CHAPTER III

RESEARCH DESIGN AND METHODOLOGY
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In this chapter attempt has been made to explain the plan and procedure of the research work with special reference to the method, sampling technique, data collection and treatment of data.

The present chapter is divided into five parts –

3.1 Method used in the study
3.2 Sampling technique
3.3 Development of tools and their use
3.4 Collection of data
3.5 Treatment of Data

3.1 Method used in the study

The main objective of the present study was to examine the internal efficiency and cost-effectiveness at primary school system across urban and rural areas and to know the factors responsible for the inefficiency and ineffectiveness thereof. It also attempted to know the Government interventions for increasing efficiency of the system. To fulfil objectives of the study, different indicators of quality education such as trend in enrolment as well as dropout, repetition and promotion rates were computed and compared across urban and rural areas. Hence the study was brought under the
category of descriptive research. The basic purpose of descriptive research is to describe and interpret the state of affairs. It deals with the conditions or relationship that exist, practices that prevail; point of view, beliefs or attitude that are held; process that are going on; effects that are evident or are being felt; or trends that are developing. The method of descriptive research primarily concerned with the present, although it often considers past events and influences as they relate to current conditions (Best, John W. and Kahn, J.V., 2006, p.114). A number of case studies were done using survey method to fulfil the objectives laid out for the study. This method was considered appropriate for this research work, because no readymade data which are required for examining different objectives under study, such as school data on enrolment, dropout, promotion, retention, item-wise recurring expenditure, achievement scores, etc. were available. This resulted in no alternatives to the investigator but to visit sampled schools for collection of data.

3.2 Sampling technique

It became necessary to select a representative sample of the population which is scattered over a very wide geographical area because of limitations in time, fund and manpower.

For proper representativeness and precision a stratified random sampling technique has been adopted for the study. In educational research usual stratification factors are sex, age, urban-rural residence, socio-economic status, educational background, occupation, religion, caste, general intelligence and so on (Koul, L., 2005, p.118). In this study stratification is done on the basis of location i.e. urban and rural areas. At first two blocks
from Kamrup and Marigaon districts were selected randomly using simple random technique. Under Kamrup district, Hajo block for rural schools and Guwahati block for urban schools were selected. Similarly Mayong (rural) and Mayong (urban) blocks from Marigaon District were selected for the study. Then list of L.P. Schools under the each block were collected from DISE, SSA. Primary schools of selected blocks were stratified into two strata viz. rural and urban area based on their location. Thereafter from each stratum a representative sample of 5 percent of school were selected with the help of simple random technique without replacement for detail investigation. On an average 3 teachers from each sampled schools were also included in the sample. In addition to this, 35 dropout children were also included purposively from the catchment area of sampled schools.

Table 3.2.1 shows the block-wise number of schools, teachers and enrolment at primary level in the sampled districts.

Table 3.2.1

Block-wise No. of L.P. schools, total teachers and enrolment in Kamrup and Marigaon districts

<table>
<thead>
<tr>
<th>Name of district</th>
<th>Name of the block</th>
<th>No. of L.P. schools</th>
<th>No. of teacher</th>
<th>Enrolment</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Urban</td>
<td>Rural</td>
<td>Total</td>
</tr>
<tr>
<td>Kamrup</td>
<td>Boko</td>
<td>2</td>
<td>229</td>
<td>231</td>
</tr>
<tr>
<td></td>
<td>Chamaria</td>
<td>0</td>
<td>162</td>
<td>162</td>
</tr>
<tr>
<td></td>
<td>Chaygaon</td>
<td>0</td>
<td>227</td>
<td>227</td>
</tr>
<tr>
<td></td>
<td>Dimoria</td>
<td>14</td>
<td>156</td>
<td>170</td>
</tr>
<tr>
<td></td>
<td>Hajo</td>
<td>0</td>
<td>217</td>
<td>217</td>
</tr>
<tr>
<td>Name of the block</td>
<td>Total No. of school</td>
<td>Sampled school</td>
<td>No. of sampled teachers</td>
<td></td>
</tr>
<tr>
<td>------------------</td>
<td>---------------------</td>
<td>----------------</td>
<td>-------------------------</td>
<td></td>
</tr>
<tr>
<td>Hajo (Rural)</td>
<td>217</td>
<td>11</td>
<td>33</td>
<td></td>
</tr>
<tr>
<td>Guwahati (Urban)</td>
<td>262</td>
<td>13</td>
<td>39</td>
<td></td>
</tr>
<tr>
<td>Mayong (Rural)</td>
<td>276</td>
<td>14</td>
<td>42</td>
<td></td>
</tr>
<tr>
<td>Mayong (Urban)</td>
<td>11</td>
<td>1</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Marigaon</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Laharighat</td>
<td>299</td>
<td>299</td>
<td>632</td>
<td></td>
</tr>
<tr>
<td>Mayong</td>
<td>276</td>
<td>287</td>
<td>637</td>
<td></td>
</tr>
<tr>
<td>Kapili</td>
<td>38</td>
<td>38</td>
<td>130</td>
<td></td>
</tr>
<tr>
<td>Bhurbandha</td>
<td>192</td>
<td>192</td>
<td>489</td>
<td></td>
</tr>
</tbody>
</table>

Thus the sample consists of 39 L.P. Schools and 117 Assistant Teachers of sampled L.P. Schools.
3.3 Development of tools and their use

The present study required a fairly large variety of data. The data were obtained from both primary and secondary sources.

The primary data were collected from the respondents with the help of a set of schedule, questionnaire, personal interview and observation method. The interview method was applied to collect information from dropouts and their parents. Most of the parents were illiterate and their educational status were very low and hence interview method had to be used in their cases. Moreover, along with schedules and interview, observation method was also used to have more and accurate information. Field notes were also widely used to record additional information during the field visit. Focus Group Interview (FGI) with the Headmaster of sampled schools was organized at Beltola L.P. School (Guwahati), Saikia para L.P. School (Hajo) and Lathabari Nehru Bidyapith (Marigaon) in order to have a collective view on the present system of pupils evaluation, existing textbooks and on other academic inputs or issues which directly and indirectly influence the efficiency and effectiveness of school system. On the other hand, the secondary data were collected from different sources such as website of UNESCO, NCERT and NUEPA; census report, school authorities, office of the DEEO, Directorate of Elementary Education, Directorate of SCERT, State Institute of Education; books, documents and journals available at different libraries of NCERT (New Delhi), NUEPA (New Delhi), SCERT, Assam (Guwahati), SIE (Jorhat), AASC (Guwahati), Dibrugarh University (Dibrugarh), Gauhati University (Guwahati), SSA, Assam (Guwahati). The investigator personally
visited all the above libraries for collecting documents and other information required for this study. Secondary information regarding government interventions were collected from various publications of SSA including SSA Newsletter 2005-06, Agenda Notes of Executive Body meeting of SSA and other published and unpublished documents of SSA, DPEP, SCERT, DEE and Government press.

The following tools were developed and used to collect data for the study.

3.3.1 School information schedule (Appendix I)

The Headmaster of the sampled primary schools were asked to fill in this schedule, which would project a holistic picture of the school. The following items were included in the schedule: Name and address of the school and Headmaster, year of establishment, strength of teachers and their training status, enrolment during the last ten years, grade-wise enrolment, dropout data, physical condition of the school, school supervision, item-wise recurring expenditure etc. Questions regarding effectiveness of present system of pupils evaluation, textbooks, SSA interventions were also included in the schedule. The headmasters were requested to suggest some strategies for improving efficiency and effectiveness of school system. They were requested to fill up the schedule in consultation with the Assistant teachers and community members. Along with the school information schedule, the headmasters were also requested to provide result sheet of Class IV students in the last periodic evaluation as per format at Appendix II.
3.3.2 Questionnaire for sampled assistant teachers
(Appendix III)

The questionnaire was developed to some extent with a view to collect information regarding academic qualification as well as professional qualification of the teachers, their views on different Government interventions for quality improvement of school education, academic problems faced by them and their suggestions for achieving the UEE.

3.3.3 Worksheet for cohort analysis (Appendix IV)

With the help of this worksheet, the investigator collected data regarding the pupil cohort entered in Class I of sampled schools in 1995 and followed them year after year till they left the primary school system. All the school admission registers and attendance registers of sampled schools were carefully studied from 1995 to 2005 and information recorded regarding each and every child of 1995 cohort in this worksheet.

3.3.4 Interview schedule for dropout (Appendix V)

Questions regarding causes of leaving schools, their present occupation etc. were incorporated in this schedule.

3.3.5 Observation schedule (Appendix VI)

An observation schedule was used by the investigator to record observations during field visit in respect of physical infrastructural facilities and classroom transaction by the teachers.
3.3.6 Try out of the questionnaire and schedule

The questionnaire and schedules were subjected to try out for necessary modification. A try out helps the investigator to delete ambiguity and difficulty of items of the tool and bring improvement in it. All the tools developed for this study were given to teachers of 3 primary schools and they were asked to give their views on the nature of questions that asked in the questionnaire and schedule. It was found that except a very few question-items, the rest worked well and the respondents felt easy in giving responses. Accordingly, necessary modifications were made to the questionnaire and schedule in consultation with the experts in the field.

3.4 Collection of data

The investigator visited different state educational Directorates like Directorate of Elementary Education, Directorate of SCERT, Directorate of Economics & Statistics and also the Publication Department of Gauhati University, Dibrugarh University, NCERT, NUEPA and State Mission Office, Sarva Siksha Abhiyan Mission, Assam to collect various documents and data required for analysing different objectives under study. The investigator collected secondary information from EMIS of SMO, SSA, Assam and office of the DEEO-cum-DMC, SSA of Kamrup and Marigaon Districts. In addition to this the investigator collected the required data with the help of various schedules and questionnaires from the Headmasters, Assistant teachers, dropout children etc. during his visit to sampled schools and its catchment area. The collection of data from the respondents was very difficult. Hence, the investigator had to visit each sampled school atleast 4/5 times and
contacted all the sampled teachers to collect necessary information. After establishing psychological rapport they were explained that the investigation was only to collect information for a research study. It was further told that the information provided by them would be kept confidential. Hence, they were requested to give their opinion freely and frankly without any hesitation. The respondents were given sufficient time to fill up the questionnaire and school information schedule. Apart from this, Headmasters and Assistant Teachers were interacted on spot and given opportunity to share their experiences in respect of conducting various tasks in the school and to express their views on effectiveness of various Government interventions for quality primary education and these were recorded in the field notes. Focus Group Interview with the Headmasters of sampled schools was also organized in 3 places i.e. Beltola L.P. School (Guwahati), Saikiapara L.P. School (Hajo) and Lathabari Nehru Bidyapith (Marigaon) and various issues discussed related to efficiency and effectiveness of primary school system. For participation in each F.G.I., seven headmasters from sampled schools were randomly selected along with the CRCC of the clusters concerned. The investigator raised certain questions before the participants one by one for deliberation. The participant teachers actively involved themselves in the process of interaction. Responses were recorded carefully by the investigator. It helped the investigator in retrospection and let him began with a bit looking back to the past to assess problems and prospect of primary school system in the state. According to the document of NCERT (2001, p.78) a Focus Group Interview is an interview with a small group of participant on specific topic. Groups are typically of six to eight participants who participate in the interview for one-half to two hours.
The participants are relatively homogeneous in nature who are asked to reflect on the questions asked by the interviewer. Participants get to hear each other’s responses and to make additional comments beyond their own original responds as they hear what other participants have said. It is not necessary for the group to reach any kind of consensus nor it is necessary for the participants to disagree. The aim is to get high quality data in a social context where participants can consider their own views in the context of the views of others. This technique provides some quality control on the data collection where participants tend to provide checks and balances on each other that weed out false or extreme views.

In this way, with a sustained efforts and hard work, it was possible to collect the data required for examining different objectives under study.

3.4.1 Scoring of data

Scoring of collected data was done by taking down the responses from questionnaire, school information schedule, interview schedule in term of tallies. In this way, all the schedules and questionnaires were dealt with corresponding number of tallies that are marked and counted; and the scores in each column, were treated as final scores. For every item the sum total of the frequencies was checked off and on found to be correct. The collected data were treated with the help of statistical techniques which are explained under the following captions.
3.4.2 Treatment of data

3.4.2.1 Computation of internal efficiency

The technique of cohort analysis which is popularly applied in demographic analysis has been used in this study for assessing internal efficiency and educational wastage in sampled schools. A cohort is generally defined as a group of people who jointly experience a series of specific events over a period of time (UNESCO website). In this study pupil cohort means a group of children who enter the first grade of a primary school cycle in the academic year, 1995 and subsequently each of them experience promotion, repetition, dropout and successful completion of the final grade i.e. grade IV in his or her own way.

Cohort analysis is a graphical representation by the use of a flow diagram which traces through the entire primary educational cycle the flow of the group of pupils who enter grade I of primary cycle in the beginning of the year 1995. This analytical technique provides detailed information on just what happen to the students of the specific pupil cohort as they go through the particular educational cycle year-by-year and grade-by-grade. It helps to know just how many students go on through the educational cycle till last grade, how many repeat and how many dropouts (UNESCO document, Module II).

In the flow diagram each box contains the number of pupils in the particular grade in a particular year. From each box there are three arrows: one that angles up and indicates the dropouts; one that angles down towards a box containing the number of students promoted to the next grade in the
next year; and another arrow going vertically down to a box containing the number of students repeating that grade in the next year. The boxes contain the numbers and on the arrows are co-efficient indicating proportions of pupils who dropout, promoted or repeated the grade. The sum of the co-efficients coming out of any given box should be equal to one (UNESCO document, Module III).

There are three ways namely true cohort, apparent cohort and reconstructed cohort (UNESCO website, downloaded on 22-06-2005, p.1) for analysing educational internal efficiency by means of student flow method, depending on the type of data available.

**True cohort method** : It provides a precise assessment of different indicators of internal efficiency in an ideal way. This technique involves either a longitudinal study by monitoring the flow of each and every student of a selected pupil cohort through a full educational cycle, or through retrospective study of school records in order to retrace the flow of pupils through the grades over a period of time. This method is costly and time consuming and requires reliable school records with data on individual student (UNESCO document, 1998, p.14).

**Apparent cohort method** : This method can be used when there are no data on repetition. In this method, school wastage is assessed by using enrolment data by grade for at least two consecutive years. Here enrolment in grade I in a particular year is compared with enrolment in the consecutive grades during the following years and any decrease in enrolment from one grade to the next is assumed to be due to dropout.
This method is most commonly used and so far produces an approximative estimates of internal efficiency and wastage. The main weakness of this method is that it assumes that pupils are either promoted or else dropout of the school system. Repetition, a factor of paramount importance is overlooked. This method is appropriate for regions that practice automatic promotion (UNESCO document, 1998, p.14).

**Reconstructed cohort**: This is another commonly used method, which places less demand on the availability of detailed data over time. In this method, data on enrolment by grade for two consecutive years and data on repetition by grade from the first to the second year are sufficient to estimate the main flow rates: promotion, repetition and dropout. Once obtained, these rates can be analysed by grade to study the patterns of repetition and dropout. They can also be used to reconstruct the pupil cohort flow to derive other indicators of internal efficiency (UNESCO document, 1998, p.14).

### 3.4.2.2 Method used in the present study for computation of internal efficiency

In this study, the method of true cohort was applied in strict sense without any deviation for computing different indicators of internal efficiency of primary school system and wastage thereof.

In this study, the group of pupils who entered the first grade of primary cycle in the year 1995 was considered as pupil cohort for the investigation and each and every child of the cohort was followed up to 2005 applying true cohort method.
All the school admission registers and attendance registers of sampled schools were intensively studied from 1995 to 2005 and information filled up regarding each and every child of 1995 cohort in the worksheet for cohort analysis. The names of these students were recorded in the worksheet first from the admission register of the sampled schools. The carrier of each and every student of the cohort was followed from grade I in 1995 onwards in the successive years and grades by carefully recording in the worksheet from the school registers. The counterfoils of certificates issued by the headmasters of schools concerned to the successful completers of primary stage were also examined to identify the students who promoted regularly and who have completed primary level after repeating grades one or more times. The grade repeaters were the cases of stagnation. Those pupils whose names had been struck off from school register due to considerably long absence were treated as dropouts. The grade and the year at which the student dropped out were also recorded. Utmost care was taken not to miss a single student from the student cohort. Each and every child was carefully and independently followed during his or her existence in any grade of primary education upto 2005.

The flow diagram was constructed on the following assumptions:

1) A student is allowed to continue upto 2005. If he or she is not able to complete the cycle on or before 2005, he or she will be forced to leave the system.

2) There will be no additional new entrant into the system in subsequent years.
3) The student who takes transfer to another school during his/her course of study at primary level will not be included in the cohort.

4) The student who died during the course will not be included in the cohort.

3.4.2.3 Computation of indicators of internal efficiency

3.4.2.3.1 Co-efficient of efficiency

Co-efficient of Efficiency was taken as a measure of internal efficiency of the primary education system in this study. It was calculated as the ratio, expressed as a percentage, between the optimal number of pupil-years required for a pupil cohort to complete a level or cycle of education (i.e. primary level) if no pupil repeated grades or dropped out and the estimated total number of pupil-years actually spent by the same pupil cohort to complete the cycle.

\[
\text{Ideal student year required to complete the cycle if no pupils repeated grades or dropped out} \\
\text{Co-efficient of Efficiency} = \frac{\text{Ideal student year required to complete the cycle if no pupils repeated grades or dropped out}}{\text{Actual student years spent by the pupil cohort to complete the primary educational cycle}}
\]

Any additional years spent to graduate pupils beyond the prescribed duration of a cycle indicates an efficiency of less than 100 percent or unitary (UNESCO document, 1998, p.14).
3.4.2.3.2 Input output ratio

It is the reciprocal of Co-efficient of Efficiency, used as an alternative measure of internal efficiency of the educational system. The optimum input output point is unity.

\[
\text{Actual student years spent by the pupil cohort to complete the primary educational cycle} \\
\text{Input output ratio} = \frac{\text{Actual student years spent by the pupil cohort to complete the primary educational cycle}}{\text{Ideal student year required to complete the cycle if no pupil repeated grades or dropped out}} \\
\]

3.4.2.3.3 Average number of pupil years

It indicates the average number of pupil years required to produce a primary graduate. It was calculated as follows:

\[
\text{Actual total number of student years spent by the entire pupil cohort} \\
\text{Average pupil year} = \frac{\text{Actual total number of student years spent by the entire pupil cohort}}{\text{Total number of graduates produced from the pupil cohort}} \\
\]

3.4.2.3.4 Survival rate to Grade IV

The Survival Rate used in this study indicates the percentage of pupils who enrol together in Grade I (the pupil cohort) in 1995 that eventually reaches Grade IV.

3.4.2.3.5 Percentage of pupils reaching Grade IV without repetition

It indicates the percentage of pupils who enrol together in Grade I in 1995 that reaches Grade IV without repetition in 1998.
3.4.2.3.6 Computation of process indicators

One of the following three possible events may take place in the next year ‘t+1’ when a child enters into a particular grade ‘g’ in a particular year ‘t’ : (i) either the child may pass the particular grade ‘g’ and will be in the next grade ‘g+1’ in the year ‘t+1’. These students are termed as the promotees. If grade ‘g’ happens to be the final grade (in this study grade IV), then the promotees will be termed as the graduate of primary level; or (ii) the child may fail in the grade ‘g’ and repeat the same grade ‘g’ in the next year ‘t+1’. These students are known as the repeaters; or (iii) the child may leave the system (i.e. school) during the same year ‘t’ without completing grade ‘g’. These students are termed as dropouts (Zaidi, S.M.I.A., 1997, pp.13-14).

In this study three process indicators viz. Promotion Rates, Repetition Rates and Dropout Rates are computed since inception of Sarva Siksha Abhiyan in 2002-03 for 3 years i.e. 2002-03, 2003-04 and 2004-05.

Promotion Rate : The promotion rates indicate the percentage of students passing the specific grade to the total number of students originally enrolled in that grade. The promotion rates were calculated by the following formula.

\[
P_{t+1} = \frac{g+1}{E_{t+1}} \times 100
\]
Where,

\[ P = \text{Promotion rate} \]
\[ g = \text{grade out of which students are promoted} \]
\[ t = \text{the year of reference} \]
\[ p = \text{number of students promoted} \]
\[ E = \text{Enrolment} \]

**Repetition Rate** : The repetition rate is the percentage of students who repeat the same grade in the next year to the total number of students enrolled in the original grade in the base year. The repetition rates were computed by the following formula:

\[
R = \frac{g_t \times (g_{t+1})}{E_t} \times 100
\]

Where,

\[ R = \text{repetition rate} \]
\[ r = \text{number of repeaters} \]
\[ g = \text{grade repeated} \]
\[ t = \text{the year of reference} \]
\[ E = \text{Enrolment} \]
**Dropout Rate**: The dropout rate is the percentage of students who leave the system without completing the grade to the total number of students originally enrolled in the grade. The dropout rates were calculated with the help of the following formula:

\[ D = \frac{d}{g} \times \frac{100}{E} \times \frac{g}{t} \]

Where,

- \( D \) = dropout rate
- \( d \) = number of dropouts
- \( g \) = grade of reference
- \( t \) = the year of reference
- \( E \) = Enrolment

### 3.4.2.4 Computation of Gender disparity

Gender disparity in enrolment was examined in terms of Gender Parity Index (GPI) as follows:

\[ GPI = \frac{\text{Girls enrolment in primary grades in year } 't'}{\text{Boy's enrolment in primary grades in year } 't'} \]
3.4.2.5 Computation of cost effectiveness

To gain an idea about cost effectiveness of sampled primary schools, unit costs were computed and compared with the levels of achievement of students of Grade IV in the school examination in terms of Achievement Index as well as with the Promotion Rate.

3.4.2.5.1 Analysis of unit cost

In this study, the institutional recurring expenditure incurred by the sampled schools during 2005 per student was considered as unit cost. The institutional costs are financed by the Government and the collection through fees, endowments and philanthropic contributions. At present a major portion of Government fund has been channelised to primary education sector through Sarva Siksha Abhiyan Mission. The private costs incurred by students for purchase of books, stationery, transport and other maintenance expenses were not considered during computation of unit cost. On the other hand, opportunity costs or the benefits foregone due to attending schools by the children are also not including in the cost items for analysing unit cost as because according to the Child Labour (Prohibition and Regulation) Act, 1986, employment upto the age of 14 years has been made illegal in India as well as in compliance with the constitution assurance to protect the child right to free and compulsory education to all children upto the age of 14 years. The retirement benefits given to teachers and employees which are also a part of institutional cost are not taken into consideration.

Thus unit cost is obtained by dividing the total recurring expenditure incurred by the sampled schools by the total enrolment attributable.
Total Recurrent Expenditure in the year ‘t’
Unit Cost = \frac{\text{Total Recurrent Expenditure in the year ‘t’}}{\text{Total number of students in the year ‘t’}}

The total recurrent expenditure includes all sorts of annual expenditure incurred in salary of teaching and non-teaching staff, expenditure in conducting examination, celebrating festivals and functions, holding co-curricular activities, annual payment for electricity, municipality tax, telephone bill, the maintenance of buildings and furniture, purchase of instructional materials and supplies (chalk, paper etc.), auxiliary expenses such as mid-day meal and health check-up, other contingent expenditure. However, cost of textbooks which had been supplied to student free of cost with financial assistance under Sarva Siksha Abhiyan was not included in the cost items. On the other hand, expenditure incurred for in-service teachers training was also not considered in working out unit cost.

For examining cost effectiveness of primary schools, computed unit costs were compared with the levels of achievement of all the students of Grade IV in the last periodical evaluation at the primary stage as well as with the promotion rate. For comparison, Achievement Index and Promotion Rates were computed with the help of following formula.

\[
\text{Achievement Index, } A = \frac{\text{Average of total marks secured by Grade IV students}}{\text{Total marks for a Grade IV student}} \times 100
\]

\[
\text{Promotion Rate, } P = \frac{\text{No. of students promoted to grade ‘g+1’ in the year ‘t+1’}}{\text{Total No. of students enrolled in grade ‘g’ in the year ‘t’}} \times 100
\]
References


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UNESCO Website (downloaded on 22/06/05). "Use of Cohort Analysis Models for Assessing Educational Internal Efficiency", .