family, Number of siblings, Nature of consultations and treatment, Status of the family etc.

**Birth History:** Pre-natal, Natal, Neo-natal, Post-natal history, Immunization History etc.

**Development History:** Development milestones, the Motor development and Speech and Language of the child developed normally or delayed.

**School history:** Previous schooling, his/her Attendance, Regularity, Performance, Reason for Changing the School, Classroom Behaviour etc.

**Play History:** Enjoys play, Play most of the time, Preference to play, Behaviour at play, Leisure time activities, Special likes and dislikes etc.

**Social Environment:** Family involvement in Personal needs, Education and play activities, Interpersonal relationships, Neighborhood-interaction, Peer group adjustment, Emotional and behaviour problems etc.

**Management problems with the case:** If any problem faced by the parents to manage with the case was mentioned here.

3.4.4. Individualized Educational Programme (IEP) for Mentally Challenged Children

The ultimate purpose of Individualized Educational Programme is to provide a comprehensive service for a child with mentally challenged to meet his / her educational and training needs individually. It provides instructional direction,
functions as the basis for evaluation and improves communication among staff members, teachers, parents and student with mentally challenged. In the present study, Individualized Educational Programme was developed by the investigator for every mentally challenged child of experimental group according to his / her individual needs and characteristics. The major components in developing Individualized Educational Programme, which are being explained below have also been presented in Table-3.3

**TABLE - 3.3**

**Components of Individualized Educational Programme**

| General Background Information about the Child |
| Assessment of Current Level of Functioning |
| Setting Annual Goal |
| Setting Behavioural Objectives |
| Procedure |
| Evaluation and Review of Objectives |

(Statements detailing the special services to be provided to achieve the objectives: behavioural techniques, methods and instructional materials, stages of learning, principles of teaching and steps of concept development to make learning effective)

(Rate of student’s achievements in a particular task, against a set criterion, was evaluated and reviewed)
1. General Background Information about the Child

The relevant data is collected to get the clear picture of the child and the environment in which he/she has been brought up. This is called the General Background Information about the subjects. In the present study, these data were collected and recorded on a Case History Performa by the investigator by following the same contents as given in the preceding sub-section 3.4.4. A specimen copy of case study of one subject has been given in Appendix -IV.

2. Assessment of Current Level of Functioning

To assess the current level of functioning, a special trained teacher observes performance of mentally challenged student in a specific activity and then notes down it exactly what he/she did without any interpretation of it. This summary of a subject's current level of functioning provides a basis for subsequent goal setting as it can be known that from where programming should be preceded. The current level of functioning usually refers to the last skill the individual has been able to perform in the particular domain. In the present study, current levels of functioning of the subjects were assessed in all the adaptive behavioural skills viz. Motor Skills, Self-help Skills, Communication Skills, Social Interaction, Functional Academics, Domestic Behaviour, Community Orientation, Recreation & Leisure Time activities, and Vocational activities with the help of Madras Developmental Programming System- Behavioural Scale. Certain types of informations such as toilet habits and grooming of the subjects were gathered from the parents. Scoring was done according to the MDPS mentioned in the sub-section 3.4.3. Statements of performance levels were written to emphasize the positive aspects of the subject (i.e., what the subject can do). This component was followed by the next component i.e. Setting Annual Goal.

3. Setting Annual Goal

Based upon the assessment of current level in all the areas, annual goals are set up for each subject. An annual goal represents the achievement anticipated for a child in an academic year. As the name implies, these goals predict long-term gains during the school year. The following features help in determining these goals.

- Chronological age
• Past learning profile
• Recent learning history
• Response to instructions

Four major criteria are included in setting up annual goals, these are

• Measurable
• Positive
• Student-oriented and
• Relevant

In the present study, these entire four criterions were considered to specify the annual goals of the subjects, which were based on the above mentioned criteria. After this, behavioural objectives were specified from annual goals.

4. Setting Behavioural Objectives

Several behavioural objectives are set up to attain the annual goals. Behavioural objectives are so named because they refer to behaviours which can be objectively observed and measured. They are also known as short term objectives which mean the breaking down of annual goals into smaller units so that specific strategies can be worked out to meet these objectives in a given period of time. They reflect major instructional achievements between the current performance level and the ultimate goal. In the present study the behavioural objectives were specified from each annual goal and viewed in five parts as indicated below:

a) Who is the person to be trained?

Behavioural objective for an individual is the name of the subject to be trained, e.g., Karan.

b) What is the behaviour in question?

It describes the behaviour that the special teacher intends to develop, strengthen, and modify in observable and measurable terms in the individual, e.g., Karan will count aloud upto five...
c) **Under what conditions will this behaviour occur?**

Any behaviour will occur only under certain conditions. Therefore, it specifies here the conditions under which the behaviour will occur, e.g., *When presented ten objects and asked, Karan will count aloud upto five.*

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d) **What is the level of performance expected?**

There are many ways to state the expected level of performance which answer one or more of the questions such as, "How often do you want the behaviour to occur, how many times, for how long or how well?" It may vary according to the conditions required for the performance of the skill. The investigator, while specified the level of performance she expected a behaviour to occur around 80% of the time, e.g., *When presented ten objects and asked, Karan will count aloud upto five objects 4 out of 5 times.* But in life-and-death situations a performance level of 100% is absolutely necessary, e.g., *When asked to cross the roads, Karan will cross the road from Zebra crossing by following the Red light 5 out of 5 times (100%).*

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e) **How long will it take for the behavioural objectives to be achieved?**

(Dead line)

It indicates the period of time it will take for the objective to be achieved. Such a deadline enables the investigator to plan the activities to achieve the behavioural objective in the specified time, e.g., *when presented ten objects and asked, Karan will count aloud upto five objects 4 out of 5 times accurately by 5th Oct. 2006.*

By following all five components, behavioural objectives for the subjects were written in a sentence form, as it completed in the example of its last component.

5. **Procedure**

*(Statements detailing the special services to be provided to achieve the objectives: Behavioural techniques, teaching methods and instructional materials, stages of learning, principles of teaching and steps of concept development to make learning effective)*

After knowing "What to teach" a teacher has to follow "How to teach". To
achieve the behavioural objective, a structured process is designed with special
services by involving the behavioural techniques, teaching methods and instructional
materials to make learning effective for each subject as is being given in Table 3.4.

**TABLE -3.4**

**Special Services Used In Procedure Planning**

<table>
<thead>
<tr>
<th>Behavioural Techniques</th>
<th>Teaching Methods</th>
<th>Instructional Materials</th>
<th>Stages of Learning</th>
<th>Principles of Teaching</th>
<th>Concept Development</th>
</tr>
</thead>
<tbody>
<tr>
<td>Task analysis</td>
<td>Multi-Sensory Approach</td>
<td>Concrete Objects</td>
<td>Acquisition</td>
<td>Simple to Complex</td>
<td>Matching</td>
</tr>
<tr>
<td>Prompting</td>
<td>Computer Assisted Instruction</td>
<td>Models</td>
<td>Maintenance</td>
<td>Known to Unknown</td>
<td>Identification</td>
</tr>
<tr>
<td>Modeling</td>
<td>-</td>
<td>Pictures / Flash cards</td>
<td>Generalization</td>
<td>Concrete to Abstract</td>
<td>Naming of Objects</td>
</tr>
<tr>
<td>Shaping</td>
<td>-</td>
<td>Audio-Visuals</td>
<td>-</td>
<td>Whole to Part</td>
<td>-</td>
</tr>
<tr>
<td>Chaining</td>
<td>-</td>
<td>Puppets</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Reinforcement</td>
<td>-</td>
<td>Charts</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Fading</td>
<td>-</td>
<td>Software Packages</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>-</td>
<td>-</td>
<td>Play Materials etc.</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>
a) Behavioural Techniques

It is observed that mentally challenged children can learn a lot of skills if scientific techniques are used for teaching. In the study, following behavioural techniques for effective teaching were used by the investigator.

Task analysis

Mentally handicapped children are unable to learn the task as a whole, but when presented the task in simple steps, they are able to make better progress. The process of identifying these small steps is known as task analysis. It is the analysis of a task into simpler steps and arranging them in a sequential order. Macarthy (1987) states that task analysis is a teaching strategy in which the task is broken down into teachable components and arranged in sequential order. It is a blueprint for instruction / teaching, through which a student should proceed to achieve the terminal goal.

Prompting

A prompt is a form of temporary assistance used to help a student to perform a task in a desired manner. When a student is unable to perform the task, a prompt (temporary assistance) has been used to help the student to perform the task. As the student learns to perform the task, the temporary prompt is faded (slowly removed) from use.

Modeling

Modeling is a method of teaching by demonstration. It can be used to teach new behaviours or to correct the performance of an already learnt behaviour in the child. Modeling prompts are slightly more intrusive than verbal prompts because the teacher must demonstrate the correct response. The model responses are not limited to human performances. The model can be printed through visual illustration.

Shaping

Shaping refers to sequential, systematically reinforcement of successive approximations of target behaviour until the behaviour is achieved. Each step in the sequence will be reinforced until established. Then the criterion for reinforcement will be shifted to the next step. Shaping procedures may be used to establish new behaviours in disabled students.
Chaining

Chaining refers to the actual process by which each of the responses is linked to one another to form the behavioral chain. The identification of the response sequence is done through a task analysis. When backward chaining is used, the components of the chain are acquired in reverse order. The last component is taught first and other components are added, one at a time. When forward chaining is used, the teacher starts with the first link in the chain, trained it to criterion, and then goes on to the next.

Reinforcement

Reinforcement describes a relationship between two environment events, behaviour (response) and an event or stimulus (consequence) that follows the response. The relationship is termed reinforcement only if the response increases or maintains its rate as a result of the consequence. Reinforcement is frequently the critical component of programmatic attempts to teach new behaviour, to increase existing behaviours that are occurring in frequently and to maintain behaviours at acceptable levels. Positive reinforcement is the contingent presentation of a stimulus, immediately following a response that increases the future rate and/or probability of the response. Negative Reinforcement is the contingent removal of an aversive stimulus immediately following a response that increases the future rate and/or probability of the response.

Fading

Fading can be used to cover a variety of techniques in which gradually reduction in levels of prompting and also reduction of space cues of various kinds is done i.e. the gradual decrease in the strength of visual cues (in the form of diagrams, patterns or dots etc.).

b) Teaching Methods

While designing a structured plan, a special teacher has followed some useful methods for effective teaching which are explained as under.
Multi-Sensory Approach

Multi-sensory approach refers to teach by using other senses in addition to hearing and vision. This method depends on a lot on tactile sense for training. This approach was advocated by Madam Maria Montessori in her Montessori Method. In this method emphasis is given on reinforcement of the senses so as to enable the children to discriminate between various stimuli that give rise to sensation of weight, colour, sound, touch, temperature, and so on to aid in exercising their judgment and reasoning.

Computer Assisted Instruction (CAI)

Technology can play a powerful role at every step in person’s life, particularly in lives of the individual who have special needs. Computer Assisted Instruction (CAI) has several types of instructional programmes namely, drill and practice, tutorial, educational games, demonstration, simulation, problem solving and discovery learning. The NIMH developed some exclusive software and is in the process of developing more for mentally challenged children.

c) Instructional Materials

Instructional materials are required for teaching skills to children with mental retardation. Different types of materials such as concrete objects, models, pictures / flash cards, audio-visuals, puppets, charts, software packages, play materials, etc. are used by teachers in the classroom during teaching. It has been noted in the literature that if the students are allowed to handle the material by themselves, the learning will be more meaningful and long lasting. Thus the teaching materials and aids promote multi-sensory learning. As students use / manipulate the material by themselves, it creates an interactive environment between the teacher and the students. In addition, students need a novel experience which sustains their interests. Therefore, a variety of activities using material should be planned to make the teaching learning environment more conducive for learning. Instructional planning is incomplete without selection of appropriate learning aids required for instruction. Learning aids made learning more meaningful and facilitates learning of a task / activity. The teaching aids used with one student in teaching an activity need not to effective in teaching the same activity to another student.
**d) Stages of Learning**

Stages of learning are followed while developing and implementing the procedure for teaching which have been given in Figure 3.4. This may also be called Instructional Hierarchy. The first step in the hierarchy is to teach the child a new task (acquisition), second is to perform and to maintain the learned task to a higher level of accuracy (maintenance) and lastly to generalize the learned tasks in environments or situations when required (generalization).

![Fig. 3.4: Stages of Learning](image)

**e) Principles of Teaching**

In addition to the techniques, methods, instructional materials and stages of learning some fundamental teaching principles are used while teaching tasks/skills to mentally challenged children as given in Table 3.5.
Principles of Teaching

- Simple to complex
- Known to unknown
- Concrete to abstract
- Whole to part

Teaching is to be started with a step which is bound the child to meet success, as he/she learns simpler steps, gradually introduce difficult steps. What the child knows in a skill, start with that current level of functioning, gradually start with, what he needs be taught, which is unknown for him/her. Teaching must have concrete examples associated with abstract concepts. Any concept taught must be introduced as a whole, then start with its various parts.

f) Concept Development

One should follow certain steps while teaching concepts to mentally challenged children. This is also called the Hierarchy of Concept Development as presented in Figure 3.5.
Enjoyable and rewarding games were also planned by the investigator for the subjects to concentrate and to absorb in whatever they were doing.

With the help of these behavioural techniques, teaching methods, instructional materials, stages of learning, principles of teaching and steps of concept development the investigator has planned a systematic and structured procedure to attain the behavioural objectives of the subjects.
6. **Evaluation and Review of Objectives**

Quarterly progress of the programme plan is recorded at this step. It means looking into the behavioural objectives i.e.

- Did the behaviour change as stated in the objective? Did it happen at the time stipulated in the objective?
- What were the reasons, if it did not happen?

In this component, Individualized Educational Programme is evaluated, not the subject's entire behaviour. The whole progress is reviewed and it led on to further modification or planning of programme as a continuous process.

The progress is recorded as per the ranks based on the level of performance. It has been given in Figure: 3.6.

![Rank of Evaluation Diagram](image)

**Fig.3.6:** Ranks of Evaluation.

Thus, the investigator followed this process of evaluation. Optimum opportunity was provided to the child for a wide range of learning experiences. The instructional materials used were appropriate to the child and his environment. As
the Individualized Educational Programme represents the basic plan and skill programme to suit the students need, it was in explicitly written form.

The investigator has followed all the six components explained above in developing Individualized Educational Programmes of all the subjects under study. Since one group consists of ten subjects, a specimen copy of Individualized Educational Programme (IEP) of all the subjects of one group from one area / domain has been given in detail at Appendix-V.

3.4.6 Group Teaching Lesson Plan

One should not have a misconception that developed Individualized Educational Programme can be carried out only for an individual at a time. It can be carried out in a group setting also. Implementation of Individualized Educational Programme in group setting helps in saving time of the teacher as well as of the students. The group teaching procedure develops the effectiveness (whether the skills taught have been learnt by the students) and efficiency (amount of time required for something to be learnt). There can also be some social benefits such as the opportunity for learning to participate with others, to increase ability of functioning, to develop social reinforcers as well as group enthusiasm. To implement the Individualized Educational Programmes on the subjects in group setting, a teacher must prepare a systematic Group Teaching Lesson Plan which is also to be planned systematically. Same components i.e., Current Level of Functioning, Annual Goal (General Objective of the group), Behavioural Objectives, Procedure and Evaluation & Review of the Objectives, except first component (General Background Information about the Child) as used in developing Individualized Educational Programme, are to be followed in Group Teaching Lesson Plan. In addition to these components of Individualized Educational Programme, some more methods like co-operative learning and peer tutoring were used as they were very effective in developing group enthusiasm.

Co-operative learning is a method of promoting learning through student’s co-operation rather than competition. Essentially, students work together to seek solutions to problem instead of competing against one another. It involves face-to-
face interaction with peers, use of pro-social skills and group processing of a given task. Here the teacher acts as a consultant to the student groups.

**Peer tutoring** is a method of offering individual instruction in group setting by using classmates to teach target students. Students are often able to learn more effectively from a fellow student than from the teacher. The student who teaches is the tutor, and the student being taught is the tutee. The peer tutor may be of the same age as the tutee or older. It develops a healthy relationship between the students to built social relationships within the classroom.

In the present study, on the basis of Individualized Educational Programme developed for each subject of experimental group in all the adaptive behavioural skills, the investigator has developed Group Teaching Lesson Plans for five groups (each group considered ten subjects) to see its effectiveness, efficiency and social benefits in group setting on the subject's achievement. Thus Group Teaching Lesson Plan was developed in blue print by the following components given in Figure 3.7. Based on Individualized Educational Programmes of ten subjects in one group (as given in Appendix-V), a specimen copy of Group Teaching Lesson Plan has been given in detail at Appendix-VI.

### 3.5 PROCEDURE FOR DATA COLLECTION

In any type of research, the data are gathered so that hypotheses formulated at the 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'. It also required that the collection of relevant data must be adequate in quality and quantity and as reliable and valid as possible.
Fig. 3.7: Components of Lesson Planning in Group Setting (Group Teaching Lesson Plan)
The present study was conducted in three stages, detail of which is given below:

**Pre-testing Stage**

Initially, at the pre-testing stage, the investigator collected the general background information about all the 100 mentally challenged children who have been diagnosed as moderate by the school authorities at the time of admission. The general background information taken from the parents as well as special educators of the all the subjects have been recorded on a Case History Performa which helped the investigator in development of Individualized Educational Programme and Group Teaching Lesson Plan for them. To maintain ethical norms, permission and consent was taken from the Heads of the concerned institutes as well as the parents of the subjects to collect the data for the present study. In this regard, special care has also been taken so that the feelings of the subjects as well as their parents may not get hurt. During the pre-testing stage, Madras Developmental Programming System (MDPS) – Behavioural Scale was administered on all the 100 subjects to assess their adaptive behaviour skills viz. Motor Skills (Gross and Fine motor), Self-help Skills (Meal time activities, Dressing, Grooming and Toileting), Communication Skills (Receptive and Expressive Language), Social Interaction, Functional Academic skills (Reading, Writing, Number, Time and Money), Domestic Behaviour, Community Orientation, Recreation & Leisure Time activities and Vocational activities. The scores, thus, obtained for each skill of every subject were recorded both graphically and numerically in the Behavioural Profile of MDPS. All the 100 mentally challenged children were further equally divided into two groups i.e. experiment group and control group. The subjects of both the groups were taken from the separate institutions intentionally so that the subjects belonging to control group may not feel ignored as no Individualized Educational Programme and Group Teaching Lesson Plan was developed for them.

**Experimental Stage**

On the basis of assessment of the current level in 18 adaptive behaviour skills viz. Motor Skills (Gross and Fine motor), Self-help Skills (Meal time activities, Dressing, Grooming and Toileting), Communication Skills (Receptive and
Expressive Language), Social Interaction, Functional Academic skills (Reading, Writing, Number, Time and Money), Domestic Behaviour, Community Orientation, Recreation & Leisure Time activities and Vocational activities (Total 18 skill areas), of the subjects, Individualized Educational Programme in each skill area for every subject of experimental group was systematically developed in each skill for three months by using all its six components explained under section 3.4.5 in the same chapter. The needs, requirements and priorities were also taken into consideration while developing systematic Individualized Educational Programme of each subject (A specimen copy of Individualized Educational Programme of all ten subjects of one group has been given in Appendix-V). Based on the Individualized Educational Programme of every subject of one group of ten subjects, Group Teaching Lesson Plan on each skill was developed by using its components as mentioned under section 3.4.6 in the same chapter. After developing Individualized Educational Programme and Group Teaching Lesson Plan, all the special educators of the concerned institutions, 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 Group Teaching Lesson Plan, which was based on the Individualized Educational Programmes, on the group of ten subjects and it was implemented in the group setting of experimental group for 3 months. Objectives were quarterly evaluated to see the progress of subjects. The Individualized Educational Programme of each subject of experimental group and Group Teaching Lesson Plan was reviewed for planning of the next quarter. However, this procedure was continued for six months. In this way, 90 Group Teaching Lesson Plans on 18 skill areas were developed for all the five groups (10 subjects in each group) for 3 months and these were reviewed quarterly for next 90 Group Teaching Lesson Plans for next 3 months. Details of these 18 skill areas have been given in Section 1.11 of Chapter-I. A specimen copy of Group Teaching Lesson Plan for one group of ten mentally challenged children based on their Individualized Educational Programmes (as given in Appendix-V) was developed, which has been given in detail at Appendix-VI.

However no Individualized Educational Programme and Group Teaching
Lesson Plan was developed for the subjects of control group and hence, no special training was given to them.

The medium of training was Hindi. Training was given to each subject in group setting of experimental group for five hours daily in all the adaptive behaviour skills 30 to 40 minutes were given for one skill area per day and their performance was recorded every month. Appropriate and accurate instructional materials were prepared and used for training according to the target behaviour of the subjects of the entire group.

Post-testing Stage

After the training, of six months, each subject of both the groups i.e., experimental and control groups, was again evaluated individually to record their progress in all the adaptive behaviour skills with the help of Madras Developmental Programming System (MDPS)-Behavioural scale and recorded numerically and graphically on its Behavioural Profile. This was done to check whether the subjects of experimental group have achieved the pre-determined set of objectives of Individualized Educational Programme or not. The mean gain scores were also recorded for both the experimental and control groups of the subjects.

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. Therefore after sorting data for final scores, the following statistical techniques were used for analysis of data.

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:

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

Where:
\( \bar{X} = \text{Arithmetic Mean} \)
\( \sum X = \text{Sum of all the values of variables X} \)
\( N = \text{number of observations} \)

**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 adaptive behaviour skills viz. Motor Skills, Self-help Skills, Communication Skills, Social Interaction, Functional Academic skills, Domestic Behaviour, Community Orientation, Recreation & Leisure Time activities and Vocational activities.

\( 't \text{ value}' \) was calculated by using the following formula:

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

\[
S = \sqrt{\frac{(n_1 - 1)S^2_1 + (n_2 - 1)S^2_2}{n_1 + n_2 - 2}}
\]

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 \( t_{\text{cal}} > t_{\text{tabulated}} \) at \( \nu = (n_1 + n_2 - 2) \) 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.