CHAPTER THREE
Design of the study

3.0 Introduction

3.1 The sample

3.2 The tools and their administration

3.2.1 Questionnaire on general information of the schools

3.2.2 Students attendance registers (class I to IV from 1974 to 1981 and 1990-91 to 1997-98)

3.2.3 Interview schedule on the opinion of teachers regarding non-detention policy at primary education

3.2.4 Schedule on socio-economic background (income, education and occupation)

3.2.5 Checklist regarding causes of dropout

3.2.6 Attainment level test

3.3 Pilot study

3.4 Collection of data

3.5 Statistical treatment

3.6 Conclusion
CHAPTER THREE
Design of the study

3.0 Introduction
This chapter deals with the design of the study that has been developed in order to test the hypothesis. It has been divided into two parts: The first part describes the sample for this study and the various tools used for collecting data. The second part describes how the data for the study were collected and the way various statistical and other measures were used to analyze the data.

3.1 The Sample
Multi-phasic stratified random sampling technique is adopted. Midnapore, South 24-Parganas and Murshidabad districts are selected as advanced, medium and low literacy level districts and on the basis of information about the implementation of non-detention policy. Altogether six blocks, two from each district were randomly selected. Then three gram panchayats from each of the six blocks were randomly selected. Thus it was 18 gram panchayats altogether. Then all the schools under eighteen gram panchayats were surveyed where the complete attendance register of 1974 to 1981 and 1990-91 to 1997-98 sessions were maintained. Then from each gram panchayat one such school was selected. Design for the selection of the sample schools is shown in Figure - 1A and 1B.
Figure 1A
Design for the selection of the sample school

West Bengal

↓ District 1 ↓ District 2 ↓ District 3

↓ Block 1 ↓ Block 2

↓ G.P₁ ↓ G.P₂ ↓ G.P₃ ↓ G.P₁ ↓ G.P₂ ↓ G.P₃
↓ School 1 ↓ School 2 ↓ School 3 ↓ School 4 ↓ School 5 ↓ School 6

↓ Block 1 ↓ Block 2

↓ G.P₁ ↓ G.P₂ ↓ G.P₃ ↓ G.P₁ ↓ G.P₂ ↓ G.P₃
↓ School 1 ↓ School 2 ↓ School 3 ↓ School 4 ↓ School 5 ↓ School 6

↓ Block 1 ↓ Block 2

↓ G.P₁ ↓ G.P₂ ↓ G.P₃ ↓ G.P₁ ↓ G.P₂ ↓ G.P₃
↓ School 1 ↓ School 2 ↓ School 3 ↓ School 4 ↓ School 5 ↓ School 6
Figure 1B
Design for the selection of the sample school

West Bengal

Midnapore
(District with advanced rate of literacy)

South 24-Parganas
(District with medium rate of literacy)

Murshidabad
(District with low rate of literacy)

Kakdwip Block

Falta Block

Pratapaditya Nagar G.P.

Belasingh No. 1 Fatipur Falta G.P.

Kotulpurg EEO 1 Falta Block

Prathamik School

Prathamik School

Kakdwip Sambrachandrapur Anandamanaer

Prathamik School

Vidyalaya

Vidyalaya

Pingla Block

Daspcr I Block

Pindrul Gobardhanpur Jalchak No. I

Basudvpur Rajnagar Daspcr 2

G.P. G.P. G.P.

G.P. G.P. G.P.

Harman Prathasnik Brambhanpur Lakshmiparli

Bakunthapur Rajnagar Daspcr

Vidyalaya

Prathamik

Primary

School

Primary

School

Nabagram Block

Murshidabad Ziaugane Block

Kriteauri 5 No. Narayanpur N. Dakhilh

Natungram Prasadpur 5 No. Tatulla

G.P. G.P.

G.P. G.P.

Nagro Bhoilangpur Anuspur

Natungram Prasadpur Imrabang

Primary Adibasi Prathamik

Prathamik Primary

School Vidyalaya

School Vidyalaya
In all these 18 schools all pupils enrolled in class I in 1974 and 1990-91 sessions constitute our sample. 539 students of 1974 session (before implementation of non-detention policy) and 830 students of 1990-91 sessions (when non-detention policy was officially implemented) were within the ambit of our study. Of these the first 539 were samples of 1st phase and 830 were samples of 2nd phase. The year 1974 was taken as base year because this year provides data for dropout and stagnation before non-detention policy was adopted. Again 1990-91 session was base year to study the effect of non-detention policy on dropout and stagnation problems.

Again out of these 18 schools, 216 children were sampled out on the basis of promoted, stagnant and dropout students all through class I to class IV. Out of each class one promoted, one stagnant and one dropout were identified at random. Thus each school contributed 12 such students. So, 18 such schools contributed 216 (18x12) students as samples.

Further 200 students were selected as subjects of the attainment level test from class IV. These 200 came from 18 schools: each school contributed 11 students. 2 more were added to make it 200. Every selection was made at random.

For other types of data, the investigator contacted 18 headmasters and 51 assistant teachers (counted together as 69). Altogether 78 should have been taken but 9 of them was not available owing to circumstances beyond the control of the investigator. Details of the sample are given in the table 1.
Table 1

Details of the sample

<table>
<thead>
<tr>
<th>Name of the schools</th>
<th>Fresh enrollment in class I in the academic session 1974</th>
<th>Fresh enrollment in class I in the academic session 1990-91</th>
<th>Promoted, stagnant and dropout students in the academic session 1997-98</th>
<th>Class IV students in the session 1997-98</th>
<th>Teachers including head teacher</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Nagra Primary School</td>
<td>11</td>
<td>24</td>
<td>12</td>
<td>11</td>
<td>2</td>
</tr>
<tr>
<td>2. Bholadanga Adibasi Primary School</td>
<td>15</td>
<td>22</td>
<td>12</td>
<td>11</td>
<td>4</td>
</tr>
<tr>
<td>3. Amatpur Primary School</td>
<td>16</td>
<td>47</td>
<td>12</td>
<td>11</td>
<td>3</td>
</tr>
<tr>
<td>4. Natungram Prathamik School</td>
<td>22</td>
<td>49</td>
<td>12</td>
<td>11</td>
<td>5</td>
</tr>
<tr>
<td>5. Indradanga Nimnabuniyadi Vidyalaya</td>
<td>05</td>
<td>72</td>
<td>12</td>
<td>11</td>
<td>4</td>
</tr>
<tr>
<td>6. Prasadpur Primary School</td>
<td>24</td>
<td>53</td>
<td>12</td>
<td>11</td>
<td>5</td>
</tr>
<tr>
<td>7. Kakdwip Primary School</td>
<td>73</td>
<td>89</td>
<td>12</td>
<td>11</td>
<td>8</td>
</tr>
<tr>
<td>8. Sambhuchandrapur Prathamik Vidyalaya</td>
<td>60</td>
<td>34</td>
<td>12</td>
<td>11</td>
<td>4</td>
</tr>
<tr>
<td>9. Anandanagar Prathamik Vidyalaya</td>
<td>40</td>
<td>37</td>
<td>12</td>
<td>11</td>
<td>5</td>
</tr>
<tr>
<td>10. Fatepur Mahamayatala Prathamik Vidyalaya</td>
<td>35</td>
<td>52</td>
<td>12</td>
<td>11</td>
<td>4</td>
</tr>
<tr>
<td>11. Kotaldanga Primary School</td>
<td>85</td>
<td>30</td>
<td>12</td>
<td>11</td>
<td>4</td>
</tr>
<tr>
<td>12. Chakkrishnarampur Primary School</td>
<td>33</td>
<td>35</td>
<td>12</td>
<td>11</td>
<td>1</td>
</tr>
<tr>
<td>13. Harma Prathamik Vidyalaya</td>
<td>12</td>
<td>17</td>
<td>12</td>
<td>11</td>
<td>3</td>
</tr>
<tr>
<td>14. Brambhanipur Prathamik Vidyalaya</td>
<td>18</td>
<td>29</td>
<td>12</td>
<td>11</td>
<td>3</td>
</tr>
<tr>
<td>15. Lakshimpuri Primary School</td>
<td>17</td>
<td>38</td>
<td>12</td>
<td>11</td>
<td>2</td>
</tr>
<tr>
<td>16. Daspur Primary School</td>
<td>32</td>
<td>84</td>
<td>12</td>
<td>11</td>
<td>4</td>
</tr>
<tr>
<td>17. Rajnagar Board Primary School</td>
<td>28</td>
<td>50</td>
<td>12</td>
<td>11</td>
<td>4</td>
</tr>
<tr>
<td>18. Baikunthapur Primary School</td>
<td>13</td>
<td>68</td>
<td>12</td>
<td>13</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>539</td>
<td>830</td>
<td>216</td>
<td>200</td>
<td>69</td>
</tr>
</tbody>
</table>
3.2 The tools and their administration

With a view to achieving the various objectives of the present study mentioned in Chapter One, six tools were used which are described below in brief. All the tools were finalized on the basis of the findings of pilot study. All tools were prepared in Bengali. All the tools were prepared by the researcher under the guidance of Dr. S. Chakrabarti and other experts in social science.

3.2.1 Questionnaire on general information of the school

This questionnaire consisting of 19 items was constructed to collect the following information about the school:

- Location
- Medium of instruction
- Teaching personnel
- Number and condition of classrooms
- Availability of text book and teaching learning materials
- Library, urinal and toilet
- Drinking water facilities
- Students health examination records
- Mid-day meal and school uniform
- Involvement of guardians, etc.

It was administered to the head teachers of the 18 schools.

3.2.2 Students’ attendance register (class I to IV from 1974 to 1981 and 1990-91 to 1997-98)

Students’ attendance registers of all four classes of primary schools were used as school records about students. The researcher collected the name of each student who was enrolled to class I in the academic sessions 1974 and 1990-91 from the admission register of the schools.
The stagnation and dropout of students in successive years were found from the same register. Attendance registers of different classes of different academic sessions for 1st and 2nd phases were used as shown in table 2 for this purpose.

Table 2

*Attendance registers used in the study*

<table>
<thead>
<tr>
<th>Classes</th>
<th>Attendance registers of different years for 1st phase (before declaration of non-detention policy)</th>
<th>Attendance registers of different years for 2nd phase (after declaration of non-detention policy)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Class-I</td>
<td>1974 to 1981</td>
<td>1990-91 to 1994-95</td>
</tr>
</tbody>
</table>

Identifying the promoted, stagnant and dropout students from the prepared lists, cohorts for the 1st and 2nd phases were prepared for the study.

3.2.3 *Interview schedule on the opinion of teachers regarding non-detention policy at primary education*

Forty two items were included in the schedule to know the following information. The nature of the items are both open and close ended. Separate sheets were attached to each interview schedule for getting detailed information from teachers.

- Availability of study materials
- Instruction processes
- Types and modes of evaluation
- Immediate evaluation
- Terminal evaluation
- Remedial teaching
- Information regarding stagnation and its causes
• Productive and creative works
• Work experience
• Games and sports
• Maintenance of cumulative record card and progress report
• Teacher's opinion about various constraints for implementing non-detention policy
• Suggestion for improvement for implementing of non-detention policy.

3.2.4 Schedule on socio-economic background (income, education and occupation)

The schedule consisted of 13 items. It collects information regarding level of income, education and occupation of the households. Demographic information like religion, caste, mother tongue, family size, type of house and quantum of own agricultural land were also included. There were items on main and additional occupation of the family. To cover income, items on individual income of the family members, income from land and domestic animals; and other sources were given in the schedule.

3.2.5 Checklist regarding causes of dropout

Some previous research studies dealing with similar problems were studied. Their items were scrutinized and listed. Then again some guardians, parents, educationists, teachers were interviewed and their opinions were recorded also. The investigator, on the basis of information obtained, refined them and prepared the final form. It was divided into two parts. Under children occupied in occupation, 17 areas of occupation were listed. And in second part, 13 other various causes of dropout were enlisted.
3.2.6 Attainment level test

Attainment level test for class IV students was constructed by the researcher under the guidance of the supervisor, Dr. S. Chakrabarti, Department of Education, Calcutta University. The attainment level test was constructed by the investigator keeping the following ideas in mind.

That it is not a sophisticated test in the sense of keeping statistical fineness.

A test maximizes individual difference, discriminates individuals, classifies individuals group-wise in different levels of ability.

The purpose of the present investigator is to find "how much the individual has learnt", how much of the course objectives were grasped by the students. The schools were in rural areas, many of the pupils were first generation learners. Though the present investigator had conducted a preliminary study and tried out the items yet he did not exclude all preliminary items which appeared 'easy', nor did he omit all items offering high level of difficulty.

He remained faithful to the objectives – scanned the syllabus, tried out the items, kept the language of the items intelligible to the learners, questions were made of short sentences, answers too, were needed to be short.

Indian Statistical Institute (ISI), Kolkata prepared attainment level test for class IV and applied on larger sample. While preparing this test the investigator consulted the items in Attainment level test prepared by I.S.I.
However, individual differences would be there to maintain some type of reliability and validity, avoiding the massing of 'easy' items or the elimination of all 'difficult' items - item analysis was made. This is forwarded in the Appendix.

The test was prepared on the basis of the syllabus devised by West Bengal Board of Primary Education. This test was framed in three parts: Bengali, Mathematics and Environmental studies. Full marks of the test were 150 and time given for the test was two hours.

First part of the test carrying 50 marks contained six items of Bengali for measuring comprehension (10), language awareness (6), picture comprehension (10), handwriting (8), spelling (6) and dictation (10). Observation, language, concept consistency and imagination for assessing picture comprehension ability; correct shape of alphabet, gap between letters within a word and between words, neatness, completion of letters for assessing handwriting ability; and correctness, speediness, punctuation (comma and full stop), completion and neatness for judging dictation ability were taken into consideration. Scoring principles: two marks for right answer, one mark for partially right answer and zero for wrong answer.

Second part of the test of 50 marks consisted 11 items of Mathematics to measure the following abilities: arithmetical concept from pictures (3), concept of large and small numbers (3), addition (6), subtraction (6), multiplication (6), division (6), and application of addition, subtraction, multiplication and division (20). Scoring principle followed was part marking method for each step of answer to all the items.
Last part of the test of 50 marks comprised 25 items on Environmental Studies i.e. science, history and geography. Each item carried two marks. Items were framed to measure the following components: concept of living and non-living objects from pictures (16), democracy and social awareness (10), freedom from orthodoxy (2), scientific and general awareness (6), cognition of social friends (6), hill, mountain and island (2), state, country and sub-continent (2). (The numbers in parentheses indicate marks assigned) Types of items were fill in the blank, multiple choice and rearrangement type.

3.3 Pilot study
Pilot study was carried on 2 primary schools where records of students' attendance in classes I-IV were available in both the phases (1974 to 1981 and 1989-90 to 1996-97). These two schools were Sharisha Primary School under Sharisha Gram Panchayat of Diamond Harbour Block 2 and the other was Talpukur Primary School under Usthi Gram Panchayat of Magrahat Block 1 of South 24 Parganas district. In 1974 and 1989-90 academic sessions students' enrollment was recorded and their presence in the school on various primary classes (I-IV) in two phases was studied. Through informal discussions with teachers factual information about non-detention policy was collected. Home visits were conducted by the researcher to collect information about socio-economic background of 6 promoted, 6 stagnant and 6 dropout students and causes of dropout were collected through informal discussion with the parents and children. All the tools were applied on the sample school taken for pilot study. Necessary modification was done with discussion with experts after analyzing the results of pilot study. The findings of pilot study is presented in chapter four.
3.4 Collection of data
Attendance register of each class was collected; enrollment figure against each student was noted for 1974. The names of the students were written section wise, gender wise, caste and community wise. After that the names of promoted, stagnant and dropout and transferred students were identified – these are collected from attendance registers. Likewise, for 1990-91 academic session enrollment, promoted, stagnated and transferred students’ data were collected.

Having done this collection of data from the primary source, the present investigator contacted the head masters and collected information about physical facilities – and it was supplemented with investigator’s own observation.

Teachers were interviewed regarding implementation of non-detention policy. With the schedule, opinion of each teacher was ascertained – for clarification of ideas, discussions were held with each teacher and their opinions regarding various constraints were noted.

The investigator probed deep into the problem how much of it could be implemented, how much remained to be done, whether continuous evaluation, immediate evaluation, remedial teaching are being carried on in right earnest, if cumulative record card and progress reports are maintained, what are the problems for implementation, etc.

The attainment level test was administered at the end of academic session of class IV. The test was administered with the help of the teachers, the time limit was 2 hours. Help was given in case of difficulties faced by the students, this is to dispel the initial state of nervousness. The answer sheets were collected and scored.
Home visit was undertaken, the investigator met the parents one by one, discussed details, collected data (socio-economic background) according to the schedule prepared beforehand.

For seeking information about the dropouts, the dropout students themselves were approached and the information thus collected was cross verified with the checklist and the answers received from the parents. The migrated dropouts could not be interviewed and their parents were contacted instead.

3.5 Statistical treatment

For quantitative analysis of data, percentage, mean, standard deviation, t-test, z-test, chi-square test and ANOVA were applied and qualitative analysis was done on the basis of observations obtained during visit to schools and houses of students.

It is essential at this stage to give the method for the calculation of rate of stagnation and rate of dropout. A number of methods have been devised by educationists to measure the incidence and extent of stagnation and dropout in education. The methods have been evolved on the basis of the availability of data and the purpose for which they are estimated. Following three popular methods are in use:

1. Apparent Cohort Method
2. Reconstructed Cohort Method
3. True Cohort Method

In the case of cross sectional data, enrollment in class I in a given year is considered as cohort. Enrollment in all other classes in the same year is compared with class I, and if the same number of children are not found
in the subsequent classes, the dimension is considered as an evidence of dropout. This method has a number of limitations, because the number of children in a subsequent class in a year is not due to the pass outs of the preceding class only. There are repeaters of the same class, fresh enrollments into the class, transfers, etc. Therefore, time series data of the cohort is considered to be more rational.

Reconstructed cohort method uses the data on successive year classes enrolments and repeaters in full cycle of a cohort. It is, therefore, possible to derive the promotion rate, stagnation rate and dropout rate.

The true cohort method takes into consideration the school career of a cohort of pupils, and each individual's career is constantly followed and recorded in a plain sheet. In this study true cohort method was used.

The rate of stagnation and dropout was estimated with the help of slightly modified formula originally used by UNESCO (1970). Rate of stagnation and dropout was calculated as follows:

Rate of stagnation = \( \frac{S}{N} \times 100 \)

where, \( S = \) number of students who stagnate in that class after attaining the class

\( N = \) number of students out of the cohort who attend the class.

Rate of dropout = \( \frac{D}{N} \times 100 \)

where, \( D = \) number of dropout students in a particular class i.e the number of students who attended that class but do not attend the subsequent class

\( N = \) number of students out of the cohort who attend the class
The statistical methods used in this study were mean and standard deviation, t-value, z-value, $\chi^2$-value and F-value (ANOVA) recommended by Goon, A.M., Gupta, M.K. and Dasgupta, B., Fundamentals of Statistics Vol. 1 and Vol. 2.

1. Mean = $\bar{x} = \sum_{i=1}^{k} f_i x_i$

$$\text{S.D.} = \sqrt{\frac{1}{N} \sum_{i=1}^{k} f_i x_i^2 - \bar{x}^2}$$

where, $x$ is the variable

- $k$ is the number of classes or groups in which the variable is classified
- $x_i$ is the mid-point of the $i^{th}$ group
- $f_i$ is the frequency of the $i^{th}$ group, and
- $N = \sum_{i=1}^{k} f_i =$ total number of observations.

2. To compare the means of two populations or groups (say $\mu_1$ and $\mu_2$) the t-statistic was used. Let $N_1$ and $N_2$ be the sample sizes drawn from the two groups and $\bar{x}_1$ and $\bar{x}_2$ the sample means. The sample variances are defined as

$$S_1^2 = \frac{\sum_{i=2}^{N} f_i x_{i1}^2 - N_1 \bar{x}_1^2}{N_1 - 1}$$

and

$$S_2^2 = \frac{\sum_{i=2}^{N} f_i x_{i2}^2 - N_2 \bar{x}_2^2}{N_2 - 1}$$

Then the t-statistic is defined as

$$t = \frac{\bar{x}_1 - \bar{x}_2}{\sqrt{\frac{1}{N_1} + \frac{1}{N_2}}}$$

where

$$s^2 = \frac{(N_1 - 1)s_1^2 + (N_2 - 1)s_2^2}{N_1 + N_2 - 2}$$
To test $H_0 : \mu_1 = \mu_2$ against $H_1 : \mu_1 > \mu_2$.

We reject $H_0$ at the 0.05 level of significance if $t > t_{n-1, 0.05} \left[ H_1 : \mu_1 \neq \mu_2 \right]$

$t_1 > t_{n-1, 0.025}$.

3. In comparison of the proportions of some characteristics under different situational (phase, gender, community, district) the z-test was used which is as follow. Let $p_1$ and $p_2$ be the population proportions of different situations and $P_1$ and $P_2$ the sample proportions based on $N_1$ and $N_2$ observations respectively.

To test $H_0 : P_1 = P_2$ against $H_1 : P_1 \neq P_2$

The statistics was used:

$$Z = \frac{P_1 - P_2}{\sqrt{p(1-p)\left(\frac{1}{N_1} + \frac{1}{N_2}\right)}}$$

Where, $p =$ proportion in combined sample for sufficiently large $N_1$ and $N_2$, $z$ is distributed as a standard normal variable $N(0,1)$.

$H_0$ is then rejected at the 5% level of significance if $|z| > 1.96$ ($z_{0.025}$).

To test $H_0 : P_1 = P_2$ against $H_1 : P_1 > P_2$ we rejected $H_0$ at the 5% level of significance if $z > 1.64$.

4. The $\chi^2$ statistic was used to compare between different groups (promoted, stagnant and dropout) in relation to the socio-economic background of the students. Using a two-way classification with $k$ and $l$ classes the formula used was

$$\chi^2 = \sum \left[ \frac{(f_o - f_e)^2}{f_e} - 0.5 \right]$$

where, $f_o =$ observed frequency in a given cell

$f_e =$ expected frequency in the given cell

= product of the marginal frequencies divided by the total number of observations
We rejected the hypothesis of no difference between the groups at the 5% level of significance if \( \chi^2 > \chi^2_{(k-1),(1-0.05)} \).

5. In comparing the means of more than two populations we have used the Analysis of Variance (ANOVA) technique.

Let,

\[ x_{ij} = \text{ } j^{th} \text{ observation in the } i^{th} \text{ population} = \mu_i + e_{ij}, \text{ } j=1,...,n_i \text{ } i=1,...,k \]

where \( \mu_i \) is the mean of the \( i^{th} \) population and \( e_{ij} \) is the observational error.

To test \( H_0 : \text{all } \mu_i's \text{ are equal and } H_1 : \text{at least one } \mu_i \text{ is different} \)

We proceed as follows

Let, \( T_{to} = \sum_{j=1}^{n} x_{ij} \text{ } n = \sum_{i=1}^{k} n_i \)

\[ T_{to} = \sum_{i=1}^{k} T_{io} \]

ANOVA TABLE

<table>
<thead>
<tr>
<th>Source</th>
<th>d.f.</th>
<th>Sum squares</th>
<th>Mean squares</th>
<th>F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Between Population</td>
<td>k-1</td>
<td>( SSB = \sum_{i=1}^{k} \frac{T_{io}^2}{n_i} - T_{to} )</td>
<td>( MSB = \frac{SSB}{k-1} )</td>
<td>( p = \frac{MSB}{MSE} )</td>
</tr>
<tr>
<td>Error</td>
<td>n-k</td>
<td>( SSE = TSS - SSE )</td>
<td>( MSE )</td>
<td>( SSE ) = ( \frac{SSE}{n-k} )</td>
</tr>
<tr>
<td>Total</td>
<td>n-1</td>
<td>( TSS = \sum_{i=1}^{k} \sum_{j=1}^{n} x_{ij} - \frac{T_{to}^2}{n} )</td>
<td>( TSS )</td>
<td>( TSS ) = ( \frac{TSS}{n-1} )</td>
</tr>
</tbody>
</table>

Reject \( H_0 \) at the 5% level of significance if and only if \( F > F_{k-1,n-k,0} \).
3.6 Conclusion

This chapter is concerned with presenting the design of the study which attempted to find out the stagnation and dropout of students at primary stage of education, socio-economic background of promoted, stagnant and dropout students, causes of dropout, effective implementation of non-detention policy in primary education and attainment level of students at the end of class IV. Presentation of data, analysis and interpretation of results and discussion are reported in the next chapter.