IV. METHOD AND PROCEDURE

Method

Statement of the Problem

The problem under investigation can be stated as:

"The Effectiveness of Integrated Intervention for enhancement of development of preschoolers in the Union Territory of Chandigarh".

Operational Definitions

For the realization of the objectives laid out, the following definitions have been made operational.

Effectiveness

Quantitative effectiveness would be measured in terms of increases in IQs, concept development and skills in different developmental domains namely, Self Help, Motor, Cognition, Social Emotional, and Communication. Qualitative effectiveness would be observed through behaviour changes of children, their
all-round development and reactions of parents and teachers.

**Integrated Intervention**

Intervention given to children belonging to various levels of intelligence namely, Mental Defective, Borderline, Dull Normal, Average, Bright Normal, Superior, and Very Superior in a common group setting through implementation of Portage Classroom Curriculum.

**Preschoolers**

Children in the age group of 3 3/4 to 5 years who attend nursery classes or Anganwadi centres.

**Advantaged and Disadvantaged Children**

Children belonging to either high (SES$_h$) or low (SES$_l$) socio-economic strata of the society. The designated demarkation between SES$_h$ and SES$_l$ is family’s annual income of Rs. 25,000/= and either earning parent educated upto matriculation.

**Design**

The present investigation was an evaluation
research as it aimed at evaluating the effectiveness of intervention programme for preschool children belonging to advantaged and disadvantaged families.

To achieve the stated goals, a 'One group Pretest-Posttest' experimental design (Campbell & Stanley, 1963) was employed which was tested on two independent models EG1 and EG2. As mentioned in the introduction preschool education in India does not follow any uniform pattern. It is also academically oriented rather than being developmentally based. For this reason no comparisons could be made and hence no control groups were taken for each model thus resulting in the choice of the above stated experimental design.

'One group Pretest-Posttest' experimental design is a widely used design in educational research, but it is not free from certain internal, and external variables which can jeopardize internal validity and make this design weak (Campbell & Stanley, 1963). The internal extraneous variables are: (a) history, (b) maturation, (c) testing, (d) instrumentation, (e) statistical regression, (f) selection, (g) mortality, and (h) interaction of selection and maturation. The external extraneous
variables are: (a) interaction of testing and intervention, (b) interaction of selection and intervention, and (c) reactive arrangements. Figure 4.1.1 highlights the above stated variables.

**Figure 4.1.1** Extraneous Variables effecting the Validity of the Design.

<table>
<thead>
<tr>
<th>Variables</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>External</strong></td>
<td>1. Interaction of testing and intervention</td>
<td>2. Interaction of selection and intervention</td>
</tr>
<tr>
<td></td>
<td>3. Reactive arrangements regression</td>
<td></td>
</tr>
<tr>
<td><strong>Internal</strong></td>
<td>1. History</td>
<td>2. Maturation</td>
</tr>
<tr>
<td></td>
<td>3. Testing</td>
<td>4. Instrumentation</td>
</tr>
</tbody>
</table>

In order to obtain the true effect of intervention programme, most of these extraneous variables were accounted for and have been explained as below.
The effect of 'history' was not applicable in this investigation as it was planned for 3 1/2 months and India remained socio-politically stable throughout the effective span of this investigation.

To counter the effect of 'maturation', norm referenced, and developmentally based criterion referenced assessment tests were used in the investigation. The norm referenced tests (WPPSI, and BTBC-PV) used in present investigation neutralize the effect of age by providing different norms for different age levels. The criterion referenced test (PCCh) assesses children on skills along the developmental continuum. Thus there was no effect of 'maturation' upon the effectiveness of the programme.

The third source of lack of validity in this design is the effect of 'testing' that is, the effect of pretest itself which implies that the students taking the test for a second time usually do better than the ones taking for the first time. To counter this reliable standard tests were used in the investigation. WPPSI, and BTBC-PV are standardized and widely accepted tests and have good test retest
reliability. The test retest reliability coefficient of WPPSI is .89. For BTBC-PV the same is .94 and .87 for 3 1/2 and 4 1/2 year old children respectively. In terms of internal consistency also, these tests yield reasonably reliable scores with an average internal consistency for WPPSI and BTBC-PV being .96 and .88 respectively. The pretest and posttest just before and after the 3 1/2 months intervention period also minimized the effect of test and retest. Thus the effect of ‘testing’ was negligible if not eliminated totally.

The effect of ‘instrumentation or instrument decay’ was not applicable in the present investigation since the scoring on the test items was done on the guidelines provided in the test manuals which are precise and objective and do not leave any scope for subjectivity.

The next source of lack of validity is the effect of ‘statistical regression’. It is generally a function of the correlation between the variables. The higher the correlation, the lower the regression towards the mean. The final results showed positive and significant correlation among the three variables.
(IQ, skill mastery, and concept development). Thus regression effects were also not appreciable.

The effect of 'interaction of selection and maturation' was not applicable in the investigation as the two models comprised children of one age range only.

The two sources of lack of external validity in this design are 'interaction of testing and intervention', and 'selection and intervention', which needed to be accounted for. The effect of 'interaction of testing and intervention' is more when the pretest procedures and materials are unusual. But in the present investigation the materials and test items used in all the assessment devices were similar to those that are usually used by teachers in classroom settings.

With regard to 'interaction of selection and intervention' their adverse effects were minimized by introducing randomization in the selection of representative groups. Moreover, the groups were kept independent and no inter group comparisons were done with regard to evaluating the effectiveness of the intervention.
The effect of ‘reactive arrangements’ was not applicable in this investigation as the intervention programme was carried out by teachers in regular classrooms.

Thus all the above listed factors jeopardizing the validity of the design were overcome. Hence the results of this investigation are unbiased.

The age, the socio-economic status, and the various levels of intelligence at which the children under investigation functioned, were among the controlled variables, whereas the intervention given through the Portage Classroom Curriculum (PCC) and remediation on relational concepts for enhancing the IQS of children served as manipulated or independent variables. The intervention activities were conducted during the free play and structured play time for the nursery children. The ICDS centres provide non-formal education to children from 3-6 years of age, and there is no fixed curricular content to be taught except counting of numerals up to 30, so the intervention activities were carried out during the children’s stay in their respective centres daily.
Pictorial representation of the design has been presented in Figure 4.2.1

**Figure 4.2.1  Design of the investigation**

<table>
<thead>
<tr>
<th>Pretest</th>
<th>Intervention</th>
<th>Posttest</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. WPPSI</td>
<td>1. Skill mastery through PCC</td>
<td>1. WPPSI</td>
</tr>
<tr>
<td>2. BTBC-PV</td>
<td>2. Concept development through BTBC-PV</td>
<td>2. BTBC-PV</td>
</tr>
<tr>
<td>3. PCCh</td>
<td></td>
<td>3. PCCh</td>
</tr>
</tbody>
</table>

**Participants**

This study involved preschool children of one nursery school and five ICDS centres. Children were designated as eligible for intervention if they fulfilled the following criteria of eligibility:

1. They fell in the age range of 3 3/4 to 5 years.

2. They were attending a nursery school or a
day care centre to receive education in some form, that is, formal or non-formal.

3. They belonged to either high or low socio-economic strata of society.

4. They were assessed either Mental Defective, Borderline, Dull Normal, Average, Bright Normal or Superior or Very Superior on the Intelligence Scale (WPPSI).

5. Some Children were assessed as Developmentally Delayed.

**Sampling Procedure**

The main objective of this investigation was to assess the efficacy of intervention in optimizing the all round development of preschool children, and preparing them for regular schooling with better social competence and functional communication in solving their problems. So children belonging to the advantaged and disadvantaged sections of society were included in the study. As for the advantaged group, a
list of private nursery schools in the Union Territory of Chandigarh was obtained and one school was selected through the randomized sampling method. For the disadvantaged group also, the investigator obtained a list of Anganwadi centres operating under the Integrated Child Development Service (ICDS) in urban slums of Chandigarh and the block of Bapu Dham was randomly selected. Of the 17 ICDS centres operating in the Bapu Dham block, 5 centres were again chosen through the randomized sampling procedure. The initial sample consisted of 207 children (102 from the advantaged, and 105 from the disadvantaged group). After screening these children on the conditions mentioned above, only 173 children were selected for the final sample, of which 90 children belonged to the advantaged, and 83 children belonged to the disadvantaged group. Pictorial representation of the sample has been shown in the figure 4.3.1.
Figure 4.3.1 The sample

1. Selection of two groups on the basis of Socio-economic status and age 3 3/4 to 5 years

<table>
<thead>
<tr>
<th>Group</th>
<th>SES</th>
<th>Number of Children After Screening</th>
</tr>
</thead>
<tbody>
<tr>
<td>EG1 (SESH)</td>
<td>HIGH</td>
<td>90</td>
</tr>
<tr>
<td>EG2 (SESL)</td>
<td>LOW</td>
<td>87</td>
</tr>
</tbody>
</table>

* 2 children dropped owing to visual handicaps

2. Screening of the selected samples on the basis of intelligence levels

<table>
<thead>
<tr>
<th>Group</th>
<th>SES</th>
<th>Number of Children After Screening</th>
</tr>
</thead>
<tbody>
<tr>
<td>EG1 (SESH)</td>
<td>HIGH</td>
<td>90</td>
</tr>
<tr>
<td>EG2 (SESL)</td>
<td>LOW</td>
<td>83</td>
</tr>
</tbody>
</table>

* 4 children dropped owing to moderate mental retardation

Hypotheses

On the basis of close perusal of related literature and objectives of the present study, the following hypotheses were formulated:
1. There would be significant differences in the IQs of children before and after intervention.

2. An increase in the knowledge of basic relational concepts would be noticed as a result of intervention.

3. The intervention programme would result in enhancement of all round development of children in terms of gains in skills.

4. There would be differentials in the effectiveness of early intervention for children belonging to different levels of intelligence.

5. Multi-Level Teaching would prove to be an effective technique for integrated intervention at the preschool level.

6. Parental involvement would have a positive effect on enhancement of all round development of children.

7. There may be pseudo-developmental delays
due to environmental deprivations especially in children belonging to lower socio-economic strata of society.

8. Different aspects of development would be interrelated.

9. Language and cognitive development would be related to all round development.

**Tools Used**

The following tools were used in this investigation:

1. Wechsler Preschool and Primary Scale of Intelligence (WPPSI), by Wechsler (1967).


3. Portage Classroom Curriculum developed by Brinckerhoff and others (1987) and adapted according to Indian conditions by the present investigator under the guidance of her research guide.

5. Questionnaires for parents and teachers, developed by the investigator (1991).

1. Wechsler Preschool and Primary Scale Of Intelligence (WPPSI)

This scale systematically appraises mental and performance abilities of children in the age group of 4 to 6 1/2 years. However it can also be given to children of adjoining age groups, 3-year old bright, and to dull children who are 7 years and over. (See chapter 4, p. 36 of the WPPSI manual). The materials, test items and directions have been selected for their effectiveness and suitability for the age range comprised by the scale namely, 4 to 6 1/2 years, and norms are provided for these ages. It consist of 11 tests, 6 verbal and 5 performance. Verbal tests consist of: (1) Information, (2) Vocabulary, (3) Arithmetic, (4) Similarities, (5) Comprehension, and (6) Sentences (supplementary). Performance tests consist of: (1) Animal House, (2) Picture
Completion, (3) Mazes, (4) Geometric Design, and (5) Block Design.

WPPSI has been standardized on 1200 children, having equal number of boys and girls in each of the six age groups (4 to 6 1/2 years). For the normative sample the 1960 U.S. census data has been used to select the representative sample, which includes white and nonwhite children based on their respective ratios found in the census. Like the other two Wechsler Scales namely, WAIS-R and WISC-R, the WPPSI also employs the deviation IQ ($M = 100, SD = 15$) for the verbal, performance and full scale IQs, and scaled scores ($M = 10, SD = 3$) for the subtests. The IQs are obtained by comparing the child’s scores with the scores earned by a representative sample of his/her own age group. The raw scores on each subtest are converted into scaled scores within the child’s own age group by using a table in the WPPSI manual. The IQ tables in the WPPSI manual are based on 10 of the 11 subtests. Sentences, a supplementary test, does not count towards measuring the IQ and is excluded from the calculation of the IQ unless another verbal subtest is not administered. Animal House retest is
also excluded from the IQ tables.

There is a provision for prorating in the WPPSI. It becomes necessary when less than 10 subtests are administered. The WPPSI manual has a table for prorating scores when only four of the five subtests are administered in each scale. However, when fewer than four subtests are administered in each scale, the IQ can be computed by using the special short form procedure. These short forms should never be used for classification or selection purposes. The confidence intervals or precision ranges for the 68, 85, 90, 95, and 99 percent levels for each scale on the WPPSI are similar for all the age levels covered by the scale. The WPPSI has a good reliability. Internal consistency reliabilities for each of the three IQs range from .91 to .96 over the range covered by the scale. The reliability co-efficients for average internal consistency, across all the six age groups are as follows: (a) full scale IQ = .96, (b) verbal Scale IQ = .94, and (c) performance Scale IQ = .93. The split-half full scale, and test retest reliabilities (r=.89), have been satisfactory.
There has been very little information about the validity of the scale. However, since the publication of the WPPSI, a number of concurrent and predictive validity studies have been reported. Studies using the 1960 Stanford Binet Form L-M norms have indicated that the WPPSI has satisfactory concurrent validity (mdn $r = .82$). In a study on WPPSI and Mc Carthy scales the IQ on the WPPSI full scale has been on an average 7 points higher than the Mc Carthy scales, General Cognitive index scores ($m's = 107.52$ and $100.71$ respectively and $r = .86$) which is a significant difference and suggests that the two scales do not have interchangeable standard scores. The WPPSI yields satisfactory predictive validity coefficients for white middle class populations. Kaufman (1973) has reported correlations of .30 and .37 between the WPPSI and the mathematics and reading parts of the Metropolitan Achievement tests respectively. The predictive validity of the WPPSI is more variable with children of ethnic minorities and low SES. The only significant differences have been reported between mathematics and full scale IQ ($r = .43$) and between mathematics and performance IQ ($r = .52$) (Sattler, 1988).
2. Boehm Test Of Basic Concepts—Preschool Version
(BTBC-PV)

This test assesses young children's mastery of basic concepts. It can also assess possible developmental delays in language acquisition. It is a pictorial multiple choice test in which the child is required to point to one of the three pictures, after listening to a statement made by the examiner. This test is administered to children of age group 3 to 5 years. However, it is also appropriate for older children who have special educational needs. The kit includes a manual, a picture book, an individual record form, and a class record form. The test measures the child's understanding of 26 basic relational concepts that refer to characteristics of persons and objects such as size, direction, position in space, quantity and time etc. It consists of 5 warm-up items followed by 52 test questions (2 items per concept).

The test has been standardized on a sample of 433 children attending private daycare centres, nursery schools, public preschools, and Head-Start
programmes. The sample which has been evenly divided between males and females at each of the five age levels (3, 3 1/2, 4, 4 1/2, 5 years) has also been stratified with regard to race, region and socio-economic status. Internal consistency and test retest reliability have been determined on the Boehm-Preschool. Internal consistency has been calculated by using coefficient alpha, and split-half coefficients corrected according to the Spearman-Brown formula. Coefficient alpha represents the degree to which all items contribute to the measurement of the same ability. Alpha coefficients across the five age levels (3, 3 1/2, 4, 4 1/2, and 5 years) range from .85 to .91, with the average coefficient for Boehm-Preschool at .88. Split-half coefficients reflect the consistency of one half of a test with the other half. Values for the Boehm-Preschool across the above stated ages range from .80 to .87 with the average coefficient being .85. Thus in terms of internal consistency, this test yields reasonably reliable scores. The test retest reliability coefficients with the retest interval from 7-10 days have been .94 and .87 for 3 1/2 and 4 1/2 year old children respectively which reflect a
high degree of the score stability in the test. The content validity of BTBC-PV has been inherent since its initial development. Concurrent validity result with Peabody Picture Vocabulary Test-Revised (PPVT-R) (Dunn & Dunn, 1981, cited in the BTBC-PV manual) for 29 preschool children with a mean age of 3 years and 10 months, is .63 ($p < .0001$) and for 19 language delayed children with a mean age of 4 years and 4 months, is .57 ($p < .005$).

3. Portage Classroom Curriculum (PCC)

The Portage Classroom Curriculum is designed for use in a classroom setting with children in the age range of 2 to 6 years. The contents of this Curriculum provide children with skills that increase their access to varied environments, provide success in solving everyday problems, and prepare them for regular Kindergarten placement, social competence, functional communication and protective behaviours within a group setting.

This curriculum consists of a checklist, eight thematic units, family activity letters, and the administrative manual.
The Checklist.

The checklist consists of those developmentally based skills for children from 2 to 6 years of age, which are considered essential for a successful placement in a Kindergarten classroom. It can be used effectively for the following purposes: (a) for assessing children in preschool programmes, (b) for developing curricular content, (c) for monitoring the progress of children, and (d) for grouping children for instructional purposes. The checklist is divided into five developmental domains. The skills in each domain are divided into age ranges within which most children acquire the skills that are listed. Further, the skills in each domain are grouped into subdomains or specific skill areas to assist teachers and staff in assessing children and planning curricular content. The domains covered by the checklist are: (a) Self Help, (b) Motor, (c) Cognition, (d) Social Emotional, and (e) Communication.

The domain of ‘Self Help’ helps children to become more independent in caring for their own needs and personal safety. Self help has five subdomains
namely: (i) eating, (ii) dressing and grooming, (iii) independence, (iv) safety, and (v) protective behaviours. The subdomain protective behaviours has been excluded from the present study because not many cases of sexual abuse, child abuse & neglect are reported in our country. Moreover, in India not many parents and teachers are keen on teaching Protective behaviours to such small children who are not yet ready for regular schooling.

The domain of 'Motor' assesses a child's ability to move about by running, climbing, jumping and other large muscle movements, as well as skills in using small muscle movements to cut, draw and manipulate objects in many ways. This domain has two subdomains namely, (i) large motor, and (ii) small motor.

The 'Cognitive' domain evaluates a child's understanding of concepts such as time, colour, shape and relationship between objects. It also assesses problem solving and early academic skills. This domain is divided into four subdomains namely, (i) concept development, (ii) problem solving,
(iii) mathematics, and (iv) reading.

A child’s interaction skills with his peers, adults, toys and materials are assessed by the ‘Social Emotional’ domain. A child’s sense of self, emotional expression, and self control are also measured. This domain has the following subdomains: (i) social interaction, (ii) affect/self concept, and (iii) play development.

A child’s understanding of and ability to use the language is assessed by the ‘Communication’ domain. It is further divided into four subdomains namely, (i) semantic relations, (ii) form, (iii) content, and (iv) use.

**Eight Thematic Units.**

The curriculum consists of eight thematic units which provide teachers with suggestions for integrating skills from several domains into activities. The units can be implemented with children who exhibit a great variety of skill levels across all the five developmental domains. These units have been developed on the following themes:
The instructional technique for developing the skills in children is Multi-Level Teaching which integrates skills within several domains into a single activity for a group of diverse children. During unit activities, Multi-Level Teaching structures individualized instruction.

Family Activity Letters.

In order to involve parents in enhancing the developmental levels of their children, family activity letter have been used in the curriculum. Written in a letter format with space for individualization, these letters involve the use of household materials and suggest parents, times and places where learning can be enhanced during the natural routine of family’s day.

The Administrative Manual.

The manual contains directions and guidelines for administering the checklist, implementing the
curriculum through Multi-Level Teaching, data collection, adaptations that can be made in the units, home/school communication and family activities etc.

The portage classroom checklist is not a standardized instrument, so its results are not reported as standardized test scores. The teacher can describe the age range for a child's abilities within each domain.

4. Competency Based Instructional Module For Teachers and Anganwadi Workers

With the view of orienting the teachers and AWWs towards proper implementation of the curriculum, and for dealing effectively in an integrated classroom setting, the author developed a competency based instructional module, taking Project Exceptional Training for Caregivers (ETC), developed by McNellis (1988) as the source. Beginning with thoughts for the trainers that supplement the trainer’s knowledge of the teaching and learning process, this module is further divided into four
sections, namely, (a) pre and post-test for caregivers, (b) self assessment by caregivers, (c) what the care giver should know before giving intervention? and, (d) parental involvement, caregiver and child relationship, and trainer’s orientation for programme implementation.

The pre and posttest section consists of a questionnaire for teachers and AWWs, meant to assess their previous knowledge of the teaching and learning and developmental process. The same test for posttest is administered to teachers after the one week training. Under this section are listed the basic and special needs competencies which a caregiver must possess for dealing with children effectively.

This section is further divided into three sub-sections. The first section consists of three lessons that describe the general process of child development to the caregivers through a series of lectures and discussion lessons. The second part briefly explains the tools used in the present investigation so that the caregivers have a complete picture of what they are expected to do during the
intervention period, and how they have to go about it. The third part deals with the description of various observation techniques that help the teachers and caregivers in identifying the weaknesses and strengths of a child, and see the child as an individual. The last section briefly touches upon how the teachers and caregivers should deal with parents and children in order to elicit the best out of their interaction. Also mentioned are the strategies that teachers and caregivers can adopt for successful implementation of the programme. (For complete information on the module, refer to Appendix III).

5. Questionnaires for Parents and Teachers

The author developed two questionnaires for the present investigation. One questionnaire was designed to evaluate the extent of parental involvement in their child’s education, and development. Parents’ questionnaire was sent to their homes with a covering letter from the school authorities. For the disadvantaged group, this procedure was not feasible as most of the parents were illiterate, so one or both parents were interviewed either within the
programme setting or in their homes, whichever was most convenient for the parents.

The other questionnaire was developed for the teachers and AWWs, as a partial fulfillment for testing the hypothesis ‘Multi-Level Teaching would prove to be an effective technique for integrated intervention at the preschool level’. This was given to the teachers and AWWs at the end of the programme. At a subsequent occasion, their responses were collected. (For details on the content of the questionnaires please refer to Appendix V and VI).

Procedure

Consent of the Concerned

Prior to the onset of actual data collection, the consent of the school and ICDS authorities, was obtained in writing. (Appendix I and II).

Before the data collection, the author also took parental consent by meeting the parents of children at a specially organized parent-teacher
meeting in the school. As for the ICDS centres, a special effort was made to call most of the parents to make them aware of the programme to be implemented and also to obtain their consent for taking up their children for intervention.

Phases of the study

The data was collected in the following phases: (a) pretest, (b) intervention, and (c) posttest.

Pretest

During this stage, the children were assessed individually on Boehm Test of Basic Concepts-Preschool Version (BTBC-PV), developmental checklist of Portage Classroom Curriculum (PCC), and Wechsler Preschool and Primary Scale Of Intelligence (WPPSI). After establishing a base line on the developmental levels and knowledge on basic relational concepts, the investigator implemented the intervention programme through PCC, and remediation on concept formation. WPPSI was administered to assess the IQ levels of the children before the intervention programme.
Intervention

Extending over a period of about 3 1/2 months, the intervention period was the period of programme implementation. The success of any programme depends upon meticulous planning and careful implementation, so every care was taken in implementing the programme with proper planning in order to achieve the stated goals. The following activities were performed during the intervention period: (i) training of teachers and AWWs, (ii) remediation on basic relational concepts, and (iii) intervention through Portage Classroom Curriculum (PCC).

Training of teachers and AWWs

The teacher is the key to success of any educational programme, particularly for younger children for whom nothing within the school environment is as important as their teacher. Giving due consideration to this position, the investigator imparted one week’s training to the teachers and AWWs, in order to ensure their proper orientation to programme implementation. This training was imparted
through a competency based instructional module, developed by the investigator.

Before the actual onset of the training a questionnaire was given to the teachers and AWWs, to assess their previous knowledge of the teaching and learning, and general process of child development. Thereafter, a week long training programme was conducted which made the teachers and AWWs familiar with the developmental process, observation techniques and the various tools used for evaluation and intervention. The main aim of this training was to equip the teacher fully for implementing the activities in integrated settings so that the learning of children could be facilitated. After the training period, the teachers and AWWs were again given the same questionnaire to assess if there were any resultant gains of the training. Their responses were collected at a subsequent meeting.

The results of the pre-intervention tests provided the teachers and AWWs with complete information about each child’s individual performance, as well as the performance of the whole
class. To ensure individual attention, the teachers and AWWs used this information as a ready reckoner while implementing various intervention activities.

**Remediation on Basic Relational Concepts**

The results of the pretest on BTBC-PV provided useful guidelines for planning the remediation. A list of the unmastered or partially mastered concepts in a particular class was made to facilitate the investigator and teachers in planning the intervention effectively. The data was computer fed to ensure accuracy and quick retrieval of the results. The teachers and AWWs were provided with the filled class record forms and the list of children who were weak on a particular concept. The individual and class record forms put the investigator in a position to decide the concepts which needed more reinforcement. Accordingly, two concepts per week were selected for providing intervention. Guidelines were provided to the teachers and AWWs for introducing concepts through many situations. The investigator devised games, concept cards, Puppets and many other aids for remidiation on concepts.
A variety of ways were employed to ensure complete mastery of the children over the concepts. This required development of interesting and cost effective aids, so the investigator developed the following aids for remediation:

**The Concept Cards.**

Optimum learning takes place when the interests of learners are taken into consideration. This belief formed the basis in the development of concept cards. Younger children have a great fascination for animation characters, so the investigator selected a tiger as the central character for all the concept cards. To ensure greater association between the tiger and the children, the tiger was named "Looma". It performed different activities in all the Concept Cards, and in each card it cleared a new concept term. Photographs of some Concept Cards have been presented in the following pages.
The Concept Cards

Concept Outside

Concept Finished
Class activities through Concept Cards

Concept Down

Concept Backwards
The Hand Puppet.

Another aid for the remediation of concepts was devised out of very cheap and waste materials like bottle lids, woolen yarn, curtain rings and soft cardboard sheet with glazed paper pasted on it. The puppet could be easily manipulated with a single string, and could perform a lot of movements. The hand puppet was named "Noddy". Noddy proved to be very useful in attracting children’s attention and helping children master some of the important concepts. Photographs of class activities through Hand Puppet have been presented in the following pages.
Class activities through Hand Puppet
Class activities through other Aids

A happy family

Class activities through other Aids
Other Aids.

Apart from these, the investigator devised interesting games and used various classroom and other familiar articles for example, long and short pencils, books, chairs, tables, fruits etc. as aids for providing remediation on concepts.

Intervention through Portage Classroom Curriculum (PCC)

On the basis of pretest results, a total of 50 activities from all the eight thematic units of the curriculum were selected for implementation during the intervention period.

For conducting the activities, each class was divided into groups of 6 to 8 children per group. Efforts were made to include the children of varying abilities within one group. Wherever necessary, adaptations were made in the activities according to Indian conditions (for details on adaptations, please refer to the booklet attached). On an average, 4 activities were planned per week. In the Nursery
school, the teachers and their aides conducted the activities, and in the Anganwadi centres, the AW and their helpers conducted the activities under investigator’s guidance. Photographs of some Curriculum Activities have been presented in the following pages.
Class participation in PCC activities

Draw a Friend

Sky, Land and Water
Parental Involvement.

Efforts were made to involve the parents of the children, for reinforcing at home, the skills that their children had newly acquired. This was done by sending activity letters to the parents of nursery school children. Letters could not be sent to the parents of children in the ICDS centres as most of them were illiterate. Instead, the investigator used to call the mothers of the children and motivate them to practice the stated skills with their children. Gradually, the mothers started responding to the programme, but the parents from high socio-economic group showed a remarkable interest and involvement in the programme and readily complied with the suggestions given by the investigator. The intervention activities were carried out mostly during structured play, free play or story time in the Nursery school initially, but after a fortnight, the school authorities increased half an hour of their school timing to avail the best advantage of the intervention programme. These activities were implemented for a period of around 3 1/2 months after which the all round development of all the children
was again monitored on the same checklist.

**Posttest**

To assess the impact of the curriculum with Multi-Level Teaching as a teaching technique, all the pretest tools were readministered to find out if there were significant gains in the developmental levels, concept formation and IQs of the children under investigation. A questionnaire was developed for the teachers and **A¥Ms** at the end of the intervention programme and their responses were elicited a week later.

**Statistical Analysis**

A brief description of the various statistical techniques used for testing the research hypotheses is as follows:

1. Descriptive statistics such as means and SD for manipulated variables was used.

2. Paired $t$-test was used for evaluating the
effectiveness of the intervention programme.

3. Correlations among WPPSI, PCCh, and BTBC-PV, and inter correlations among the domains of PCCh were computed.

4. Wherever necessary, graphic representation was done to highlight the results.
<table>
<thead>
<tr>
<th>Description of terms</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mental Defective</td>
<td>MD</td>
</tr>
<tr>
<td>Borderline</td>
<td>BO</td>
</tr>
<tr>
<td>Dull Normal</td>
<td>DN</td>
</tr>
<tr>
<td>Average</td>
<td>AV</td>
</tr>
<tr>
<td>Bright Normal</td>
<td>BN</td>
</tr>
<tr>
<td>Superior</td>
<td>SU</td>
</tr>
<tr>
<td>Very Superior</td>
<td>VSU</td>
</tr>
<tr>
<td>Developmentally Delayed</td>
<td>DD</td>
</tr>
<tr>
<td>Anganwadi</td>
<td>AW</td>
</tr>
<tr>
<td>Anganwadi workers</td>
<td>AWWs</td>
</tr>
<tr>
<td>Integrated Child Development Services</td>
<td>ICDS</td>
</tr>
<tr>
<td>Low socio-economic status</td>
<td>SESₐ</td>
</tr>
<tr>
<td>High socio-economic status</td>
<td>SESₐ</td>
</tr>
<tr>
<td>Intelligence Quotient</td>
<td>IQ</td>
</tr>
<tr>
<td>Self Help</td>
<td>SH</td>
</tr>
<tr>
<td>Cognition</td>
<td>CG</td>
</tr>
<tr>
<td>Social-Emotional</td>
<td>SE</td>
</tr>
<tr>
<td>Communication</td>
<td>COM</td>
</tr>
<tr>
<td>Motor</td>
<td>MOT</td>
</tr>
<tr>
<td>Portage Classroom Curriculum</td>
<td>PCC</td>
</tr>
<tr>
<td>Portage Curriculum Checklist</td>
<td>PCCh</td>
</tr>
<tr>
<td>Description of terms</td>
<td>Code</td>
</tr>
<tr>
<td>--------------------------------------------</td>
<td>----------</td>
</tr>
<tr>
<td>Wechsler Preschool and Primary Scale</td>
<td>WPPSI</td>
</tr>
<tr>
<td>of Intelligence</td>
<td></td>
</tr>
<tr>
<td>Boehm Test of Basic Concepts-</td>
<td>BTBC-PV</td>
</tr>
<tr>
<td>Preschool Version</td>
<td></td>
</tr>
<tr>
<td>Advantaged group</td>
<td>EG1</td>
</tr>
<tr>
<td>Disadvantaged group</td>
<td>EG2</td>
</tr>
</tbody>
</table>