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Chapter – III
PLAN AND PROCEDURE OF THE STUDY

3.1 Introduction

The previous chapter presented the review of related literature. This chapter presents the plan and procedure of the study. This study is a survey of mathematics curriculum and its transaction at the primary school level in Bangladesh and West Bengal of India to enable the researcher to compare curriculum of both countries. For the realization of objectives as stated in chapter-I under section 1.8, a survey was planned to collect data from different sources of the primary schools of Bangladesh and west Bengal of India. Objectives of the study are given here again to facilitate the reader to get clear picture of the plan and procedure in context of these objectives.

Objectives:

(1) To critically examine the mathematics curriculum for primary education in Bangladesh and West Bengal of India.

(2) To identify the teaching process of primary mathematics that take place in classes of Bangladesh and West Bengal of India.

(3) To identify the problems and obstacles in transacting primary mathematics curriculum in classroom situation in Bangladesh and West Bengal of India.

(4) To identify the major strengths and weaknesses of the primary mathematics curricula of Bangladesh and West Bengal of India.

(5) To compare the primary mathematics curriculum of Bangladesh with that of West Bengal of India with respect to

    a.   teaching processes in classes.

    b.   problems and obstacles in transaction of curriculum in classroom

    c.   strengths and weakness of the curriculum.

(6) To provide specific suggestions for revision and modification of primary mathematics curriculum of Bangladesh and West Bengal of India.

Two types of data were collected - qualitative and quantitative to attain the objectives 1to 4 of the study. To realize objective five, results were compared on the basis of analyzed data which would be collected for objectives-1 to 4. To realize the

objective six i.e., finally specific suggestions were provided for revision and modification of primary mathematics curriculum of Bangladesh and West Bengal of India based on analysis and interpretation of data collected.

Detailed information about sources of data, selection of sample and construction of tools are presented. Description of the pilot study and description of the constructed tools have been included. Also, procedure of data collection and data analysis techniques are given.

3.2   Sources of Data

Data were collected from different sources such as documents on mathematics curriculum, reports of committees and commissions, mathematics teachers, academic supervisors, curriculum specialists, subject specialists and classroom observation for achieving objectives of the present study.

3.3   Sample of the Study

For achieving objective one, document / reports and textbooks were taken up. For achieving objectives 2 to 4, teachers, academic supervisors, curriculum specialists, subject specialists and classroom observation were taken up as the sample. The selection procedure for each one is presented below.

3.3.1   Selection of Documents

Documents from both countries, such as Curriculum Documents and Implementation Reports, Mathematics ·Textbooks, Development Plans and Programmes, National Policies on Education, Reports of Education Commissions, and Research Reports on teaching of mathematics were critically analyzed. Thus, documents became the primary source of information / data for objective one.

3.3.2   Sample Selection for Mathematics Teachers

Six districts from Bangladesh and West Bengal were selected purposively. And following the same strategy, two sub-districts (Thana / Circle) were selected from each district, a total of 12 in each country. Again, 5 primary schools from each sub-district were selected randomly. Thus, a total of 60 primary schools were selected from each country. Further, two mathematics teachers from each school were taken as

the sample of the study. Thus, the total sample size of mathematics teachers is 240; 120 from each country. Selected district, along with schools are listed in Appendix-A.

3.3.3 Sample Selection for Academic Supervisors

Assistant Thana Education Officers (ATEO) / Sub-Inspector (SI) of schools from each country, who were responsible for supervising the classroom activities of the selected sample of the teachers, formed the sample of Academic Supervisors for the study. Thus, the numbers of Academic Supervisors selected were 120; 60 from each country.

3. 3.4 Sample Selection for Curriculum Specialists

12 curriculum specialists (6 from each country) were selected purposively from both the countries. Out of them, 6 curriculum specialists - 4 from Institute of Education and Research (IER), University of Dhaka and 2 from Bangladesh National Curriculum and Textbook Board - were selected purposively from Bangladesh to comment on the curriculum of primary mathematics in Bangladesh.

Similarly, 6 curriculum specialists - 4 from Department of Education, Calcutta University; 1 from David Hare Teachers' Training College and 1 from West Bengal Board of Primary Education - were selected purposively from West Bengal to comment on the curriculum of primary mathematics in West Bengal.

3.3.5 Sample Selection for Subject Specialists

8 subject specialists (4 from each country) were selected purposively from both the countries. Out of them, 4 subject specialists - 2 from Department of Mathematics, University of Dhaka, 1 from University Laboratory School and College, and 1 from Adamje College, Dhaka were selected from Bangladesh.

Similarly, 4 subject specialists - 3 from Department of Pure Mathematics, Calcutta University, 1 from Sommiloni College, South 24-Parganas - were selected from West Bengal.

3.3.6 Sample Selection for Classroom Observation

The sample for classroom observation consisted of 24 primary schools, 12 from each country; covering 120 classes of mathematics teaching - learning process; 60 from each country in primary level (grade I-V).

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3.4 Construction of the Tools

Four tools, such as two questionnaires, one for the primary school mathematics teachers, the other for the academic supervisors, one opinionnaire for the experts (curriculum and subject specialists), and an observation schedule were constructed by the investigator. The first step in the construction of the tools was to identify all those components of the curriculum about which the opinion of the teachers, academic supervisors and experts were to be obtained. The first draft of the questionnaire for mathematics teachers had 65 items, the questionnaire for academic supervisors had 45 items, the opinionnaire for experts (curriculum and subject specialists) had 17 items and the observation schedule had 22 items. These were then referred to eight experts (4 from Bangladesh and 4 from India) in order to obtain their opinion about the validity of the items in the tools as well as the clarity of items and their comprehensibility. The feedback obtained from the experts was utilized for revising the tools.

The revision was mainly in terms of deleting ambiguous items, rephrasing items to avoid repetition of meaning of the items and refining the language of certain items. Keeping in view the above points, a revised draft of the tools was prepared and referred to the same eight experts to seek their further comments on them. The following were the experts' comments about the tools:

i.   The items in the tools as per the objectives of the study were adequate.

ii.   There was no ambiguity in the expression of the items from the language point of view.

iii. Reorganization of some of the serial numbers of the items might be done for keeping better sequences of the items in the gradual order in the tools.

As per the above comments and suggestions the tools were modified. The final form of the tools is reproduced in Appendix B to E.

Initially, all the tools were developed in English. These tools were then edited carefully and scrutinized by language experts. The national language / regional language and the medium of instruction in the primary schools of Bangladesh and West Bengal is mother tongue Bengali. So to get response easily, the two questionnaires (one for mathematics teachers and one for academic supervisors) were translated into Bengali and all these tools in Bengali were given to four experts for

their comments and suggestions. As per the experts' comment about the tools, there were no ambiguities in the expression of the items from the language point of view.

Both the Bengali versions of the tools have been annexed in Appendix- B & C. Regarding the language of the opinionnaire, the investigator discussed with some of the experts in Centre of Advanced Study in Education (CASE) and Institute of Education and Research (IER). All the experts felt that the language of the opinionnaire may remain English and it will not be difficult for the experts to fill in the opinionnaire. The observation schedule was used by the investigator himself. So, the language of the opinionnaire and the observation schedule was English.

3.5   Pilot Study

The pilot study was conducted in 5 primary schools of Dhaka district in Bangladesh and 5 primary schools of Kolkata district in West Bengal covering a specific view for checking whether the tools needed revision. The pilot study was planned to make the language of the tools understandable and to see whether the respondents can handle the instrument with ease. There were two types of respondents, such as mathematics teachers and academic supervisors with different backgrounds regarding their academic qualifications in the sample schools of different strata.

The administration of the tools was done by the investigator through personal contact with the respondents of the ten primary schools (in both countries) and academic supervisors who are responsible for supervising the classroom activities of the selected sample of teachers of the respective schools. Each of the ten academic supervisors, was given one copy of questionnaire, and twenty mathematics teachers (two teachers in each of these ten schools) were given twenty copies (one copy to each teacher) of questionnaire for mathematics teachers for responding. Since the administration of the tools was done in the presence of the investigator, all the tools were returned. On the basis of the scrutiny of the responses, it was found that the items of the different tools were responded properly. As no claim of ambiguity about the language of the tools was raised from the respondents, they required no modification.

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3.6 Description of the Tools

The description of the constructed tools is given below:

3.6.1 Questionnaire for the Mathematics Teachers

This questionnaire was prepared with the purpose of finding information of mathematics teachers' academic qualifications, professional training, teaching experience, use of teaching aids, teachers manual, use of lesson plan, interaction with pupils, difficulties and easiness of subject-matters, remedial teaching, appropriateness of content/objectives/competencies, the method of teaching followed by them in the classroom, and also to identify the problems faced by them relating to strength, weaknesses of curriculum and socio-cultural aspects. The questionnaire contained 24 items on the above mentioned aspects. The items in the questionnaire were a combination of open-ended type and closed-ended type (vide appendix-B).

3.6.2 Questionnaire for the Academic Supervisor

This questionnaire was designed for the academic supervisors with a view to find out some additional information with regard to methods of teaching and problems/obstacles faced by the teachers in classroom situations. There were 17 items which were combination of open - ended type and closed – ended type (vide appendix-C). All the items were meant for finding out the academic supervisors' perceptions with regard to the methods of teaching followed by mathematics teachers in the classroom situation.

3.6.3 Opinionnaire for the Experts (Curriculum specialists and subject specialists)

The Opinionnaire was designed for the experts with a view to examine the suitability and feasibility of the curriculum, particularly objectives, competencies, content and consistency among these aspects. Also strength, weaknesses and socio-cultural aspects of the curriculum were incorporated in the opinionnaire. The opinionnaire contained 7 items on the above mentioned aspects. This opinionnaire had two parts: Part-I was a five alternative response choices and Part-II was an open-ended (vide appendix-D).

3.6.4 Observation schedule

The observation schedule was used by the investigator with the specific purpose of finding out the methods of teaching followed by the mathematics teachers in the classroom. The observation schedule contained 17 items which was closed-ended type (vide appendix-E).

3.7 Process of Data Collection

For the realization of the objective one of the present study the following data were collected from the documents:

(i) Revision and Modification of Curriculum of the Primary Stage against the Background of Universal Primary Education, Essential Learning Continua (primary Education)-1988, prescribed by National Curriculum Textbook Board, Bangladesh.

(ii) Primary Curriculum and Syllabi-1981, prescribed by West Bengal Board of Primary Education, West Bengal.

(iii) Textbooks (grades I-V) of both countries.

(iv) Mathematics Education in Asia and the Pacific, UNESCO-NIER Regional programme-1983.

(v) Report on Regional Conference on Development of Integrated Curriculum in Mathematics for Developing Countries of Asia-1975, Indian National Science Academy.

To realize the second, third and fourth objectives of the present study, the data were collected by personal contact with mathematics teachers, academic supervisors, and experts (curriculum and subject specialists) from Bangladesh and West Bengal of India through different tools.

Personal classroom observation was also made in the primary mathematics classes through structured observation schedule (Vide Appendix-E). The following major steps were adopted for the observation in the primary mathematics classes:

(i) The investigator paid a visit to each of the selected primary schools during the phase of data collection.

(ii) The investigator sought permission of the head teacher of each of the school to observe mathematics classes.

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(iii) All the observed information was recorded in the structured observation schedule used by the investigator.

3.8   Procedure of Data Analysis

The data collected were classified and tabulated. The following two techniques of analysis have been used in order to arrive at the findings of the study.

3.8.1 Quantitative Analysis

The data collected through questionnaire, opinionnaire, and observation schedule were analysed as follows:

There were two types of items in the tools, viz., closed-ended type (such as multiple choices, yes/no) and open-ended type. The responses to each item of closed-ended type were analyzed in terms of number (frequency) of responses. The frequencies were further converted into percentages to describe the results of the item to arrive at the findings. The data supplied by the respondents to each of the open-ended items were categorized on the basis of their contents into different clusters along with their frequencies and percentage.

In case of examining the suitability/appropriateness of the curriculum, particularly objectives, competencies, contents and consistency among these aspects, the respondents were asked to put tick mark (√) against relevant categories of responses viz., 'To a Great Extent (TGE)', 'To Some Extent (TSE)', 'To a Little Extent (TLE)', 'Not AT All (NAA)' and 'Different Opinion' given against each item. The last choice 'different opinion' was not responded by any of the experts. **Hence, the scale was reduced from five to four points with choices namely, TGE, TSE, TLE and NAA.** Thus 4-point scale was utilized for further statistical analysis by assigning numerical values to each alternative response choice as shown below:

Choices	Abbreviations	Scale Values
To a Great extent	TGE	3
To Some Extent	TSE	2
To a Little Extent	TLE	1
Not AT All	NAA	0

The sum of the products of scale value and corresponding number of responses was considered as the total score of the individual item. The mean value of

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each item was computed by dividing the total score of the item by the total number of responses.

Mean Score of an item = $\dfrac{3 \times N_1 + 2 \times N_2 + 1 \times N_3 + 0 \times N_4}{N}$

Where N is the total number of respondents; N_1, N_2, N_3, N_4 stand for number of responses for the choices; To a Great Extent, To Some Extent, To a Little Extent and Not at All respectively.

By this calculation procedure, the mean score of any individual item ranged between 0 and 3. Keeping in mind the continuum of scale values from 0 to 3, the mean values would be interpreted as follows for different intervals.

Interval	Interpretation
[2.5, 3]	TGE
[1.5, 2.5)	TSE
[0.5, 1.5)	TLE
[0, 0.5)	NAA

3.8.2 Qualitative Analysis

Technique of critical analysis in context of curriculum objectives and its comparison with standard set of objectives (RCDICMDCA) have been utilized. Using the same technique, the investigator investigated aims and objectives stated in the curriculum and grade-wise content-areas of primary mathematics based on the documents and textbooks in both the counties for the realization of objective one of the present study.

3.9 Summary

This chapter has explained in detail the plan and procedure to attain the objectives of the study to compare the mathematics curriculum at primary level in Bangladesh and West Bengal of India. The next two chapters present the details of analysis and interpretation of data.