Chapter-V

ANALYSIS AND INTERPRETATION OF THE DATA

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5.1 Introduction

The present chapter is aimed at analysis and interpretation of the data collected based on the responses of the respondents (mathematics teachers, academic supervisors and experts) and the observations of actual teaching-learning processes of mathematics classrooms at primary level of both the countries. The analysis and interpretation of data gathered from mathematics teachers, academic supervisors, experts (curriculum and subject specialists) and classroom observation are presented under sections 5.2, 5.3, 5.4 and 5.5 subsequently.

5.2 Analysis and Interpretation of Data gathered from Mathematics Teachers

The data were obtained through the questionnaire (vide appendix-B) from 240 teachers, 120 from each country - Bangladesh and West Bengal. The data have been analyzed item-wise and presented according to their frequency of responses in each country. The frequencies again have been converted into percentages for describing the results with a view to arrive at the findings.

5.2.1 Academic/Professional Qualifications and Teaching Experience

Data were sought from the teachers about their academic/professional qualifications and teaching experiences. Their responses are shown in Table-5.1 and Table-5.2

Table - 5.1
Academic/ Professional Qualifications of Teachers

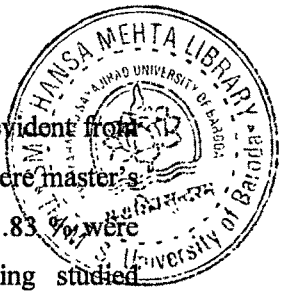
Examination Passed	Class / Division obtained	Bangladesh (N = 120) Math teachers				West Bengal (N = 120) Math teachers			
		n_1	%	n_2	%	n_1	%	n_2	%
Matriculation / S.S.C.	1st	23	19.17	120	100	27	22.5	120	100
	2nd	56	46.67			85	70.83		
	3rd	39	32.50			8	6.67		
	Pass	02	01.67						
	Total	120	100			120	100		
Intermediate / H.S.C. (I.A./I.S.C. / I.Com.)	1st	06	05.00	21	17.50	10	08.33	42	35
	2nd	27	22.50			66	55.00		
	3rd	43	35.83			20	16.67		
						03	02.50		
	Total	76	63.33			99	82.50		
Graduate	1st	01	00.83	04	03.33	07	05.83	19	15.83
	2nd	14	11.67			36	30.00		
	3rd	21	17.50			12	10.00		
	Pass	01	00.83			05	04.17		
	Total	37	30.83			60	50.00		
Post Graduate	1st	-		00	00.00			02	01.67
	2nd	04	03.33			07	05.83		
	3rd	02	01.67			03	02.50		
	Total	06	05.00			10	8.33		
PTI/PTC/C in Ed.	1st	10	08.33	61	50.83	17	14.17	29	24.17
	2nd	39	32.50			22	18.33		
	3rd	15	12.50			-			
	Total	64	53.33			39	32.50		
BT/B.Ed./Dip. in Ed.	1st	-		07	05.83	34	28.33	61	50.83
	2nd	13	10.83			45	37.50		
	3rd	02	01.66			03	02.50		
	Total	15	12.49			82	68.33		
M.Ed./M.A. in Ed.	1st								
	2nd					07	05.83		
	3rd								

N = Total teachers of each country

n_1 = Number of the mathematics teachers based on their academic results (class / division wise) obtained at different levels of their academic qualifications.

n_2 = Number of teachers who have studied mathematics at different levels such as S.S.C./H.S.C./Graduation etc.

All the teachers [from both the countries] are qualified S.S.C. degree holders and studied mathematics. It was found that out of total 120 teachers in the sample, only 63.33 % were H.S.C., 30.83 % were graduate holders and 05.00 % were master's degree holders in Bangladesh. Among them, 17.50 % were H.S.C. and 03.33 % were



graduate teachers having studied mathematics at these levels. It is also evident from the data that only 82.50 % were H.S.C., 50.00 % were graduate and 8.33 % were master's degree holders in West Bengal. Among them, 35.00 % were H.S.C., 15.83 % were graduate and 1.67 % were master's degree holders teachers having studied mathematics at these levels. It also shows that 53.33 % Bangladesh's mathematics teachers were qualified certificate in Education whereas 50.83 % teachers studied mathematics. 32.50 % West Bengal's teachers were qualified certificate in Education(C in Ed). Among them 24.17 % teachers studied mathematics. 68.33 % teachers are qualified as B.Ed. degree holders. Among these, 50.83 % studied mathematics.

Table-5.1 reveals that as per categorization, out of 120 mathematics teachers of Bangladesh schools, only 19.17 % of them have 'first division' in their S.S.C. examination, 05.00 % in H.S.C examination and 0.83 % in graduate and 08.33 % in 'certificate in Education' examination. Out of 120 mathematics teachers of West Bengal schools only 22.50 % of them have 'first division' in their S.S.C. examination, 8.33 % in H.S.C., 5.83 % in graduate examination, 14.17 % in 'certificate in education' and 28.33 % in B.Ed. examination.

On the basis of the academic results (class/division), the analysis shows that West Bengal mathematics teachers' scholastic achievement is higher than that of Bangladesh teachers.

Table - 5.2

Teaching Experience as Mathematics Teachers

Items	Number of the School teachers country wise	
	Bangladesh	West Bengal
Teaching experience (number of years)	%	%
1	06.67	05.83
2	04.17	04.17
3	05.00	02.50
4		
5	00.83	12.50
6	02.50	
7	05.00	02.50
8	04.17	
9	02.50	09.17
10	06.67	01.67
11		02.50
12	02.50	04.17
13	02.50	02.50
14	02.50	00.83
15	14.17	05.00
16	00.83	00.83
17	03.33	
18	04.17	02.50
19	01.67	
20	09.17	05.83
21		04.17
22		02.50
23	02.50	
24	04.17	10.00
25	00.83	03.33
26		
27	02.56	
28	03.33	02.50
29	04.17	02.50
30	01.67	04.17
31		
32	01.67	04.17
33	00.83	02.50
34		00.83
35		
36		
37		00.83

The teaching experience of teachers ranged from less than five years to more than twenty years. All the teachers of both countries were engaged in teaching of mathematics at the primary level (grades-I, II, III, IV and V). It also reveals that Bangladesh's mathematics teachers' teaching experience ranged from 1 to 34 years, and West Bengal's mathematics teachers' teaching experience ranged from 1 to 37.

Also looking to the percentage of teachers and corresponding experience, it is found the teachers with experience from one to three years in Bangladesh are more compared to that of West Bengal. Also teachers with experience of 15 years in Bangladesh are 14.17% while that West Bengal is only 0.5%. Then almost similar

trend of the proportionate number of teachers and the corresponding number of years is found in both the countries except the number of teachers with experience of 20 years.

5.2.2 Participation in Training Programmes at Different Level

The teachers' opinion regarding workshop/training is given in Table-5.3

Table-5.3

Workshop/Training Programmes in Mathematics

Bangladesh						**West Bengal**					
Name of the seminar/workshop	**Level**			**Place**	**Year**	**Name of the seminar / workshop**	**Level**			**Place**	**Year**
	L	**N**	**I**				**L**	**N**	**I**		
Cluster training	1			Baada doma sirajgong	1995	Special orientation programme for primary teacher(SOPT)	2			E-Shan-free primary school, Bogula, Nodia	1997 2002
Cluster training	1			Kazipur	1998	Teaching-learning method	4				1998 2002
Curriculum dissemination Training	1			PTI Tangail	1996	Operation black board		2		Dum Dum	1991
						Mathematics orientation programme	1 1				1995 1998
						Workshop on mathematics	2			Dum Dum / SI Uttar para, Hugli	1995
						Week long orientation programme of primary teachers of Govt. schools.	1			Kolkata	1994
						Math. Lesson plan	1			SI office, kolkata	1990-91
						Workshop on Mathematics	2			David Hare school	1994
						SOPT	2			Town hall, kolkata	1998 2000
						Math training	2			Barakpur	2002

Note: No response 118 (Bangladesh), 98 (West Bengal) **L** = Local, **N** = National, **I** = International

In this respect, only 1.67% teachers from Bangladesh attended the cluster training and curriculum dissemination training on mathematics at local level which was held at Sirajgong and Tangail in 1995, 1998 and 1996 respectively. Only 16.67% teachers from West Bengal attended following training programmes at local/national level on mathematics which were held at different places (vide table-5.3) during 1990-2002. Name of the training programme :(i) Special Orientation Programme for Teachers (SOPT) (ii) Teaching-learning methods on Mathematics.(iii) Mathematics orientation programme(iv) Workshop on mathematics (v) Mathematics lesson plan (vi) Mathematics training (vii)Week-long orientation programme for primary teachers of Government schools. (viii) Operation Black Board.

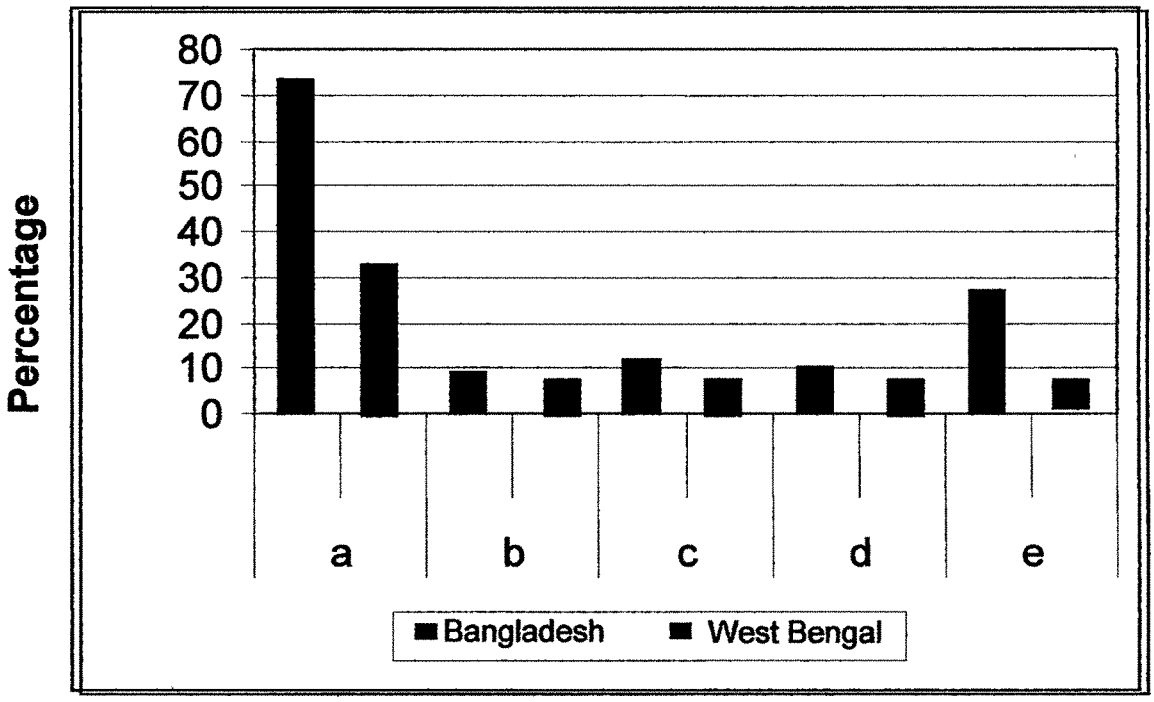
In this regard, it was found that there is no specific workshop/training programme on primary mathematics in Bangladesh whereas the same activities were found to a little extent in West Bengal. In this point of view West Bengal teachers get few opportunities to develop/update knowledge than that of Bangladesh.

5.2.3 In-Service Training Programmes

Most of the teachers (67%) of West Bengal (as per their response to the questionnaire) opined that school authority deputed them for in-service training for their professional growth. 73 % of the teachers of Bangladesh and 33 % teachers of West Bengal who responded to the questionnaire had not been deputed for any in-service training programme. They gave various responses for not being deputed for the in-service training programmes (vide figure-5.1).

Figure-5.1

Constraints for In-service Training



a – Shortage of mathematics teachers in the school and substitution of mathematics teachers is not possible by teachers of other subjects.

b – The place of training is far away from the school.

c – Non payment of T.A. and D.A. in cash during training period.

d – No extra financial benefit for such training.

e – Any other.

Shortage of mathematics teachers in the school and substitution of mathematics teachers by teachers of other subjects not being possible was the reason mentioned by the teachers of both countries as constraints to the organization of in-service training. It is also evident from the same figure that some other barriers (b, c & d) were found in Bangladesh more than in West Bengal for the in-service training.

27 % of teachers of Bangladesh described following constraints (other than a, b, c & d) for not attending in-service training programme (i) There was no training provision for mathematics teaching separately.(ii) No primary school teacher was

exclusively categorized as mathematics teachers only.(iii) School Authority/Government did not take any initiative to send the teachers for in-service training for professional growth.(iv)The teachers attended sub-cluster training programmes on different subjects, including mathematics at different local level schools, once in two months by rotation.

6 % of teachers of West Bengal described following constraints (other than a, b, c & d) for not attending in-service training programme (i)School Authority/Government did not take any initiative to send the teachers for in-service training for professional growth.(ii) No training programme had been organized by the Government for the primary teachers for the teaching of mathematics. (iii)Teachers who had been trained in different subjects are deputed for conducting the seminar/workshop for training of teachers.

From the above data, it is clear that more in-service training facilities were provided to West Bengal teachers than that of Bangladesh teachers. Also, more barriers were found in Bangladesh compared to West Bengal for in-service training programme.

5.2.4 Teaching Aids and Equipments

In the questionnaire teachers were asked regarding their training on 'using of teaching aids and equipments'. 79.17% of the teachers of Bangladesh indicated that they had not taken the training on using of teaching aids and equipments. 58.33 % of the teachers of West Bengal mentioned that they had taken the training on the same. Thus the number of trained teachers in using teaching aids and equipments is more in West Bengal compared to that of Bangladesh.

As far as the specification of training in using teaching aids and equipment is concerned, 20.83 % teachers of Bangladesh (who had taken the training) mentioned the name of the training/course such as -sub-cluster training; curriculum dissemination training; model schools management; P.T.I. Training; B.Ed. Training and Multi ways of Teaching Learning.

41.67 % teachers of West Bengal (who had taken the training) mentioned the name of the training/course such as -training on appropriate use of mathematical models and charts; mathematics orientation programme; training on pocket board using for operation of addition and subtraction; junior basic training and joyful learning.

5.2.5 Training Facilities

The teachers were asked to opine whether training facilities should be extended. As per the response to the questionnaire, 94.17 % of the teachers from Bangladesh and 63.33 % from West Bengal felt that professional training facilities should be extended for various reasons.

The reasons stated by Bangladesh teachers are: for development of quality mathematics teaching, effective and interesting classroom teaching, development of skills in teaching, developing the concept of mathematics by using simple techniques, and the professional development of mathematics teachers with special attention to training for presentation, application and evaluation to increase teaching efficiency.

The reasons stated by West Bengal teachers are: to apply appropriate methods to enhance the quality of mathematics teaching; develop the efficiency and skills of teaching/communication through proper training; impart quality education by trained teachers; train mathematics teachers with the easiest, scientific and latest teaching techniques; and to develop up-dated teaching-learning techniques and avoid traditional system/methodologies.

10 % teachers (West Bengal) did not respond in this questionnaire and 26.67 % teachers (West Bengal) said that training facilities need not be extended and that the existing training facilities were sufficient.

It may be concluded that Bangladesh teachers need more training on mathematics teaching for developing quality and skills with special attention on presentation, application and evaluation to increase teaching efficiency than that of West Bengal teachers.

5.2.6 Mathematics Content and Using of Teaching Aids

The teachers were asked to list out the mathematics topics/subtopics and teaching aids used grade wise. Their responses are presented in table- 5.4(a) to 5.4(e) grade-wise.

Table - 5.4 (a)

Mathematics Topics and Corresponding Teaching Aids for Grade – I

Mathematics topics / subtopics	Specific teaching aids		Percentage of teachers who used teaching aids	
	Bangladesh	West Bengal	Bangladesh	West Bengal
Manipulation of concrete objects and counting number	sticks, seeds, leaves, flowers, flag chart of number; chalk.	-	17	-
Comparison: more-less, tall-short, heavy-light	sticks, stone, abacus, prescribed picture in textbook, pupils.	sticks, seeds, marble, ball, flowers, pencil, chart and prescribed picture in textbook, pupils.	18	29
recognize the number	stick, marble, leaves, pencil, ball, flowers, seeds, chart, glass.	marble, ball, seeds, chalk, duster, plastic number, pocket board, finger, cup, bottle, flower, pupils, candle, pencil, chart.	22	62
Concept of equal-unequal	-	flowers, bottle, cup, chalk, duster, pupils, chart	-	60
Addition – Subtraction	sticks, marble, stone, seeds, key, glass, chart, chalk, duster, black board, pupils.	pocket board, plastic number, chalk, black board, abacus, flowers, leaf, bullet (made by soil), Chart, pupils.	19	61
Concept of zero (0)	-	mango, box, children, plate, cup, basket.	-	50
Place values	-	abacus, sticks	-	33
Coins and Notes	Bangladeshi paisa, taka	Indian paisa, rupees	15	30
Concept of Hour-day-week	Chart of clock, day	Chart of clock, day	4	10

From the above table-5.4(a) it can be revealed that for most of the topics/subtopics of mathematics; corresponding specific teaching aids are used by the teachers from both the countries. These teaching aids used by teachers of both the

countries are very similar. The table also indicates that majority of the teachers from West Bengal use pocket board for explaining the concepts of number, addition, and subtraction, thereby giving a better understanding of these concepts.

It is found that the use of teaching aids were more by the teachers of West Bengal in respective contents when compared to the teachers of Bangladesh.

Table - 5.4 (b)

Mathematics Topics and Corresponding Teaching Aids for Grade – II

Mathematics topics / subtopics	Specific teaching aids		Percentage of teachers who used teaching aids	
	Bangladesh	West Bengal	Bangladesh	West Bengal
Number	abacus, sticks, seeds, stone, marble, chart, pupils	-	13	-
Odd-even number	chart, sticks, pupils	-	14	-
Comparison of number	abacus, seeds, sticks, pupils.	-	17	-
Before, In between, After	-	sticks, seeds, pupils.		10
Addition subtraction	abacus, sticks, marble, leaves, chart	abacus, sticks, match-sticks, finger, wood block, chalk, pocket board	14	55
Measurement (length, weight and liquid)	-	sticks, color chalk pencil, pipe, meter scale, a beam of balance, weight.	-	50
Multiplication and division	sticks, leaves, seeds, chart of multiplication facts	sticks, seeds, leaves, chocolate, cup, chart of multiplication facts.	13	35
Concept of fraction	potato, bread, stick, leaves, seeds.	ball, bread, folding paper	9	25
Coins and notes	Bangladeshi paisa, taka	Indian paisa and currency	3	10
Week-day-month-year-time	Chart of day-month-year	Chart of day-month- year	3	13

From the table-5.4(b), it can be seen that maximum (17%) teachers from Bangladesh used teaching aids like abacus, seeds, sticks and pupils while teaching 'comparison of numbers' to show concrete illustrations of large and small numbers and fewer teachers used the same kind teaching aids while teaching concepts of

numbers and odd-even numbers. On the contrary, maximum (55%) teachers from West Bengal used teaching aids like abacus, sticks, finger, woodblock, chalk and pocket board while teaching addition and subtraction. It also revealed that 10 % teachers from West Bengal used teaching aids like sticks, seeds and pupils for explaining the concepts of before, in between and after.

It is found that the uses of teaching aids were more by the teachers of West Bengal in respective contents when compared to teachers of Bangladesh.

Table-5.4 (c)

Mathematics Topics and Corresponding Teaching Aids for Grade – III

Mathematics topics / subtopics	**Specific teaching aids**		**Percentage of teachers who used teaching aids**	
	Bangladesh	**West Bengal**	**Bangladesh**	**West Bengal**
Number (place value, odd-even, big-small)	sticks, seeds, marble, leaf, abacus	-	8	-
Addition-subtraction	sticks, marble, leaves, chart	sticks, marble, woodblock, chart	19	56
Multiplication-division	Sticks, marble, multiplication facts chart	sticks, multiplication facts chart	8	43
Prime and composite number	-	flower, pupils, sticks, chart	-	41
Factor and Multiples	-	sticks, Charts	-	13
Fractions	sticks, potato, leaves, folding paper, fillet, chart	sticks, bread, flower, leaves, potato, ball, land, chart	21	58
Coins and notes	Bangladeshi paisa, currency	Indian paisa, rupees	13	38
Measurement	fillet, scale, pipe, scale-pan, weight	pipe, scale, weight, chart	14	25
Time/day-month-year	clock, chart of day-month	clock, chart of day-month.	8	10
Geometry	balloon, brick, ball, glass, bangle, ring, wheel, protractor, divider, compass	-	14	-

The above table indicates that only 21% teachers from Bangladesh used teaching aids like sticks, potato, leaves, folding paper, fillet and chart while teaching fractions whereas 58% teachers from West Bengal used teaching aids like sticks, bread, flower, leaves, potato, ball, land and chart for the same.8 % teachers from

Bangladesh used teaching aids like sticks, seeds, marble, leaves and abacus while teaching concepts of numbers (place value, odd-even, big-small). 14% teachers used teaching aids like balloon, bricks, ball, glass, bangle, ring, wheel, protractor, divider and compass while teaching geometry. 41 % teachers from West Bengal used teaching aids like flower, stick and chart while teaching prime and composite numbers. 13 % used aids like sticks and chart while teaching factors and product.

By and large, the use of teaching aids was more by the teachers of West Bengal in respective contents when compared to teachers of Bangladesh.

Table - 5.4 (d)

Mathematics Topics and Corresponding Teaching Aids for Grade-IV

Mathematics topics/subtopics	**Specific teaching aids**		**Percentage of teachers who used teaching aids**	
	Bangladesh	**West Bengal**	**Bangladesh**	**West Bengal**
Number (Place values)	Sticks, chart of place value	sticks, chart of place value	17	13
Addition – subtraction	Stick, marble, chalk	-	19	-
Multiplication – division	sticks, marble, seeds, chart of multiplication facts	chalk, chart of multiplication facts	11	17
Factors, product, LCM, HCF	sticks, marble, stone, seeds	sticks, marble, stone, sticks, flower	13	8
Fractions	bread, marble, folding paper sticks, potato, fillet	bread, scale, pupils, folding paper, sticks, potato marble, chalk chart	23	25
Measurement	scale, scale-pan, pipe, fillet, unit chart	scale, scale-pan, pipe fillet, unit chart	15	29
Mean	-	marble, sticks, chalk	-	25
Time	clock, calendar	-	6	
Geometry thread	protractor, scale, compass, pin, thread, table, ball, book, bricks, chart	books, pencil, cup, chair, table, ball, pipe, globe, glass, kite, balloon chart bulb	10	48

From the above table revealed that maximum 23% teachers from Bangladesh used teaching aids like bread, marble, folding paper, sticks, potato and fillet while teaching fractions. 19% teachers from Bangladesh used teaching aids like stick, marble and chalk while teaching concepts of addition and subtraction. 6 % teachers used aids like clock and calendar for explaining concept of time. On the other hand maximum 48% teachers from West Bengal used teaching aids like books, bricks, pencil, cup, table, ball, pipe, globe, glass, kite, balloon etc. while teaching geometry. 25% teachers from West Bengal (only) used teaching aids like marble, sticks and chalk while teaching 'mean' for better understanding of the learners.

By and large, with respect to specific contents, teachers from Bangladesh made much less use of teaching aids than those of West Bengal.

Table-5.4(e)

Mathematics Topics and Corresponding Teaching Aids for Grade-V

Mathematics topics/subtopics	**Specific teaching aids**		**Percentage of teachers who used teaching aids**	
	Bangladesh	**West Bengal**	**Bangladesh**	**West Bengal**
Mathematical sign and verbal sentence	Chart of +, -, ×, ÷, >, <, =, ≠, ( ), { }, [ ].	-	5	-
Fractions	sticks, scale, folding paper	bread, sticks, potato, folding paper, chart	19	33
Mean	sticks, pupils, seeds	-	7	-
Measurement/area	scale, fillet, weight, pipe, cylinder, mass, chart	scale, unit of chart, land of chart, fillet, weight pipe	10	10
Geometry	table, scale, pencil, bricks, thread, protractor, compass, divider, chart	folding paper, scale, protractor, compass, divider, chart	19	35
Graph	chart	Chart	3	7

Data from the table above indicates that in specific content areas of grade V, teachers of both countries made less/sparing use of teaching aids. Only 5 and 7 % teachers from Bangladesh used teaching aids in the teaching of topics such as

'mathematical sign and verbal statement' and mean. 35% of teachers from West Bengal taught geometry using teaching aids like folding paper, scale, protractor, compass, divider, and chart.

Teaching aids are supposed to make the lesson effective, interesting and facilitate better understanding of the lesson by the students. The tables 5.4(a) to 5.4(e) show that teaching aids are rarely used in mathematics teaching classes by the teachers of Bangladesh while the same have been used more in mathematics teaching classes by the teachers of West Bengal. So, it can be said that West Bengal classroom teaching is more effective, interesting and facilitate than that of Bangladesh classroom teaching.

5.2.7 Strengths and Weaknesses of Primary Mathematics Curriculum and Its Transaction

25 % teachers of Bangladesh and 63 % teachers of West Bengal critically studied the existing mathematics curriculum and they indicated the strengths and weaknesses of this curriculum and its transaction in the following manner:

Strengths of Bangladesh mathematics curriculum as opined by teachers: (i) Appropriate and adequate explanation and illustrations for presenting topic. (ii) Content is in accordance with class wise attainable competencies. (iii) Inclusion of/scope for remedial teaching.(iv) Appropriate teaching-learning activities.(v) Appropriate evaluation system.(vi) Content integration with the socio-cultural aspects. (vii) (viii) Developing clear concept of the topics such as four fundamental operations, fractions, numbers and numerals, unitary method, simplifications, mean, LCM & HCF, measurement, percentage, capital-expenditure, graph and time and their applications to daily life.

Weaknesses of Bangladesh mathematics curriculum as opined by teachers: (i) Complex and complicated word problems related to the four fundamental operations and fractions. (ii) Deficiency of charts for decimal system. (iii) Deficiency of in-service training facilities subject wise. (iv) Difficulty in understanding existing examples of multiplication and division. (v) Inadequate number of teaching aids provided by Government. (vi) Inappropriate definitions and ideas in geometry. (vii) Insufficient concept clarification of topics such as metric system, simple interest and area of triangle for usage in daily life. (viii) Lack of adequate resources such as number of classrooms.(viii) Over crowded classroom in the urban areas.

Strengths of West Bengal mathematics curriculum as opined by teachers: (i) Learner centred teaching-learning.(ii) Chalk and talk policy used minimally in the classroom. (iii) Learning is a joyful experience (Anandamaye learning). (iv) Stimulates the learners' logical thinking.(v) Plays a key role in integrating science with other subjects. (vi) Helpful in the application of mathematics in real life situations.(vii) Helpful for children to develop an understanding from the specific to the general.(viii) Use of low-cost materials for teaching-learning activities. (ix) Content is sequentially arranged class wise which is helpful to the learners for better understanding. (x) Scientific base of existing mathematics curriculum. (xi) Suitable curriculum for primary level pupils.

Weaknesses of West Bengal mathematics curriculum as opined by teachers: (i) Difficult content for grade I and II.(ii) Pupils find difficult to understand and convert the given numerical form into verbal statement and verbal statement to numeric form and solve them vise-versa. (iii) Pupils find difficulty in understanding the language used in mathematics problem solving, given in text. (iv) Lack of interest shown by pupils (as per the teachers' opinion) in learning some topics of mathematics such as unit change, word problems related to age, word problems related to fractions and geometry (cube, sphere, cone and cylinder). (v) No separate class rooms for each class of grades I-IV in most of the schools in rural areas. (vi) Class room highly crowded, especially in the urban areas. (vii) Lack of adequate number of teachers and teaching aids. (vii) Grade-III pupils (as per the teachers' views) face difficulty in understanding the resultant product through factor analysis e.g. Products like these are not understood by pupils. Product through addition

$8 \times 5 = \underbrace{8+8+8+8}+8$; $8 \times 5 = \underbrace{8+8+8}+\underbrace{8+8}$

$= \underbrace{8 \times 4}+\underbrace{8 \times 1}$ $= \underbrace{8 \times 3}+\underbrace{8 \times 2}$

$= 32 + 8$ $= 24 + 16$

$= 40$ $= 40$

a. $9 \times 7 = ?$ By multiplication facts $9 \times 7 = 63$

Here by factor analysis $7 = 2 + 2 + 3$

$9 \times 7 = 9 \times 2 + 9 \times 2 + 9 \times 3$

$= 18 + 18 + 27$

$= 63$

Above analysis focused that teaching techniques, articulation of content and its use in daily life are considered as strength of mathematics curriculum by the teachers of both the countries. The differences were also notable in content integration with the socio-cultural context, use of low-cost materials and developing the base of learners through existing mathematics.

Similar kinds of weaknesses were found in both countries in using resources such as scarcity of teaching aids, narrow classroom. Teachers from both countries were faced similar difficulty in word problems. There are different kinds of problems i.e., inadequate in-service training facilities in Bangladesh and pupils find difficulty in understanding the language used in mathematics problem solving, given in textbooks in West Bengal.

5.2.8 Difficulty Level of Mathematics Topics

Teachers were asked in the questionnaire about the difficulty level of mathematics topics and corresponding remedial teaching measures adopted by them. Their responses are shown in Table-5.5(a) to 5.5(c):

Table - 5.5 (a): Mathematics Topics/Subtopics (Easy)

Grade / Class	Topics / subtopics	
	Bangladesh	**West Bengal**
Grade – I	Manipulation of concrete objects and counting numbers	Comparison: More-less, Long-short, Heavy-Light
	Numbers from one to nine	Acquaintance with number
	Ordering of numbers	Concept of small-big number
	Comparison: more-less, long-short, thick-thin near-far.	Just before, in between and just after
	Cardinal and ordinal number	Concepts of equal-unequal
	Matching same number and same number of objects through one-to-one correspondence.	Concept and application of addition and subtraction
	Bangladeshi coins and notes	Concept of zero (0) and its symbol (sign)
	Tell names of the week	
		Indian coins and notes
		Hour, day and week.
Grade – II	Number from 51 to 100	Counting number
	Place value	Just before, In between, just after
	Odd and Even numbers	
	Comparison of numbers: big-small	Big-small number
	Ordering of numbers	Ascending order and Descending order
	Ordinal numbers	Make addition and subtraction fact
	Addition and Subtraction (carrying and without carrying)	Reading and writing of three digit numbers
	Bangladeshi coins and notes	Indian coins and notes
	Week, day, month, second, minutes and hours	Time
Grade III	Counting, reading and writing number	Reading and writing of five digit numbers
	Place value	Reading and writing of six digit numbers
	Odd-even number	Determine Big-small numbers
	Determine Big-small number	Ascending and Descending numbers
	Ascending and Descending numbers	Product and Division of a number and zero (0)
	Addition and subtraction (carrying and without carrying)	Determine the product and Quotient by the help of Multiplication facts
	Bangladeshi coins and notes	Prime and composite number
	Time	Factors and multiples
	Daily Calendar	Indian coins and notes

		Time
Grade – IV	Numbers (Place value, Big-small, greatest-smallest, roman)	Reading and writing the number up to crore
	Simplification	Place value
	Area	Operation of multiplication and division
	Fractional numbers (equivalent fractions, Simplifying a fractions, Like, unlike fractions)	Common factors and common multiples
	Basic ideas of Decimals	Fraction - Equivalent fraction - Determine big-small number of fractions
	Mathematical sign.	Mean
	Time	
	Graph	
Grade – V	Greatest and Smallest number	Fraction - classification of fraction, four fundamental operation of fraction
	Four fundamental operations(addition, subtraction, multiplication, division)	Concept of Decimals
	Simplification of numerical expressions	percentage
	Mathematical sign and verbal statement	Measurement-Length, Breadth, Perimeter, Area of rectangle
	Mean	Graph
	Basic concept of fraction	
	Time	
	Capital-expenditure, cash-memos	
	Graph	

50 % teachers from Bangladesh and 50% teachers from West Bengal found that the mathematics topics mentioned in table-5.5(a) were easy to understand and assimilate by primary school children.

Table-5.5 (b): Mathematics Topics/Subtopics (Difficult)

Grade / Class	Mathematics topics / subtopics	Corresponding remedial teaching measures adopted by teachers	
		Bangladesh	**West Bengal**
Grade – I	Comparison Big-small	Arranging things in order from the smallest to the biggest and vice versa (1 to 9)	-
	Subtraction	Identifying the weak children and gave personal attention to the weak ones	-Teaching the lesson again and again for easy understanding - Repeated practising by students through pocket board
	Word Problems on Addition and Subtraction	Explaining the problems several times for better understanding of the pupils and then repeated drilling by the pupils	-Giving extra time to each of them individually - Using the bright students to teach the weak students
	Addition and Subtraction table	_	-Giving personal attention and extra time to the learners - Repeated practising by the pupils for making the table
Grade – II	Word Problems on Addition and Subtraction	- Repeated practising by the pupils -Giving personal attention to pupils for solving their problems.	-Framing many questions for giving guidance of the students - Teaching the pupils with the help of pocket board.
	Multiplication facts	-Encouraging children to memorize and recite in order to attain mastery of the basic multiplication facts	-
	Divisions	Repeated drilling	-Using the bright students to teach the weak students - Repeated drilling
	Measurement	-	-Teaching the lesson more than one time - Discussing with the students about measures of length, mass and capacity with the help of standard (meter, gram, litre) and nonstandard units (finger, hand-span, jar, tub)
	Geometrical shapes	-Allowing the students to collect objects like ball, marble, bricks, box, cone of banana, glass etc for realizing common geometrical shapes such as sphere, cuboids, cone and cylinder	-
Grade – III	Word Problems on Addition and Subtraction	-Giving personal attention to the children -Inspiring pupils for practising the problem again and again	-Identified the children who are weak in the respective problems - Teaching them along with other pupils, without making any distraction
	Word Problems on multiplication and division	-Identifying the weak students and giving personal attention to them for developing the skills	-Suggesting that pupils do their rough work calculations on the right hand side of the paper - Teaching the group of weak students separately - Asking parents to provide them extra coaching at home.
	Fraction	-Teaching through concrete and semi-concrete objects -Taking help from bright students for developing the skills of weak students	- Presenting the lesson through concrete and semi-concrete objects - Suggesting the pupils to observe demonstrated lesson - Repeated practising
	Measurement	-Teaching was done more than one time (several times) - Practicing the problems through group work/actively	- Using bright students to teach weak students for solving simple problems on length, mass and capacity involving operations of addition and subtraction - Repeated practising
	Geometry	-Allowing the pupils to collect ball, balloon, cone of banana, pencil, pipe etc for recognizing different kinds of objects and plane figures for getting the ideas of geometry	-

Grade – IV	Word problems on four fundamental operations	- Repeated drilling - Suggesting that pupils work in a group for developing problem solving skills	-Identifying weak students - Teaching the group of such students separately. - Suggesting that pupils practice again and again
	LCM and HCF	Explain the lesson more than one time Practising again and again by the pupils. -Repeating multiples and factors to enable future recalling	-Asking parents to provide the pupils extra coaching at home - Repeated practising
	Fraction	-Teaching through different objects - Revising the lesson again and again - Assessments were taken instantly	-Describing the different kind of fraction through concrete and semi-concrete objects - Teaching the pupils by the help of folding paper, sticks etc
	Problems on Decimals	-Teaching through necessary teaching aids -Giving individual attention to the weak students	-Using the concepts of fractional number - Using the bright students to teach weak students - Repeated drilling.
	Measurement-Area	-Teaching the pupils by using the picture of square, rectangle, triangle etc - Solving the problems involving rectangle and square by the help of students	-
	Four fundamental operations involving measurement	-	-Teaching the pupils through scale a beam of balance and litre vessels - Teaching the group of weak students separately - Giving extra time to weak students individually
Grade – V	Unitary method	-Explaining the lesson again and again - Solving the problems with the help of bright students - Repeated practising	-Personally helped the pupils who were weak solving these problems - Pupils were grouped on the basis of merit - Bright students helped the weak students
	Problem solving related to fraction and decimal	-Teaching the pupils through explanation -Practising again and again by the pupils	-The different kinds of fractions were explained through concrete and semi-concrete objects. - Repeated practicing/drilling
	%age	-Explaining the concept of percentage and relation with fractions - Repeated practising	-Explaining the concept of %age - Asking parents to provide them extra coaching at home - Using the bright students to teach weak students
	Profit-loss simple interest	Repeated drilling	
	Area -Length, breath, perimeteter - Area of rectangle	-	-Giving the help of the students for finding the areas of rectangle - Repeated practising
	Geometry Shapes	-Allowing the pupils to explain different objects like line, triangle, rectangle etc - Giving personal attention to the children to identify the different shapes in geometry.	-Allowing the children to collect stick, scale, ball, bricks, protractor compass, envelope etc. from their surroundings. -The criteria were explained for the selection of objects - Pupils were given help for drawing triangle, rectangle etc - Repeated practising.

Table-5.5(c): Average Difficult Mathematics Topics

Grade / Class	Mathematics topics / subtopics	Corresponding remedial teaching measures adopted by teachers	
		Bangladesh	**West Bengal**
Grade – I	Ordering of numbers (from 1 to 9)	-Arranging the numbers from 1 to 9 in the ascending and descending order of numbers	-Discussing the ordinal numbers corresponding to the positions of objects/persons arranged in order from left to right, right to left, bottom to top, top to bottom, front to back, back to front with respect to a point of reference
	Addition	-The topic was explained through concrete and semi-concrete objects	-Repeated drilling/practicing through pocket board
Grade – II	Place value	-Displaying the place value with the help of abacus for better understanding of the children	-
	Odd-even number	-Allowing the children to collect and handle different groups of objects available in the surroundings for understanding the content on odd-even number	-Teaching the pupils through concrete and semi-concrete objects/persons - Teaching the pupils with the help of pocket board
	Comparison Big-small	-Arranging things/pupils/numerals in order from the smallest and biggest number and vice-versa (51 to 100)	-Using the bright students to teach the weak students - Arranging the numbers in ascending and descending order vice-versa
Grade – III	Multiplication facts (11 to 20)	-Inspiring pupils for memorizing and reciting	-Inspiring pupils for memorizing and reciting
	Fraction	-Teachings were given through concrete and semi-concrete objects	-Allowed the pupils to collect sticks, leaves etc for better understanding
	Factors and multiples	-	Teaching the pupils through question -answer method - Repeated drilling
	Daily calendar	-Teaching the pupils by using calendar	
Grade – IV	Mean	-	-The topic was explained through concrete and semi-concrete objects - Using the bright students to teach weak students - Repeated drilling.
	Graph	-Demonstrating the chart - Then teaching the pupils through chart	-
	Division	-Repeated drilling	-Repeated drilling / practicing.
Grade – V	Mathematical sign	Explaining the lesson through chart of the sign (+, -,× , –, ( ), { }, and [ ]) and asking the pupils about them	
	Simplification	- Repeated drilling / practicing - Individual attention were given to the weak students	- Repeated drilling / practicing - Asking parents to provide them extra coaching at home
	Area	-	- Teaching the pupils by using rectangle and square - Using bright student to teach weak students - Repeated drilling
	Graph	- Teaching the pupils by using chart	

It was found from opinion of teachers from Bangladesh (53%) and teachers of West Bengal (42%) that mathematics topics mentioned in table no 5.5(b) were difficult to understand by primary school children. It was observed by teachers from Bangladesh (29%) and teachers from West Bengal (24%) that the mathematics topics mentioned in table no 5.5(c) were at an average difficulty level. For over coming difficulties, the remedial teaching measures adopted by primary school teachers of both the countries have also been highlighted in the above mentioned table.

It was found that 'word problems' were common difficult topics across the grades I to V of both the countries. To overcome this learning difficulty in both countries corresponding remedial teaching of similar kind such as repeated drilling, teaching weak pupils separately were adopted by teachers Bangladesh and West Bengal. In addition to this, for the removal of the learning difficulties, different remedial teaching measures adopted by teachers of Bangladesh were such as explanation of problems, teaching through teaching aids and group work whereas West Bengal teachers used extra time to teach the pupils individually, pocket board and sometimes they took the help of the bright pupils to teach weak pupils.

5.2.9 Mathematics Teaching Periods

The following table is highlighted mathematics periods taken by the teachers per week.

Table-5.6
Mathematics Periods in a Week

Math. Period frequency per week ▶	6		12		18		24		30		36	
Teachers ▶ / Grade ▼	BD	WB	BD	WB	BD	WB	BD	WB	BD	WB	BD	WB
I	10	15										
II	12	28										
III	10	11										
IV	12	8										
V	15	5										
I & II				7								
I & III			6									
I & IV			11									
I & V			11									
II & III			3									
II & IV			6	12								
II & V			6									
III & IV				7								
IV & V			4	7	3							
I, III & V											4	
I, IV & V					3							
II, III & IV						3					2	
III, IV & V				1	2							
I, II, III & IV				2		2						
I, II, III, IV & V				12								

BD- Number of teachers in Bangladesh, WB- Number of teachers in West Bengal

In response to the above item, it is apparent from table-5.6 that on a weekly basis 59 teachers of Bangladesh engage a minimum of 6 periods and 6 teachers engage a maximum of 36 periods (in class I to V). On the other hand, 67 teachers of West Bengal engage a minimum of 6 periods per week and 5 teachers engage a maximum of 18 periods per week (in grades I to V). It is also revealed from the above table that almost all the teachers of both countries (47 teachers of Bangladesh, 48 teachers of West Bengal) engage 12 periods in a week.

Above analysis revealed that teachers from Bangladesh and West Bengal have faced almost very similar mathematics teaching load in a week.

5.2.10 Duration of Mathematics Period

Teachers were asked to indicate the duration of a single period. Their response is shown in Table-5.7

Table-5.7
Duration of a Mathematics Period in Grade I-V

Response of Teachers		Duration of class period (in minutes)
Bangladesh Teachers %	West Bengal Teachers %	
9.16	3.33	30
47.60	10.83	35
21.67	57.50	40
8.33	23.33	45
13.33	3.33	50
	1.67	60

Most of the teachers i.e. 47.50 % teachers from Bangladesh and 57.50 % teachers from West Bengal indicated that the duration of a single class for grade (I-V) for teaching mathematics was 35 minutes and 40 minutes respectively.

This data revealed that West Bengal teachers spare time in classroom slightly more than that of Bangladesh.

5.2.11 Total Allotted Time/Periods for Teaching Mathematics

43 % teachers from Bangladesh and 47% teachers from West Bengal opined that the allotted periods were not enough for teaching of mathematics. They suggested additional period (here period means duration of one class 35 minutes, 40 minutes ....etc.) for grade-wise mathematics teaching which as shown in table-5.8(in %).

Table-5.8

Additional Required Periods/Time for Grade Wise Mathematics Teaching

Percentage of teachers' responses about duration of additional required periods/time for grade wise Math teaching												
Grade ↓	35 minutes		40 minutes		45 minutes		50 minutes		60 minutes		75 minutes	
	BD	WB	BD	WB	BD	WB	BD	WB	BD	WB	BD	WB
I	0.83				4.17	1.67		4.17	1.67			0.83
II	0.83				4.17	1.67		5.83	1.67			0.83
III	0.83				6.67	2.50	3.33	5.00	1.67			0.83
IV	0.83				5.83	2.50	4.17	5.83	3.33			0.83
V					3.33	1.67	0.83	1.67	4.17			0.83
Total					**24.17**	**10.00**	**11.66**	**22.5**	**12.51**			**4.15**

BD - Bangladesh, WB - West Bengal

The tabulated data show that the mathematics teachers, (24.17% and 22.50%) from both countries i.e. Bangladesh and West Bengal respectively, opined that allotted duration for mathematics period should be 45 minutes and 50 minutes respectively for all grades.

It is clear from the opinion of teachers (Bangladesh and West Bengal) that existing allotted time was not sufficient for effective teaching-learning in classroom situations.

5.2.12 Duties Other than Mathematics Teaching

Teachers were asked about their involvement in duties other than mathematics teaching. Cent per cent teachers of Bangladesh and West Bengal responded that they were also involved in duties other than mathematics teaching. Their responses were as follows (in percent):

Table-5.9

Duties other than Mathematics Teaching

Duties	Teachers Response	
	Bangladesh	West Bengal
Correction of note books	100	100
Preparing tools for teaching	58.33	97.17
Fun fair		2.50
Study tour	4.17	16.67
Picnic	35.83	54.17
Educational Exhibition	34.17	66.67
Other	36.67	23.33

All teachers of both countries indicated that they were involved in correction of students' note books. Other duties of teachers included preparing tools for teaching, fun fair, study tour, picnic and educational exhibition (table-5.9).

In addition to the above duties, 36.67 % teachers of Bangladesh responded that they were responsible for the following duties also: (i)Remedial teaching for weak students (ii) Class room cleaning (iii) Official work (iv) Involvement in cub junior scout (v) Annual sports (vi) Milad-Mahafil (vii) Cultural programme (viii) Gardening (ix) Acting/dramatic/stage-play (x) Teaching other subjects such as Bengali, English, Social Science, Science etc. (xi) Recreational class such as Music, dance, poem, recitation, drama etc.

23.33 % teachers of West Bengal responded that they were responsible for the following duties also:(i) Teaching other subject such as Bengali, English, Geography (ii) Social work (iii) Recreational class such as: Music, poem, recitation, drama, dance etc. (iv) Games (v) Preparation for three times evaluation in a year.

The findings indicate that teachers from both the countries were not only involved in mathematics teaching also involve in teaching other subjects. In addition, they involved in some other academic activities and different type of co-curricular activities. It seems that there are similar workloads for teachers of both the countries.

5.2.13 Mode of Instruction

The teachers were asked to indicate the various modes of instruction they adopted to teach mathematics. Their response is shown in table-5.10 (in percentage).

Table-5.10
Mode of Instruction

	Mode of Instruction used by the Teachers																													
	Generally														Sometimes / Occasionally														NA A	
	Bangladesh(BD)							West Bengal							Bangladesh(BD)							West Bengal(WB)							BD	WB
Methods ▶	**L**	**Di**	**De**	**A**	**Tt**	**Ps**	**Q_A**	**L**	**Di**	**De**	**A**	**Tt**	**Ps**	**Q_A**	**L**	**Di**	**De**	**A**	**Tt**	**Ps**	**Q_A**	**L**	**Di**	**De**	**A**	**Tt**	**Ps**	**Q_A**		
Math Topics ▼																														
Number	12				10		56	4	3					65					19							25				
Four fundamental operations						61	32			3			48	40				17				7				12				
Coins and notes			40				48			25				50																
Time	3		13		18		61							65		5							30				3			
Fraction			10			30	45		25	5			25						10							15		25		
Measurement						33	20						39	39				10	30							17				
Geometry			20				60					30		65		10														
Simplification						70					20		70					20		5					10					
Factor, Product, LCM, HCF		15	15			49						15	40								17							20		
Mathematical sign							70										20													
Unitary Method						71							90					21										10		
Mean						50	25					31	50						20						13					
%age						70	10						79					14							20					
Capital-expenditure, cash-memo		40	30															10												
Graph		50							50					10					30						20					

L = Lecture, Di = Discussion, De = Demonstration A = Assignment, Tt = Team teaching, Ps = Problem Solving, Q_A = Question - answer

The most widely used mode of instruction as indicated by the responses from both countries (table-5.10) to the questionnaire were the 'problem solving' mode and 'Question- answer' mode. Whereas maximum 71% and 70% teachers from Bangladesh and 90% and 79% teachers from West Bengal used the 'problem solving' method and 'Question-answer' method as a mode of instruction while teaching 'Unitary method' and 'percentage' topics respectively.

However, 50% teachers from both countries used 'discussion method' – as a mode of instruction generally while teaching 'graph'. Less number of teachers from both countries gave 'assignments' and used 'team teaching' occasionally. However, 20% teachers from Bangladesh used demonstration method as a mode of instruction occasionally while teaching 'mathematical signs'. 30% and 25% teachers from West Bengal used 'discussion method'- as a mode of instruction occasionally while teaching 'time' and 'fraction' respectively.

Appropriate instructional strategies are expected to be adopted in the classroom which would lead to appropriate transaction of curriculum among the learners. Results have shown that the teachers (Bangladesh and West Bengal) find the 'problem-solving' method and 'question-answer' method as the most appropriate for transaction of curriculum in the classroom. In this regard, West Bengal teachers used 'problem-solving' and 'question-answer' method more than that of Bangladesh.

5.2.14 Problems/Obstacles in Mathematics Teaching

Data were sought from the teachers about the problems/obstacles in mathematics teaching faced by them. Their responses are shown in Table-5.11

Table-5.11
Problems/obstacles in Mathematics Teaching

Problem / Obstacle	Teacher' responses in %	
	Bangladesh	West Bengal
Insufficient time for covering the syllabus	33.33	30.00
Mathematical models	70.83	56.67
Mathematical games suitable for primary children	60.83	60.00
Instructional materials	66.67	55.83
Mathematical exhibition	39.17	54.17
Quiz programme	37.50	33.33
Educational field trips activities	39.70	16.67
Study tour	30.83	20.00
Mathematical magazine	55.83	14.17
Magic square	27.50	22.50
Class room overcrowded	48.33	46.67
Students do not understand teachers language	-	-
Teachers don't follow children's language	-	-
Class room are mostly large and noisy	-	-
Heterogeneous socio-cultural back-ground and individual difference	18.33	13.33

The results show that majority of teachers of both countries were of the opinion that shortage of non human resources such as mathematical models, mathematical games and instructional materials were the major problems/obstacles in mathematics teaching. It was also revealed that majority of the teachers in Bangladesh faced more problems in mathematics teaching than the teachers of West Bengal.

Teachers of both countries were silent on the communication problems with children. However, the heterogeneous socio-cultural background and individual differences presented problems to a little extent only as per the interpretation based on their responses (table-5.11)

For solving above mentioned problems, 45% teachers of Bangladesh and 40% teachers from West Bengal discussed the obstacle/problems in teaching mathematics with

colleagues/head teacher/academic supervisor/resource teachers. 17.50% teachers from Bangladesh did not respond in this respect.

The suggestions received by these teachers of Bangladesh as a result of the discussion with others were as follows: (i) Identify the weak students (in mathematics) and help them by appropriate remedial teaching. (ii) For the respective content, teach from concrete to abstract with the help of appropriate teaching aids. (iii) Use blackboard to a great extent and practice orally.(iv) Increase the attendance of the students and motivate them for mathematics by giving reinforcement periodically. (v) Follow the teacher's edition, teacher's manual and apply them in teaching mathematics. (vi) Present the concepts of mathematics to the pupils sequentially; first with the help of concrete objects, then semi-concrete objects and then abstract concepts at the end.

The suggestions received by these teachers of West Bengal a result of the discussion with others were as follows: (i) Adequate preparation of the lesson before teaching in the class room. (ii) Capture the attention of students by introducing play aspects in mathematics and the use of teaching aids. (iii) Give appropriate remedial teaching to the weak students in mathematics. (iv) Take extra periods in mathematics. (v) Give individual attention to the students to solve particular problems which they do not understand. (vi) Discuss with other mathematics teachers the problems (you) faced in teaching mathematics. (vii) Use attractive, concrete and semi-concrete objects as teaching aids with adequate pre-preparation and proper lesson plan.

5.2.15 Teachers Manual

The teachers were asked about teachers' manual, needs of manual, availability of information and further what information should be added in teachers manual. Their responses are as follows: Majority teachers' of Bangladesh (91%) and of West Bengal (71%) had teachers' manual on teaching mathematics. 9% teachers' of Bangladesh and 29% teachers of West Bengal said that they did not have teachers' manual.

92% teachers of Bangladesh felt that teachers' manual is necessary to teach mathematics effectively. On the other hand, 71% teachers of West Bengal opined that teachers' manual is not necessary to teach mathematics effectively.

60% teachers from Bangladesh responded that the following information given in teacher's manual is of great importance: (i) Explanation of the technique for using different objects (concrete, semi-concrete and abstract) in teaching mathematics. (ii) Use of specific teaching aids for certain content for better understanding of the pupils. (iii) Guide for completing syllabi in the scheduled time. (iv) Explanation for competency based teaching and continuous evaluation.(v) Explanation on the different competencies in mathematics teaching that need to be known by teachers. (vi) Explanation on different aspects of teaching such as preparation, presentation, application and remedial teaching for effective teaching.

53% teachers from West Bengal responded that the following information given in teacher's manual is of great importance: (i) Explanation on joyful (anandamoy) learning. (ii) Explanation for developing and using teaching aids and lesson plan in mathematics teaching. (iii) Explanation on the technique of evaluation system. (iv) Suggestions on ways and means to avoid chalk and talk policy in the class room. (v) Explanation on the question – answer method for learners' better understanding.

On the contrary, 17 % teachers from Bangladesh opined that some more information is needed in the teachers' manual. They offered suggestions as follows: (i) Preparatory discussions for lessons should be included. (ii) Difficult problems of mathematics should be discussed in detail and related to socio-cultural context. (iii) Content-based colored pictures and life-oriented examples should be included to a greater extent. (iv) Sample lesson-plans should be included which can be followed by teachers and used in teaching.(v) Definitions in geometry should be explained in a simple way.(vi) Rhyme, poem, song, short drama should be included on the basis of contents.

25% teachers from West Bengal opined that some more information is needed in the teachers' manual. They offered suggestions as follows: (i) Easy operations/rules/formulae should be included in mathematics specially for subtraction and division. (ii) Method of teaching should be discussed in greater detail.(iii) More discussion is required for appropriate teaching aids.(iv) Easy methods for learning complex subtraction problems in grade II should be introduced. (v) Explanation for fractions should be further simplified.

From these views related to the teachers' manual it is obvious that a large number of teachers from Bangladesh are having teachers' manual, are in favour of using the same and only a few of them suggested modification in existing teachers' manual. On other side a good number of teachers from West Bengal are having teachers' manual, are not in favour of using the same and a considerable number of teachers suggested modification in existing teachers' manual. This indicates that existing teachers, manual of Bangladesh is inclusive of sufficient information to teach mathematics effectively than that of West Bengal manual.

5.2.16 Annual Plan

91% teachers from Bangladesh and 87% teachers from West Bengal reported that they prepare an annual plan for teaching of mathematics at the primary level.

A large percentage of teachers from Bangladesh and West Bengal (77% from the 91% who responded; 67% from the 87% who responded) indicated that they prepared annual plans which was written formally as well as non written. 7% teachers from Bangladesh and 17 % teachers from West Bengal (7% from the 87% who responded) mentioned that they prepared annual written plans. The rest prepared annual plans, but not written formally.

It seems that teachers of both countries prepared similar type annual plan for teaching of mathematics.

5.2.17 Use of Lesson Plan

95% teachers from Bangladesh and 85% teachers from West Bengal reported that they prepared lesson plans for teaching mathematics. Frequency of use mentioned by them is represented in table-5.12.

Table-5.12
Use of Lesson Plan

Various response for the use of lesson plan	Teachers' response	
	Bangladesh (%)	West Bengal (%)
Daily	54	72
Occasionally / Sometimes	41	13
Less time	-	5

A large percentage of teachers from Bangladesh and West Bengal (54% from the 95% who responded; 72% from the 85% who responded) mentioned that they used lesson plan daily. 41% teachers from Bangladesh and 13% teachers from West Bengal use lesson plans occasionally. 5% teachers from Bangladesh responded that they did not prepare lesson plans without asked for any explanation for not doing so. 10% teachers from West Bengal responded that they did not prepare lesson plans. Among these (teachers not using lesson plan in West Bengal), 5% teachers did not prepare lesson plans because of time constraint. 6% teachers from West Bengal opined that they did not prepare lesson plan as they could not follow a fixed teaching schedule due to shortage of teachers.

5.2.18 Illustrative Examples

Teachers were asked about the need for introducing illustrative examples for explaining mathematics content and whether they reflect cultural aspects of the society. Almost all the teachers from Bangladesh (75%) and West Bengal (79%) believed that illustrative examples that reflect cultural aspects of the society are needed very much for explaining mathematical content.

The reason of such belief as mentioned by Bangladesh teachers were due to its impact on: (i) seeking and sustaining attention of students for understanding of complex/ abstract content.(ii) inducing interest in learning among pupils. (iii) developing the logical and creative thinking of the pupils. (iv) easier and effective explanation of the contents such as area, measure, profit-loss, cash-memo, graph and ideas of geometry.

The reason of such belief as mentioned by West Bengal teachers were due to its impact on: (i) seeking and sustaining attentions of pupils for the understanding of

complex content. (ii) making problem solving easier and simpler.(iii) Inducing interest in learning among pupils. (iv) creating conducive classroom environment. (v) better understanding of topics such as: heavy-light, small-big, tall-short, mean and fractions at grades -I to V level.

From the above data, similar findings were found that illustrative examples need to a great extent for explaining mathematics content that reflect cultural aspects of the society. Also, the difference was found in teaching topics for which they are needed. Bangladesh teachers highlighted the needs of illustrative examples for explaining topics such as area, measure, profit-loss, cash-memos, graph and geometry. In contrast, West Bengal teachers highlighted the needs of illustrative examples for explaining topics such as heavy-light, small-big, tall-short, mean and fraction.

5.2.19 Content Areas and Socio-Cultural Aspects

Teachers were asked whether socio-cultural aspects of the learners' society are reflected in the content areas of primary mathematics curriculum in grade I-V. Further, the teachers were requested to give their suggestions in this regard for any modifications required in the curriculum in this context.

32% teachers from Bangladesh and 33% teachers from West Bengal responded that the following content (topics-subtopics), grade wise, reflected the socio-cultural aspects of the learners' society. 65% teachers from Bangladesh and 67% teachers from West Bengal did not respond regarding in this context.

The details of *content-areas which reflect socio-cultural aspects of the society, as opined by the teachers of Bangladesh (grade wise)* are given below:

Grade-I: Concept of number, manipulation of concrete objects (in day to day life) help the children to get ideas of counting numbers, concept of big-small, ordinal numbers, comparison, addition and subtraction, concepts of day, week and month and coins.

Grade-II: Odd-even numbers, four fundamental operations, concept of coins, big-small.

Grade-III: Concept of big-small, four Fundamental operations, concept of currency, measure, time, geometry and problem solving.

Grade-IV: Four fundamental operations, measurement, time, concept of coins, concept of geometry shapes, and problem solving.

Grade-V: Four fundamental operations, measurement, capital-expenditure, cash-memos, time, concept of coins, concepts of geometric ideas, graph and problem solving.

From the above responses, it is clear that the *socio-cultural aspects are reflected in the mathematics content areas* in the following way: For Grade I-III through the concept of big-small. For Grades I-V through the concepts of coins and four fundamental operations, for Grade III-V through the concept of measures, time, concepts of geometry and problem solving.

The details of *content-areas which reflect socio-cultural aspects of the society, as opined by the teachers of West Bengal (grade wise)* are given below:

Grade-I: Numbers, counting numbers through rhyme, more-less, big-small, thick-thin, tall-short, just before, middle, just after, problems related to addition and subtraction. Concepts of coins, time (hour, day, week).

Grade-II: Concept of just before, middle, just after; measures, concept of coins; big-small, time, week, month, year; problems related to addition and subtraction.

Grade-III: Problem solving, fractions, concept of coins, measure (s), day, month, year and time.

Grade-IV: Problem solving, average, measurement, fractions unit, time, day, week, month, year, basic concepts of geometry.

Grade-V: Fractions and decimals, unitary method, percentage, areas, basic geometry (line, point, angle, triangle, quadrilateral and circle).

From the above responses, it is clear that the *socio-cultural aspects are reflected in the mathematics content areas* in the following way: For grades I-III through the concept of numbers, and concept of currencies. For Grades I-IV through four fundamental operations. For Grades II-V through measurement and fractions. For Grade – V through unitary method, percentage and geometry.

17 % teachers from both countries suggested that new content (s) for covering socio-cultural aspects of the learners' society be incorporated in the following manner:

Bangladesh

(i) Counting number through rhyme for grade-I. (ii) Rhyme, song, poem and colour picture may be incorporated in four fundamental operations for grade (I-V).(iii) Rhyme, music may be included for standard-I and II level teaching of math.

West Bengal

(i) Learning number through games for grade-I. (ii) Use of calculator may be incorporated. (ii) More language related mathematical problem may be incorporated, and Life oriented contents may be included like concept of coins and time in Grade I to V.

5.2.20 Appropriateness of Objectives, Competencies and Content

In this respect one teacher from West Bengal indicated subtraction as an inappropriate content. Rest of the teachers from West Bengal and all teachers from Bangladesh did not give any opinion in this regard.

This finding indicates that teachers of both countries are unable to opine in this aspects. The investigator thought that teachers of both countries are not aware regarding objectives. It is also notable that mathematics curriculum of Bangladesh is competencies based but West Bengal mathematics curriculum is not competencies based, it is conducted on experimental basis [details see in section 1.5.1]. Since teachers did not give any opinion in this aspect, so it can be said that objectives, competencies and content are appropriate.

5.2.21 Suggestions for Effective Implementation of the Mathematics Curriculum

Teachers were asked to give suggestions for more effective implementation of the mathematics curriculum. 83% of teachers from Bangladesh and 85% of teachers from West Bengal responded to this item as follows. Remaining 17% from Bangladesh and 15% from West Bengal did not respond in this regard.

Bangladesh

52% of teachers gave suggestions in context of **training aspect** of teachers related to (i) professional development. (ii) extension of the training facility.

40% of teachers gave suggestions in context of **textbook content** related to (i) reducing topics at particular level. (ii) reducing word problems in standard I and II. (iii) addition of more examples in respective topic.

70% of teachers gave suggestions in context of teaching with focus on: (i) application of easy technique; effective lesson plans with provision of teaching aids and teachers' manual. (ii) presentation of lesson from concrete to abstract. (iii) mathematics teaching periods to conduct by teachers who have studied in science group with mathematics. (iv) workshop on mathematics. .

29% of teachers gave suggestions in context of monitoring of teaching learning activities through supervision of actual classroom situations.

53% of teachers gave suggestions in context of recruitment of mathematics teachers who have studied mathematics.

West Bengal

30% of teachers gave suggestions in context o training aspect of teachers related to professional skill development on teaching mathematics for grades III-V.

60% of teachers gave suggestions in context of textbook content related to (i) inclusion of multiplication facts up to 25. (ii) simplification of topics for grade-I.(iii) selected of four fundamental operations, fraction and word problems from real life situations.

57% of teachers gave suggestions in context of teaching with focus on (i) appropriate method and technique for developing interest of the learners with provision of teaching aids, mathematics exhibition, fun, puzzle, story and games. (ii) sound background of mathematics teachers.

25% of teachers gave suggestions context of monitoring of teaching – learning activities through supervision of actual classroom situations.

52% of teachers gave suggestions in context of time related to extend teaching period.

17% of teachers gave suggestions that mathematics curriculum should be compared with that of other countries for examining its up-to-dateness.

40% of teachers gave suggestions in context of evaluation related to do regular and continuous basis.

Above suggestions are represented in a nutshell through following table:

Suggestions in different aspects	**Percentage of responses given by**	
	Bangladesh Teachers	**West Bengal Teachers**
Training	52	30
Textbook content	40	60
Teaching	70	57
Monitoring	29	25
Recruitment	53	-
Time	-	52
Evaluation	-	40

From above table, it is clearly visible that teachers of Bangladesh have given more suggestions in context of training and teaching compared to that of West Bengal teachers suggestions. As far as monitoring aspect is concerned, almost similar suggestions are given by teachers of both countries. Suggestions related to content are more focus by West Bengal teachers compared to that of Bangladesh teachers. However, suggestions regarding recruitment aspect highlighted by Bangladesh teachers only while West Bengal teachers highlighted suggestions related to time and evaluation aspects.

These facts leads to the interpretation that training of teachers and their teaching are very important aspect looking to the need for the same in absence of some such programmes which was mentioned by the these teachers of Bangladesh in their previous response (Refer 5.2.2, 5.2.3 and 5.2.4). It seems that for effective teaching, proper training should provide to the teachers of Bangladesh compared to that of West Bengal teachers.

It is also clear that text book content have to be modified of West Bengal Board of Primary Education compared to that of Bangladesh National Curriculum and Textbook Board. Also, it seems that Bangladesh teacher are well aware regarding recruitment aspect while West Bengal teachers are aware regarding time, evaluation system and up-to-date curriculum.

5.3 Analysis and Interpretation of Data Gathered from Academic Supervisors

This analysis refers to the academic/professional qualifications; participation in seminar/workshop; acquaintance with curriculum report; problems/obstacles in classroom teaching; management of time and resources; use of instructional materials; in service training; socio-cultural aspects and its integration with curriculum; Suitability of objectives; content, competencies; strength and weakness of primary mathematics curriculum.

The data were obtained through the questionnaire (vide appendix-C) from 120 Academic-Supervisors, 60 from each country (Bangladesh and West Bengal of India). The data were analyzed item-wise in context of responses of respondents and then was converted into percentage.

5.3.1 Educational Qualifications

Data were sought from the academic supervisors about the academic/professional qualifications. Their responses are shown in the table-5.13

Table-5.13

Academic/Professional Qualifications

Item	Percentage of academic Supervisors at different levels			
	Bangladesh (%)		West Bengal (%)	
	With mathematics	Without mathematics	With mathematics	Without mathematics
S.S.C.	98	2	97	3
H.S.C.	22	78	25	75
Graduation Degree	10	90	22	78
Post graduate	18	45	22	53
PTI/C in Ed.	57	20	53	-
B.Ed/Dip.in Ed.	40	30	70	30
M.Ed.	2	33	10	40
Ph.D.	-	-	-	8

All academic supervisors from both countries (Bangladesh and West Bengal) were graduates degree holders. 63 %(18% + 45%) academic supervisors from Bangladesh were post-graduate and 75% academic supervisors from West Bengal

were post-graduate. A few Academic supervisors studied mathematics both at graduates and post-graduates level (vide table-5.13).

It is revealed that 57% of academic supervisors from Bangladesh studied mathematics at C in Ed. level. 53% and 70% of academic supervisors from West Bengal studied mathematics at C. in Ed. and B.Ed. level. From the facts presented in the table, it could be concluded that West Bengal academic supervisors are more experience in terms of the professional training (C. in Ed. and B.Ed.) and having mathematics as one of the subjects studied as compared to that of Bangladesh academic supervisors.

5.3.2 Course/Workshop Concerning Curriculum Development and Syllabus

41% of academic supervisor from Bangladesh and 75% academic supervisors from West Bengal opined that they participated in various courses/workshops concerning curriculum/development and syllabus.

Academic supervisor from Bangladesh mentioned the name of the course, duration of course and name of the organizing authority as follows:

Name of the Course	**Duration of the Course**	**Name of the organizing authority**
(i) Teacher assessment test	One month	Bangladesh National Curriculum and Textbook Board (BNCTB)
(ii) Acquaintance with curriculum and syllabus	One week	BNCTB
(iii) Curriculum dissemination training	One week	National Academy for Primary Education (NAPE)
(iv) Efficiency and refresher training course	Five days	Directorate of Primary Education (DPE)
(v) Sub-cluster training course	Five days	DPE

Academic supervisor from West Bengal mentioned the name of the course, duration of course and name of the organizing authority as follows:

Name of the Course	**Duration of the Course**	**Name of the organizing authority**
Training on teaching mathematics	2 to 7 days	West Bengal Board of Primary Education(WBBPE)
Refresher course on mathematics	2 days	District Primary School Sansad (DPSS) (North-24 pargonas)
Mathematics Orientation Programme	3 days	DPSS (South-24 pargonas)
Joyful Learning on Mathematics	5 days	DPSS (Hugli)
Mathematics Orientation Programme	5 days	NCERT
Refresher Course on Mathematics	2 days	DPSS (Nadia)
Workshop on Natural Science and Science Education	15 days	DPSS (Howrah)
Workshop on Natural Science and Science Education	15 days	WBBPE
Education For All	2 days	DPSS (Hugli)
Workshop on Mathematics	7 days	Kolkata

The participation of academic supervisors of West Bengal in workshop/courses is more compared to that of academic supervisors in Bangladesh. Also, it is found that the number of workshop/courses and the variety of topics in these workshop/courses are encompassing very relevant sub areas during these programmes. As a result of this academic supervisors of west Bengal are expected enriched with content and methodology of teaching mathematics at primary level compared to that of Bangladesh academic supervisors.

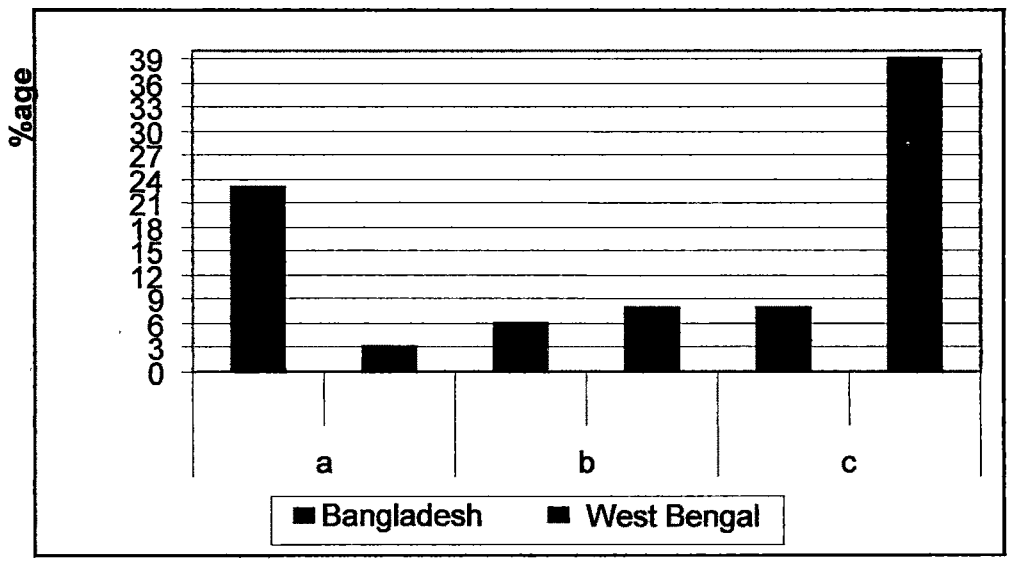
5.3.3 Acquaintance with Curriculum Report

The academic supervisors were asked whether they had gone through the latest curriculum report. 37% academic supervisors from Bangladesh and 50% academic supervisors from West Bengal opined that they had studied the latest curriculum report. Remaining 63% academic supervisors from Bangladesh and 50%

academic supervisors from West Bengal did not go through the latest curriculum report. Their response is shown in figure-5.2.

Figure-5.2

Studied Curriculum



a = partially, b = only math portion, c = totally

It is revealed from figure-5.2 that 23% of academic supervisors from Bangladesh studied curriculum report partially. 6% of academic supervisors from Bangladesh studied only mathematics portion.

On the contrary, 39% of academic supervisors from West Bengal studied complete curriculum report. 8 % academic supervisors from West Bengal studied only mathematics portion whereas most of the academic supervisors (63%) of Bangladesh and academic supervisors (53%) of West Bengal did not study the latest curriculum report at all.

Looking to the responses of academic supervisors from both countries (Bangladesh (37%) and West Bengal (50%)), it seems that West Bengal academic supervisors are more conscious regarding the knowledge of latest curriculum reports while most of academic supervisors from Bangladesh are least bothered regarding updating their knowledge of latest curriculum report at primary level.

5.3.4 Problems in Classroom

All academic supervisors of both the countries (Bangladesh and West Bengal) observed mathematics teaching in the classroom. Further, they were asked about problems faced either by teachers or students while the teachers taught mathematics. The data obtained in this regard are as follows in table 5.14 and 5.15.

Table-5.14
Teacher Related Problems

Item	Responses of academic supervisors %	
	Bangladesh	West Bengal
Highly populated class rooms	88	73
Language and communication problems of teachers	45	33
Teaching from textbook only	78	45
Inattentive students	88	43
Teaching only by lecture method	45	53
Teacher does not encourage the students to ask questions	73	43

The above table reveals that in the opinion of academic supervisors of Bangladesh, highly populated classrooms, inattentive students, teacher not encouraging students and teaching from textbook only are the most common problem in classes, whereas in the opinion of academic supervisors of West Bengal, only highly populated classrooms is the most crucial problem.

Table-5.15
Student Related Problem

Item	Responses of academic supervisors %	
	Bangladesh	West Bengal
Heterogeneity of the group	50	40
Authoritarian behaviour of the teachers	48	47
Bias of the teachers	6	30
Lack of student-teacher rapport	63	47
Inappropriate seating arrangement	73	60
Demotivating students either by punishment or negative reinforcement	48	30

Result shows that (from table-5.15), in the academic supervisors' opinion, inappropriate seating arrangement is a major (common) problem in both countries

(Bangladesh and West Bengal) during the teaching of mathematics in classroom. 63 % of academic supervisors from Bangladesh and 47% of academic supervisors from West Bengal found a lack of student-teacher rapport. The responses related bias of the teachers (6% from Bangladesh and 30% from West Bengal) reveals that only few teachers of West Bengal are influenced by it whereas in Bangladesh its proportion in negligible.

From table-5.15 it is clear that student related problems are found more in Bangladesh classrooms during the teaching of mathematics than that in West Bengal. But this variation is not much. Hardly this difference varies from 1% to 13%.

In addition to the above stated problems, problems related to students and teachers listed out by the academic supervisors of Bangladesh are: teachers' and students' lack of interest in mathematics; absence of special care/individual attention of the weak students; shortage of trained mathematics teachers; irregular attendance of learners; insufficient use of teaching aids; lack of enough writing resources (paper, note book etc.); lack of innovative teaching; inappropriate use of textbooks; no preparation by teachers before conducting the class; difficult content in the textbook of class V; and lack of the competency based teaching methods.

Actions taken up by the academic supervisors of Bangladesh to overcome the above problems: (i) training was given to teachers through clusters and Multi-Ways Teaching and Learning(MWTL).Also, they were trained in the areas such as conceptual knowledge of mathematics, different teaching techniques and ways to get assistance of bright students in teaching process.(ii) Teachers were advised and requested to use attractive and concrete teaching aids, to teach through pupils centred methods (such as participatory method, activity-based method), to prepare a lesson plan in advance and follow it in the classes, to follow the teacher's manual and question books, to spend more time for mathematics teaching, and to create conducive classroom environment.(iii) Teachers were also requested for home visits of irregular students and to arrange remedial teaching for weak students.(iv) Authority had been requested to give attention for arrangements required for appropriate seating arrangement. (v) The headmasters were requested allot mathematics classes to teachers having science background.

Problems related to students and teachers listed out by the academic supervisors of West Bengal are: lack of clarity of language used in mathematics textbooks; inability of students to follow mathematical concepts due to irregular

attendance; insufficient use of teaching aids; lack of planning (lesson plan and preparation) by teachers; lack of innovative teaching; absence of clarity about mathematics curriculum and syllabi among teachers; teachers' ignorance of objectives at primary level for teaching mathematics.

Actions taken up by the academic supervisors of West Bengal to overcome the above problems: (i) Training was imparted to teachers through mathematics orientation programme and joyful learning. Also, training was imparted for appropriate use of Teaching Learning Materials (TLM). (ii) Teachers were advised to use concrete teaching aids, to teach through pupil-centred methods (such as team-teaching method, activity based method), to prepare lesson plan and apply it properly, to follow the teacher's manual, and to create conducive classroom environment.(iii) Teachers were requested to discuss difficult problems with academic supervisors, colleagues and guardian in joint meeting, to arrange remedial teaching for weak students and to avoid use of compound word from grade-I mathematics textbook to have better understanding of text referred by students.(iv) Co-curricular activities were introduced to increase the interest of students towards mathematics. (v) Academic supervisors visited schools regularly and suggested to administrators and teachers to give attention for arrangement required for appropriate seating arrangement.

Further, academic supervisors stated that they got co-operation from teachers, head teachers, PTA, SMC and guardians/parents to implement the suggested actions for removal of the problems.

The findings reveal that teachers and students related problems were found more in Bangladesh classrooms than that of west Bengal. There are similar type of problems in classrooms of both countries like insufficient use of teaching aids, lack of mastery in conceptual understanding of mathematics subject by the teachers, irregular attendance of learners and inappropriate teacher-student ratio.

Different type of problems were also found in the classroom of both countries as follows; In Bangladesh, problems were found in mathematics classes like shortage of trained teachers, insufficient number of writing materials for students, difficult content in mathematics textbook. In contrast, West Bengal classroom problems were found that teachers have no clear understanding regarding the objectives of mathematics teaching, mathematics syllabi and evaluation procedure. However,

necessary actions/suggestions have been offered for solving above mentioned problems by academic supervisors of Bangladesh and West Bengal.

5.3.5 Importance of Time and Resources

All academic supervisors from both countries revealed to this item of questionnaire they all were of the opinion that time and resources are important aspects in mathematics teaching. Their responses are shown in table-5.16.

Table-5.16

Time, Human and Non-human Resources

Situation and Contextual Resources	Academic supervisor' response	
	Bangladesh (%)	West Bengal (%)
Insufficient time for covering the syllabus	48	38
unable to complete the course in time	50	50
Mathematical model	83	70
Mathematical game	83	70
Instructional materials	83	70
Mathematical exhibition	83	50
Mathematics quiz programme	83	50
Mathematical magazine	100	100
Magic square	100	100

48 % of academic supervisors from Bangladesh and 38% academic supervisors from West Bengal opined that teachers did not get enough time for covering the syllabus. 50% academic supervisors from both countries observed that teachers were unable to complete the course in time. 83% of academic supervisors from Bangladesh and 70% of academic supervisors from West Bengal found that there was a shortage of non-human resources such as mathematical models, mathematical games and instructional materials. All academic supervisors from both countries opined that shortage of human resources affected mathematical magazine and magic square activities adversely. However 83% of academic supervisors from Bangladesh and 50% of academic supervisors from West Bengal opined that shortage of human resources affected the mathematical exhibition and mathematical quiz programme activities adversely.

Thus from this analysis it could be interpreted that the human and non human resources have direct impact in process and product of mathematics teaching.

5.3.6 Using Of Teaching Aids

As per the response to the questionnaire all academic supervisors (from both countries) agreed that teaching aids help, motivate the learners and to clarify their mathematics concepts. From among all the respondents, most of academic supervisors (85% from Bangladesh and 72% from West Bengal) opined that teaching aids were used by teachers to some extent for teaching of mathematics. However, 6% academic supervisors from Bangladesh and 20% supervisors from West Bengal indicated that teachers did not use teaching aids at all for teaching mathematics (at primary level).

It was found that Bangladesh teachers more than west Bengal teachers used teaching aids to some extent for teaching of mathematics effectively.

5.3.7 Quality of Mathematics Teaching-Learning

Academic supervisors were asked to indicate the quality of mathematics teaching and learning in the school. Their responses are shown in Table-5.17

Table-5.17
Quality of Mathematics as Judged by Academic Supervisors

Item	Academic supervisors response (in %age)	
	Bangladesh	West Bengal
Excellent	3	-
Good	13	27
Fair	58	43
Poor	25	20

58% academic supervisors from Bangladesh and 43% academic supervisors from West Bengal indicated that the quality of mathematics teaching and learning in the school was fair. 25% of academic supervisors from Bangladesh and 20 % of academic supervisors from West Bengal opined that the quality of mathematics teaching was poor. While academic supervisors from Bangladesh (13%) and West Bengal (27%) have rated the quality mathematics classes teaching-learning as good.

Thus it is obvious that qualities of mathematics teaching-learning in the school of West Bengal are better than that of Bangladesh.

5.3.8 Organization of Mathematical Activities by Teachers

Academic supervisors were asked in the questionnaire that whether teachers arrange mathematical activities for increasing mathematics comprehension. 75% of

academic supervisors from Bangladesh and all from West Bengal responded to this item.

25% of Academic Supervisors from Bangladesh opined that teachers managed teaching in the following different ways using various activities for increasing mathematics comprehension: (i) use of the different teaching techniques and examples from real life situation, blackboard/chalk board and concrete and semi-concrete teaching aids. (ii) Organization of exhibition of teaching aids demonstration of manipulation of objects. (iii) Discussion of the different mathematical problems from daily life. (iv) Explanation of sums in simple manner.(v) Taking special care of weak students by arranging extra classes.(vi) Oral drill for activating the learners.(vii) Recitation of mathematics related rhymes and organization of the mathematical quiz.

50% academic supervisors from Bangladesh opined that teachers did not arrange mathematical activities for increasing mathematics comprehension. Activities suggested for teachers by academic supervisors of Bangladesh were as follows: (i) to publish mathematics magazine, prepare the teaching aids, use the lesson plan, arrange the mathematical exhibition and quiz programme.(ii) to allow the students to do work on themselves and the teachers to help them and to provide feedback.(iii) to participate in the refresher training course, field trip and study tour occasionally for developing the teaching skills.(iv) to arrange the special training for mathematics teachers and follow up for this programme.

89% of academic Supervisors from West Bengal opined that teachers managed teaching in the following different ways using various activities for increasing mathematics comprehension: (i) teaching of mathematics in grade-I and II level through pocket board, abacus, jute-stick, marbles, picture, model, and chart and by involving more participation of students.(ii) development of clear idea of addition and subtraction by dividing learners in small and big groups, and inserting the digits in the pocket board.(iii) development of mathematical concepts of time through different charts. (iv) imparting ideas/concepts of mathematics through innovative method (such as play way method, activity based method and joyful learning). (v) encouraging the learners to learn mathematics through rhyme and music. (vi) helping the students to make new calendar by cutting the numbers from old calendar.(vii) highlighting the new problems given to the students for solving in front of learners and helping the learners to solve it.(viii) arranging a simulated situation in classroom for teaching 'idea of coins.'

11% of academic supervisors from West Bengal opined that teachers did not arrange mathematical activities for increasing mathematics comprehension. Activities suggested for teachers by Academic supervisors of West Bengal were as follows: (i) to make appropriate use of teaching aids encourage the learners to ask questions, attend refresher course, arrange mathematics exhibition and quiz programmes. (ii) to develop the mathematical concepts of teachers through appropriate training.

Above analysis shows that West Bengal teachers arranged mathematical activities more compared to that of Bangladesh teachers for increasing mathematics comprehension among pupils. The analysis also indicates that almost similar activities were arranged for grades I-II (involving teaching aids) by the teachers from Bangladesh and West Bengal. It was found that similar activities such as use of teaching aids, 'refresher training course', 'mathematics exhibition', 'quiz programme'and mathematics exhibition were suggested by academic supervisors for teachers(who did not arrange any mathematical activities) of Bangladesh and West Bengal.

In addition to this, other activities such as 'field trip' and 'use of lesson plans' were suggested by Bangladesh academic supervisors to the primary teachers of Bangladesh.

5.3.9 In-Service Training

38% of academic supervisors from Bangladesh and 60% of academic supervisors from West Bengal opined that they organized in-service training for mathematics teachers. 52% of academic supervisors from Bangladesh and 33% of academic supervisors from West Bengal opined that they did not organize in-service training for mathematics teachers. Also, 10% of Bangladesh and 7% of West Bengal did not opine in this context.

However, teachers are given training by academic supervisors of Bangladesh on: (i) impart mathematical ideas and methods on learners centred teaching; use of teacher's manual, textbook and question book; and teaching aids. (ii) impart remedial teaching for weak students after identifying the weakness in mathematics.(iii) collection, making, using and preserving of teaching aids for grade-I mathematics teaching.(iv) arrange demonstration class on selected topic of mathematics through sub-cluster training. (v) sub cluster training: the focus is on determining the place values and discussing the four fundamental operations, percentage etc.

However, teachers are given training by academic supervisors of West Bengal on: (i) mathematics teaching through joyful learning, play-way method leaner-centred method. (ii) preparation and use of teaching aids, mathematical model, lesson plan, pocket board and blackboard.(iii) mathematics orientation programmes and evaluation technique. (iv) discussion on mathematics curriculum and syllabi, aim and objectives of teaching mathematics. (v) development of teacher-student relationship.

Analysis shows that academic supervisors of West Bengal organized in-service training on mathematics for teachers more than that of Bangladesh academic supervisors. It means that in-service training facilities are found more in West Bengal than that of Bangladesh.

Academic supervisors of Bangladesh are responsible for supervising, monitoring and training of primary teacher's. Their alertness in this task has direct impact on the quality of primary education in Bangladesh. But above analysis reveal that only 38% of academic supervisors from Bangladesh have responded to the query of organization of in-service training for primary teachers of Bangladesh. Thus only 38% academic supervisors of Bangladesh are engaged in training of primary teachers of Bangladesh on various aspects of teaching methodology while 52% of academic supervisors responded they do not organize any in-service training programme while remaining 10% have not responded at all about this query. This scenario raises the question of concern of academic supervisors for quality education at primary level as far as mathematics teaching and training is concerned.

Looking to the higher percentage response (60%) of West Bengal academic supervisors, it seems that the West Bengal academic supervisors are more aware and concerned about the teaching of mathematics and training of mathematics teachers at primary level which has direct impact on the quality of primary mathematics education in West Bengal. Also the previous finding(refer 5.3.8) says that 89% of academic supervisors of West Bengal responded in favour of use of teaching aids and other activities by the primary teachers, indicating the better quality of primary education in West Bengal.

5.3.10 Working Conditions in the Schools

Academic supervisors were asked about the working conditions in the schools. 78% of academic supervisors from Bangladesh and 67% of academic supervisors from West Bengal opined that they were not satisfied with the working condition in

the schools. However, 7% academic supervisors from Bangladesh and 33% of academic supervisors from West Bengal opined that they were satisfied with the working condition in the schools. 15% of academic supervisors from Bangladesh did not opine in this item at all. Their responses are shown in table-5.18.

Table-5.18
Working Conditions

working conditions in schools	Academic supervisors' responses (%)	
	Bangladesh	West Bengal
Absence of teachers for long duration	-	12
Limited number of class room	43	50
Teacher conducts class without lesson plan	70	53
Teachers are not punctual	47	37
No prior preparation for class	75	53
School authority is non-cooperative	37	6

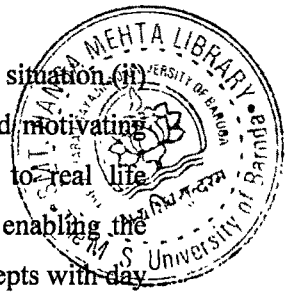
A large percentage of academic supervisors from Bangladesh and West Bengal (table-5.18) were dissatisfied with working conditions in schools because of limited number of classrooms, teaching without lesson plans and without adequate prior preparation.

From the above table-5.18, looking to the percentage of responses, it may be concluded that teachers of West Bengal are more systematic and regular than that of teachers of Bangladesh with respect to use of lesson plan for teaching, prior preparation for class and their punctuality. However, limited numbers of classrooms in the school were found having almost similar problem for both the countries.

5.3.11 Illustrative Examples in Socio-Cultural Context

Academic supervisors were asked to give their opinion about the need of illustrations in socio-cultural context to explain mathematical concept. 75% of academic supervisors from Bangladesh and 83% of academic supervisors from West Bengal believed that illustrative examples that reflect cultural aspects of the society were needed very much for explaining mathematical content. Remaining 25% of academic supervisors from Bangladesh and 17% of academic supervisors from West Bengal did not respond to this item.

The reason of such belief as mentioned by Bangladesh academic supervisors were due to its impact on: (i) clear, effective, fast, long term and enhanced



understanding of mathematical content and its linking with real life situation.(ii) developing the interest among students, eliciting logical thinking and motivating students for creativity.(iii) problem solving skills and connecting it to real life situations explaining some abstract content through concrete situations enabling the students to visualize and appreciate the connection of mathematical concepts with day to day life situations.

Academic supervisors of West Bengal gave reasons for need of illustrative examples to be incorporated from socio-cultural aspects in mathematics teaching as it helps: (i) seeking and sustaining attention of pupils for the understanding of complex content as pupils are able to see the connection of the content with their socio-cultural context. (ii) making word problems easier and simpler for understanding of children. (iii) creating conducive classroom environment. (iv)understanding and appreciating the application and importance of mathematics (content) in daily life.

It is clear from above analysis that illustrative examples in socio-cultural context are essential for explaining mathematical content effectively as opined by academic supervisors of both countries.

5.3.12 Content Areas of Mathematics that Reflect Socio-Cultural Aspect

75% of academic supervisors from Bangladesh and 90% of academic supervisors from West Bengal opined that mathematics textbooks do contain some of the content areas in the text which reflect the socio-cultural aspects of the learners' society.

Further most of the academic supervisors believed that there is no need of adding more topics relevant to socio-cultural aspects of the society as whatever portion is covered in their context is sufficient at this level. In spite of this few academic supervisors of both the countries (25% from Bangladesh and 10% from West Bengal) believed that there is scope to add some more mathematical topics related to socio-cultural aspect of the society.

The details of *content-areas which reflect socio-cultural aspects of the society, as opined by the academic supervisors of Bangladesh* are given below (grade wise):

Grade-I: concept of numbers; 'addition and subtraction'; 'word problems related to addition and subtraction'; recognition of Bangladeshi coins and paper currencies up to fifty taka; telling names of the days of a week.

Grade-II: concept of numbers: odd-even; form ideas of four fundamental operations; word problems related to four fundamental operations; multiplication facts; recognition of Bangladeshi coins and paper currencies; learning and telling the names of the days of the week and names of month; fraction, measurement, shape of geometry.

Grade-III: four fundamental operations; word problems related to four fundamental operations; concept of fractions; daily calendar; measurement, geometry and time.

Grade-IV: four fundamental operations; word problems related to four fundamental operations; simple and decimal fractions; LCM and HCF; measurement, graphs, time and concept of geometry.

Grade-V: four fundamental operations and word problems related to these; profit-loss, capital-expenditure; word problems based on fractions; mean, LCM, Unitary method, percentage; measurement, graph, time, geometry.

The details of *content-areas which reflect socio-cultural aspects of the society as opined by the academic supervisors of West Bengal* are given below (grade wise):

Grade-I: concepts such as tall or short, big or small, thick or thin, heavy or light, distant or near; concept of numbers; place value; addition and subtraction and word problems based on it; concept of currency and time.

Grade-II : use concrete objects from nearly/surrounding environment; four fundamental operations and problem solving based on it; place value and concept of fraction; measurement, length, mass and capacity.

Grade-III: four fundamental operations relating to hours, minutes, second, day, month and year; common factors and common multiples, LCM, HCF, multiple and factors; unit of length, mass and capacity; decimal fractions.

Grade-IV : simple fractions and its addition and subtraction; decimal fractions and its four fundamental operations; concept of geometry; LCM, HCF, multiples, factors; fractions, mean; different units used in daily life.

Grade-V: unitary method and related to time-distance and time-work; capital-expenditure, percentage, measurement and fractions.

In both the countries, it was found that the content-areas of mathematics textbooks reflected the socio-cultural aspects of the respective country. The textbooks of both the countries differ in terms of representation of such socio-cultural aspect

only in terms of organizations of such content at different levels at primary stages for grades I to V.

5.3.13 Reflection of Academic Supervisors on Objectives, Competencies and Content

A question was asked to academic supervisors to reflect upon objectives, competencies and content of primary mathematics curriculum with respect to its appropriateness/ inappropriateness at this level.

95% of academic supervisors from Bangladesh and all academic supervisors from West Bengal opined that objectives, competencies and content areas given in curriculum are appropriate for the learners. However, 5% of academic supervisors from Bangladesh identified some content areas which are not appropriate at this level such as: addition and subtraction in grade-I; multiplication and division in grade-III; word problems related to decimals, areas of measurement, percentage, average, interest in grade-V.

5.3.14 Observation of Academic Supervisors in Schools

Academic supervisors were asked to explain their observation regarding mathematics teachers and their teaching approach based on their visits to the respective schools. All the academic supervisors from both countries responded to this query.

All academic supervisors from Bangladesh expressed their observation regarding the mathematics teachers and teaching approach as follows: (i) Most of the teachers did not use teaching aids, 'teachers' edition', and innovative teaching method.(ii) Teachers did not provide remedial teaching, adequate practice in drilling and co –operation with student. Also, they did not try to develop a clear understanding of mathematical concepts for themselves before teaching in class.(iii) Mathematics teachers were unable to teach mathematics effectively in classroom, because of overcrowded classrooms, lack of skills in mathematics, shortage of time and inadequate preparation.(iv) Competent teachers (were interested in teaching mathematics and some teachers were not interested in teaching mathematics on competency based curriculum.

All academic supervisors from West Bengal expressed their observation regarding the mathematics teachers and teaching approach as follows: (i) Teachers

taught mathematics without preparation and lesson plan, chart and model. However, a small number of teachers taught mathematics through innovative method and used teaching aids properly.(ii) Most of the teachers were unable to teach mathematics effectively in classroom, because of overcrowded classroom, lack of clear concepts in mathematics, lack of ideas about mathematics curriculum. (iii) In most of the cases, teachers did not follow the competency based teaching of mathematics. (iv) Teachers (who were trained under DPEP) were found to be effective in mathematics teaching but almost all the schools found shortage of teachers in proportion to the number of students.

Above analysis indicates that teachers from both the countries were found using inappropriate methods of teaching due to the lack in skills and methodology of teaching mathematics. Also, overcrowded classrooms, absence of lesson plan and resources were major reasons for ineffective teaching in classrooms.

In spite of this academic supervisors from West Bengal observed that teachers with strong foundations in mathematics concepts and teachers having training under DPEP were found more effective in teaching.

5.3.15 Strengths of Mathematics Curriculum

Academic supervisors of both the countries were asked to list out the strengths of mathematics curriculum. 85% of academic supervisors from Bangladesh and 95% of academic supervisors from West Bengal responded to this item. However, 15% of academic supervisors from Bangladesh and 5% of academic supervisors from West Bengal did not respond in this regard.

Academic supervisors from Bangladesh indicated the major strengths of the present mathematics curriculum as follows: (i) Grade wise contents were included in the textbooks according to the need of socio-cultural aspects of the society and lessons were divided on the basis of four basic skills such as listening, speaking, reading and writing. (ii) Topics were arranged from concrete to abstract according to learners' age and class wise capability, because of this, learners' could attain the competencies easily. (iii) Language ambiguity has been avoided and a wide variety of concrete illustrations related to the content, from the surrounding, was included in grade I-II mathematics textbooks. (iv) Many similar model examples were given in text books for essential explanation of topics. (v) A long term programme was adopted for revision and modification of curriculum. (vi) Concept of number, fraction,

four fundamental operations, measurement, percentage, unitary method, geometry and its related problems were included in the textbook to enable the students to apply them in real life situations. (vi) Continuous evaluation is practiced in grades I- II. (vii) Almost the entire content of grade I-II is presented pictorially with illustrations

Academic supervisors from West Bengal indicated the major strengths of the present mathematics curriculum as follows: (i) Content of curriculum was appropriate grade wise which helped all children to acquire certain minimum levels of functional mathematics. (ii) Exercises are included for providing practice to the learners and improving their ability in mathematics. (iii) Opportunity is provided to attain mathematical knowledge and correct use of mathematical language related to symbol for application in real life situation.(iv) Word problems are included involving four fundamental operations and unitary method related to situations arising in everyday life. (v) Distinct objects are highlighted in textbook for relating them to the daily needs. (vi) Teaching is given with joyful learning approach and with appropriate use of teaching aids. (vii)Revision chapters are included before each new chapter in grade II-V. (viii) Introductory discussion is included in each topics of chapter. (ix) Clear explanation about zero (0), and 'place value' concept. (x) Scientific curriculum, up to date textbooks, and continuous evaluation systems.

From the above analysis it seems that common strengths of mathematics curriculum for both the countries are skills development in mathematics, suitable content-areas distributed grade-wise and arranged from concrete to abstract, appropriate evaluation procedure.

In addition to these common strengths, it is found that, content integration with socio-cultural aspect; pictorial presentation of content, emphasize on basic learning skills such as listening, speaking, reading and writing; and programmes adopted to promote up-to- date curriculum are the major strength of mathematics curriculum of Bangladesh. On the other side, major strengths of mathematics curriculum of west Bengal (in addition to the common strengths mentioned before) are introductory discussion, inclusion of revision chapter related to previous grade's textbook, up-to-date textbooks, exercise at the end-of-chapter and word problems involving four fundamental operations from numeric to statement and vis-à-vis.

From the list of the strengths of curriculum of Bangladesh and West Bengal as per the opinion of academic supervisors, it is found that the list of strengths of West

Bengal curriculum is larger than that of Bangladesh. Hence, it could be interpreted that West Bengal mathematics curriculum is stronger than that of Bangladesh.

5.3.16 Weaknesses of the Mathematics Curriculum

Academic supervisors of both the countries were asked to identify the weaknesses of mathematics curriculum that needed immediate attention. 73% of academic supervisor from Bangladesh and 85 % of academic supervisors from West Bengal did not opine in this item. However, 27% of academic supervisor from Bangladesh and 15 % of academic supervisors from West Bengal opined in this item.

Academic supervisors from Bangladesh identified areas of the mathematics curriculum which contributes towards weakness of the curriculum are such as: resources (mathematics teachers, teaching aids, mathematical games, classroom and time for teaching the syllabi); lack of appropriate methodology, techniques and activities utilized by the teachers for transaction of curriculum; less opportunity to impart curriculum in relation to life situations; ambiguous explanation for some content-areas in primary mathematics textbooks.

Academic supervisors from West Bengal identified areas of the mathematics curriculum which contributes towards weakness of the curriculum are such as: complex language used for explanation of some topics (e.g. concept of zero, multiplication, division etc.) in textbooks for grades I-V; less attractiveness of the textbooks.

Above analysis shows that Bangladesh academic supervisors could identify and list out more aspects compared to that of West Bengal academic supervisors which contributed towards weaknesses of mathematics curriculum. From the list of the weaknesses of curriculum of Bangladesh and West Bengal, it could be also interpreted that Bangladesh curriculum is weaker than west Bengal curriculum.

5.3.17 Suggestions Effective Implementation of the Mathematics Curriculum

Academic supervisors were asked to give suggestions for more effective implementation of the mathematics curriculum. All academic supervisors from both the countries responded to this item as follows:

Bangladesh

67% of academic supervisors gave suggestions in context of **training aspect** of teachers related to (i) professional development. (ii) mathematics curriculum and its effective implementation in classroom.(iii) enough practice of problem solving.(iv) use of language and different methods of teaching.

58% of academic supervisors gave suggestions in context of **textbook content** related to (i) suitability of subtopics on the basis of learners' age group and cultural context of the society. (ii) addition of more mathematical problems to the respective exercises under each chapter. (iii) the solution to be provided for the typical mathematical problem on which the exercise is given for practice.

52% of academic supervisors gave suggestions in context of **teaching**, focusing on: (i) appropriate teaching aids related to lesson. (ii) regular use of teaching aids in classes.(iii) teachers' eagerness and skill development for using teaching aids. (iv) the use of different games for developing mathematical concepts among the learners. (v) the interest for learning mathematics among the pupils.(vi) the provision of the opportunities forming practical knowledge of mathematical concepts.

58% of academic supervisors gave suggestions in context of **monitoring** of teaching- learning activities through supervision of actual classroom situations.

58 % of academic supervisors gave suggestions in context of **recruitment** of mathematics teacher who have studied mathematics as one of the subjects and possess enough potential to teach mathematics subject.

3.33% of academic supervisors gave suggestions for **maintenance of resources** related to teaching.

3.33% of academic supervisors gave suggestions in context of **co-curricular activities** related to mathematical exhibition.

West Bengal

10% of academic supervisors gave suggestions in context of **training aspect** of teachers related to mathematics.

20% of academic supervisors gave suggestions in context of **textbook content** related to(i) addition of more illustrative examples, figures. (ii) addition of more problems in exercises needed for practice.(iii) Introduction of mathematical problems ranging from concrete to abstract and from easy to complex.

83% of academic supervisors gave suggestions in context of **teaching** with focus on: (i) conducive classroom environment for effective implementation of mathematics curriculum. (ii) identification of learning difficulties of pupils and remedial teaching.(iii) application of team teaching, use of easy techniques and effective lesson plans. (iv) with provision of teaching aids and keeping in mind the activities supporting good rapport between teacher and pupils.

20% of academic supervisors gave suggestions in context of **monitoring** of teaching- learning activities through supervision of actual classroom situations.

50% of academic supervisors gave suggestions in context of **recruitment** of mathematics teacher who have studied mathematics and science both the subjects.

41% of academic supervisors gave suggestions in favour of reasonable proportion of **resources, teachers, pupils and classrooms.**

Above suggestions are represented in a nutshell through following table:

Suggestions in different aspects	**Percentage of responses given by**	
	Bangladesh academic supervisors	**West Bengal academic supervisors**
Training	67	10
Textbook content	58	20
Teaching	52	83
Monitoring	58	20
recruitment of Teacher	58	50
Maintenance of Resources/proportion of resources	3.33	41

From above table, it is clearly visible that academic supervisors of Bangladesh have given more suggestions in context of training and content compared to that of West Bengal academic supervisors' suggestions. Monitoring and recruitment aspects are more focused by Bangladesh academic supervisors. As far as recruitment aspect is concerned, almost similar suggestions are given by both academic supervisors. Suggestions related to teaching by the primary teachers with innovative ideas are more by of West Bengal academic supervisors. It is also clear that very less percentage (3.33%) of Bangladesh academic supervisors suggested for maintenance of resources related to teaching while a good percentage (41%) of academic supervisors from West Bengal suggested using reasonable proportion of resources.

These facts leads to the interpretation that training of teachers is very important aspect looking to the need for the same in absence of some such programmes which was mentioned by these academic supervisors of Bangladesh in their previous response (refer 5.3.9).Only 10% of academic supervisors from West Bengal have suggested for training aspects while 83% of academic supervisors from West Bengal suggest innovations in teaching practices. Based on their suggestions of academic supervisors one can interpret that in West Bengal there is not much need of training aspects; and the same is also supported by previous responses of academic supervisors of West Bengal indicating that there are several training courses(refer 5.3.2).

Thus it seems that academic supervisors of both the countries are very well aware of the need for quality transaction of curriculum and have according given the suggestions looking to the need of the respective country.

5.4 Analysis and Interpretation of Data Gathered from Experts (Curriculum Specialists and Subject Specialists)

In this section data on various aspects of the curriculum such as Objectives, Content, Competencies, Strength, Weakness and Socio-Cultural aspects related to curriculum were collected from the group of experts of Bangladesh and West Bengal. These experts were of two types namely curriculum specialists (six from each country) and subject specialists (four from each country).The data were collected from curriculum specialists and subject specialists in terms of opinions of experts through opinionnaire. The opinionnaire consists of two parts.

The **first part** (item-I) of the opinionnaire elicited the opinion of experts with five alternative response choices namely; To a Great Extent (TGE), To Some Extent (TSE), To a Little extent (TLE), Not AT All (NAA) and Different Opinion. The last choice 'different opinion' was not responded by any of the experts. **Hence the rating scale was reduced from five to four with choices namely TGE, TSE, TLE and NAA.** Thus a four-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 each item was computed by dividing the total score of the item by the total number of responses.

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

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.

In this 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.

Table-5.19: Interpretation of Mean Values

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

Analysis of the data obtained from **second part** (items II-VII) was analyzed on the basis of their contents along with their frequency responses.

The analysis and interpretation of data gathered from experts (curriculum and subject specialists) in this section have been mentioned under four subsections viz:

5.4.1: Analysis and interpretation of data gathered from curriculum specialists of Bangladesh

5.4.2: Analysis and interpretation of data gathered from subject specialists of Bangladesh

5.4.3: Analysis and interpretation of data gathered from curriculum specialists of West Bengal

5.4.4: Analysis and interpretation of data gathered from subject specialists of West Bengal

5.4.1 Analysis and Interpretation of Data Gathered from Curriculum Specialists of Bangladesh from Opinionnaire

The opinionnaire was distributed to six curriculum specialists of Bangladesh. All the respondents reflected their opinions to all the sub-items of item-I of part-I and all the items of part-II. In fact, part-I consists of only one item while part-II (of opinionnaire) consists of items-II to VII.

5.4.1.1 Analysis of the Data Obtained from Part-I

The responses given by curriculum specialists to all the statements of sub-items in part-I are represented through table-5.20. Later the data given in table-5.20 are analyzed and interpreted in this subsection.

Table-5.20: Opinions of the Curriculum Specialists of Bangladesh

	Statements of the sub-items:	Frequency of Responses				Mean
	Suitability / appropriateness of -	TGE	TSE	TLE	NAA	of the Scale Value
1.	Objectives of primary mathematics curriculum as incorporated in the selected grades/classes	4	2			2.67
2.	Objectives for developing basic skills and understanding of numerical concepts.	5	1			2.83
3.	Objectives for developing learning skills and attitudes	1	5			2.17
4.	Objectives for developing the habit of solving problems through scientific methods as well as developing a scientific outlook on life.	2	4			2.33
5.	Objectives for developing the skill of translating verbal statement (a) in mathematical forms using appropriate symbols and (b) diagrammatically		6			2.00
6.	Objectives for making reasonably good approximation and estimating measurements		4	2		1.67
7.	Objectives for inculcating reasoning and critical thinking abilities	1	4	1		2.00
8.	Incorporated contents for developing expected knowledge, skills and attitudes	3	3			2.50
9.	Incorporation of the concept of numbers, in the primary mathematics curriculum	4	2			2.67
10.	Four fundamental operations in mathematics towards development of thinking abilities of children.	4	2			2.67
11.	The lessons for developing awareness about unit of money, length, weight, area, square, measure and time in terms of using them in daily life.	2	2	2		2.00
12.	Fractions in developing concepts	3	3			2.50
13.	Basic geometrical figures in the development of concepts in children	2	4			2.33
14.	Competencies for developing awareness among children to solve their day to day problems.	1	5			2.17
15.	Content in the context of the specified objectives	1	5			2.17
16.	Methodology prescribed in the curriculum in the context of the specified objectives	1	5			2.17
17.	The difficulty level of the contents, to the learners	1	3	2		1.83
18.	Class wise vertical articulation of the contents	1	4	1		2.00
19.	Class wise competencies	4	2			2.67
20.	Sequential arrangement of contents from the concrete to the abstract	2	3	1		2.17
21.	Sequential arrangement of content from the specific to general	2	3	1		2.17

The data of table-5.20 were analyzed and interpreted as follows:

1. Four respondents indicated that the objectives of primary mathematics curriculum were suitable for the selected grades to a great extent. Two respondents indicated that the objectives were suitable to some extent. The mean score of these responses is 2.67 which indicates that the objectives of the curriculum are suitable for the selected grades *to a great extent* (Refer Table-5.20).
2. Five respondents were of the opinion that the objectives for developing basic skills and understanding of numerical concepts were suitable to a great extent. One respondent indicated that the objectives were suitable to some extent. The mean score of these responses is 2.83. From table 5.20 it could be interpreted that the value 2.83 lies in the interval [2.5, 3] hence the objectives are suitable for developing basic skills and understanding of numerical concepts *to a great extent.*
3. One respondent was of the opinion that the objectives were suitable for developing learning skills and attitudes, to a great extent. Five respondents were of opinion that the objectives were suitable to some extent. The mean score of these responses is 2.17 indicates that objectives are suitable *to some extent* (Refer Table-5.20).
4. Two respondents opined that the objectives were suitable for developing habit of solving problems through scientific methods as well as developing a scientific outlook on life, to a great extent. Four of the respondents expressed that the objectives were suitable to some extent. The mean score of these responses is 2.33 showing that the objectives are suitable *to some extent.*
5. All the six respondents agreed that the objectives were suitable for developing the skill of translating verbal statements into mathematical forms using appropriate symbols and diagrams, to some extent. The mean score of these responses is 2.00 indicating that the objectives are suitable *to some extent.*
6. Four respondents indicated that the objectives were suitable for making reasonably good approximations and estimating measurement to some extent. Two of the respondents thought that the objectives were suitable to little extent. The mean score of these responses is 1.67 indicating that the objectives

are suitable for making reasonably good approximations and estimating measurement *to some extent.*

7. One of the respondents indicated that the objectives were suitable for inculcating reasoning and critical thinking abilities to a great extent. Four respondents thought that the objectives were suitable to some extent. One respondent opined that the objectives were suitable to a little extent. The mean score of these responses is 2.00 indicates that objectives are suitable *to some extent.*

8. Three respondents indicated that the incorporated contents were suitable for developing expected knowledge, skills and attitudes to a great extent. Remaining three respondents opined that the incorporated contents were suitable to some extent. The mean score of these responses is 2.50 indicates that the content are suitable for developing expected knowledge, skills and attitudes *to a great extent.*

9. Four respondents indicated that the concept of numbers were suitable for incorporating in mathematics curriculum to a great extent. While two respondents thought that the concept of numbers was suitable only to some extent. The mean score of these responses is 2.67 indicates that the concept of numbers are suitable *to great extent.*

10. Four respondents indicated that the four fundamental operations were suitable for developing the thinking abilities in children, to a great extent. Remaining two respondents thought that four fundamental operations were suitable to some extent. The mean score of these responses is 2.67 showing four fundamental operations are suitable *to a great extent.*

11. Two of the respondents indicated that the units of money, length, weight, area, square, measure and time were suitable for developing the awareness in terms of using in daily life, to a great extent. Two respondents opined that the lessons were suitable to some extent. Remaining two respondents thought that the lessons were suitable to a little extent. The mean score of these responses is 2.00 showing that the lessons are suitable *to some extent.*

12. Three respondents indicated that fractions were suitable for developing the concepts in children to a great extent. The remaining three respondents thought that the fractions were suitable only to some extent. The mean score

of these responses is 2.50 indicates that fractions in mathematics are suitable for developing concepts in the children *to a great extent.*

13. Two of the respondents held the view that the basic geometrical figures were suitable for the developing the concepts of the children to a great extent. Four respondents were of the opinion that they were suitable to some extent. The mean score of these responses is 2.33 which indicates the basic geometrical figures are suitable for the developing the concepts for the children *to some extent.*
14. One of the respondents indicated that competencies were suitable for developing awareness among children to solve their day to day problems to a great extent. The remaining five respondents thought that competencies were suitable to some extent. The mean score of these responses is 2.17 indicates that competencies are suitable *to some extent.*
15. One respondent indicated that the content were suitable in the context of the specified objectives to a great extent. The remaining five respondents thought that content were suitable to some extent. The mean score of these responses is 2.17 indicating that the contents are suitable in the context of the specified objectives *to some extent.*
16. One respondent indicated the methodologies prescribed in the curriculum were suitable in the context of the specified objectives to a great extent. Five respondents indicated that they were suitable to some extent. The mean score of these responses is 2.17 showing that methodologies prescribed in the curriculum are suitable *to some extent.*
17. One of the respondents indicated that the contents were difficult to a great extent. Three respondents expressed the opinion that the contents were difficult to some extent and remaining two respondents thought that they were suitable to a little extent. The mean score of these responses is 1.83 which indicates that the contents are difficult for the learner *to some extent.*
18. One of the respondents indicated that the class wise vertical articulation of the contents were suitable to a great extent. Four respondents opined that they were suitable to some extent. One respondent indicated that they were suitable only to a little extent. The mean score of these responses is 2.00 indicating that the contents are vertically articulated *to some extent.*

19. Four respondents indicated that the class wise competencies were suitable to a great extent. The remaining two respondents indicated that the class wise competencies were suitable to some extent. The mean score of these responses is 2.67 showing that the class wise competencies are suitable *to a great extent.*
20. Two respondents indicated that the sequential arrangement of contents from the concrete to the abstract were suitable to a great extent. Three respondents expressed that they were suitable to some extent. One respondent indicated that they were suitable only to a little extent. The mean score of these responses is 2.17 indicating that the sequential arrangements of contents from the concrete to the abstract are suitable *to some extent.*
21. Two of the respondents expressed the opinion that the sequential arrangements of contents from the specific to general were suitable to a great extent. Three respondents thought that they were suitable to some extent. One of the respondents indicated that they were suitable to a little extent. The mean score of these responses is 2.17 indicates that the sequential arrangement of content from the specific to general is suitable *to some extent.*

5.4.1.2 Analysis of the Data Obtained from Item 'II'

In item II, opinions of all curriculum specialists (Bangladesh) related to the appropriateness/inappropriateness of objectives, competencies and content areas in primary mathematics curriculum were obtained. In this respect, four of the respondents were of the opinion that objectives, competencies and content in the primary mathematics curriculum are appropriate. Inappropriate competencies listed by two of the respondents are given in the following manner separately.

One respondent:

Inappropriate competencies for grade – II: (i) Counting, reading and writing numbers from 50 to 100. (ii) Writing numbers from 21 to 100 in words.

Suggested Competencies to overcome the defect:(i) Counting, reading and writing numbers should be included from 1 to 100. (ii) Writing numbers should be included from 1 to 100 in words.

Inappropriate competencies for Grade – III :(i) Reading and writing numbers from 101 to 10,000. (ii) Writing any number from 101 to 10,000 in words. (iii) Telling greater number and smaller number by comparing any two of

the numbers from 101 to 10,000. (by using symbol). (iv) Identifying 'even' and 'odd' numbers among numbers from 101 to 10,000. (v) Arranging numbers from 101 to 10,000 in ascending and descending orders.

Suggested Competencies to overcome the defect: All competencies mentioned above in (i), (ii), (iii), (iv) and (v) should be 1 to 10,000.

Inappropriate competencies for Grade -IV and V: Solving 3-step problems relating to addition and subtraction.

Suggested competencies to overcome the defect: Solving 2 and 3 step problems relating to addition and subtraction should be included.

Another respondent

Inappropriate competencies for grade – II: Applying commutative law in multiplication.

Inappropriate competencies for grade – III: Solving 3 – step problems relating to addition, subtraction, multiplication and division.

5.4.1.3 Analysis of the Data Obtained from Item III

In item III, the curriculum specialists' opinion was sought on whether socio-cultural aspects of the learners' society are reflected in the content areas of primary mathematics curriculum in grade I-V. Further, the experts were requested to give their suggestions for any modifications required in the curriculum in this context.

Three curriculum specialists mentioned that *class wise content areas in the primary mathematics curriculum reflect the socio-cultural aspects of the learners' society* in the following manner:

Grade – I: Counting numbers and writing numbers; Use of number concept in solving day to day problems.

Grade – II: Recognizing Bangladeshi coins and paper currencies (up to 100 taka); Learning the names of the weekly days in serial order and to use them in day-to- day life; Telling names of different parts of the day and to use them in daily life; Learning names of Bengali and English months in serial order and to use them in daily life; Solving different problems relating to addition and subtraction (using numbers up to 100).

Grade – III: Solving 2 step simple problems by using any two of the operations of addition, subtraction, multiplication and division; Recognizing

coins and paper currencies and learn how to write them; Using coins and paper currencies with exchange of coins in transactions of day-to-day life; Measuring the length of different things by meter and centimeter; Knowing metric units for measuring weights and to measure weights of different things in terms of gram and kilogram; Converting kilogram to gram; Knowing the litre as unit for measuring liquids and to measure liquids using litre; Consulting watch and to use it in daily life and Finding out the days of each month by using day calendar.

Grade – IV: Solving 2 step simple problems by using any two of the operations of addition, subtraction, multiplication and division; Solving simple problems by using any two of the operations of addition, subtraction and multiplication of decimal fractions; Knowing and using different units while measuring length, weight, volume and area; Learning formulae for deeming areas of rectangle and square and to solve simple problems relating to them and Drawing bar graph of simple data including population based data.

Grade – V: Solving 3 step simple problems by using any three of the operations of addition, subtraction, multiplication and division; Forming ideas about percentage and solving simple problems; Finding out the areas of class room, play ground, etc by applying the formula of area measurement; Solving simple problems related to measurement; Concept clarity about capital-expenditure and to use them in day to day life and Use of geometrical concepts in day to day life.

Note: *Three of these six curriculum experts did not opine about content areas in the primary mathematics curriculum which reflect the socio-cultural aspects of the learners' society.*

Three of the six experts suggested that new contents in the curriculum for covering socio-cultural aspects of the learners' society be incorporated in the following manner: (i) Use of computer for calculations. (ii) Content on 'time and money' should be in detail. (iii) Mathematics content should be based on real life situations. The problems designed for each topic, particularly problem solving and geometry, should be mostly related to real life situations (for all grades especially for IV and V). Paper and printing should be of better quality and printing should not be on blue paper (Present mathematics text book-IV).

5.4.1.4 Analysis of the Data Obtained from Item IV

In item IV, the curriculum experts highlighted the need for introducing illustrative examples for explaining mathematics content and ascertaining whether those reflect cultural aspects of the society. Two of the six experts *highlighted the need for illustrative examples for explaining mathematics content* which reflect different cultural aspects of the society in the following manner: (i) Children learn from known to unknown. Hence, mathematics content reflecting cultural aspects of the society familiar to the child would be more helpful for his learning. (ii) Illustrations used in the mathematics text book are not that much attractive and accurate.

5.4.1.5 Analysis of the Data Obtained from Item V

In item V the curriculum experts were requested to list major strengths of the mathematics curriculum. *Four of the six curriculum experts indicated the major strengths of the present mathematics curriculum* in the following manner: (i) It is to some extent related to children used. (ii) It is graded. (iii) It maintains both horizontal (with other subjects) and vertical coordination (within itself). (iv) It is more or less life oriented, sequential and articulated properly. (v) Unified curriculum throughout the country, so single mathematics text book is being practiced in the schools of Bangladesh at primary level.

5.4.1.6 Analysis of the Data Obtained from Item VI

In item VI, the experts (curriculum specialists) were requested to identify weaknesses in the curriculum that need immediate attention. *Four of the six respondents identified weaknesses of present mathematics curriculum that need immediate attention,* in the following manner: (i) Less illustrations and examples are provided. (ii) Theoretically, though the curriculum is satisfactory to some extent, it is not being implemented properly in the class room. This is the main drawback / weakness of the present mathematics curriculum. (iii) No separate text book for the advanced learners.(iv) No arrangement for practical work. (iv) Most of the teachers are not proficient to teach mathematics at this level.

5.4.1.7 Analysis of the Data Obtained from Item VII

In item VII, the curriculum experts from Bangladesh were requested to suggest measures for more effective implementation of the mathematics curriculum.

All the six experts gave the following suggestions for the successful implementation of the mathematics curriculum: (i) To provide facilities to the mathematics teachers for participating in the dissemination programme of the BNCTB.(ii) To provide appropriate teaching aids for teaching of this subject.(iii) Regular classes should be held. (iv) The mathematics content should be taught serially, sincerely and seriously so that there is no gap. (v) Continuous assessment of children is necessary. (vi) Regular attendance of both children and teacher is a must.(vii) Weaker children need special care.(viii) Appropriate teaching aids are essential for presenting new topics to children.(ix) Teacher training (both pre-service and in-service) needs to be strengthened. (x) Mathematics teacher should be trained on teaching-learning strategy and also on the content. (xi) Teaching should be introduced in class room effectively.

5.4.2 Analysis and Interpretation of Data Gathered from Subject Specialists of Bangladesh from Opinionnaire

The opinionnaire was distributed to four subject specialists of Bangladesh. All the respondents reflected their opinions to all the sub-items of item-I of part-I and all the items of part-II. In fact, part-I consists of only one item while part-II (of opinionnaire) consists of items-II to VII.

5.4.2.1 Analysis of the Data Obtained from Part-I

The responses given by subject specialists to all the statements of sub-items in part-I are represented through table-5.21. Later the data given in table-5.21 are analyzed and interpreted in this subsection.

Tale-5.21: Opinions of the Subject Specialists of Bangladesh

	Statements of the sub-items:	Frequency of Responses				
	Suitability / appropriateness of	**TGE**	**TSE**	**TLE**	**NAA**	**Mean of scale values**
1.	Objectives of primary mathematics curriculum as incorporated in the selected grades/classes	4				3.00
2.	Objectives for developing basic skills and understanding of numerical concepts.	4				3.00
3.	Objectives for developing learning skills and attitudes	4				3.00
4.	Objectives for developing the habit of solving problems through scientific methods as well as developing a scientific outlook on life.	2	2			2.50
5.	Objectives for developing the skill of translating verbal statement (a) in mathematical forms using appropriate symbols and (b) diagrammatically	3	1			2.75
6.	Objectives for making reasonably good approximation and estimating measurements	2	1	1		2.25
7.	Objectives for inculcating reasoning and critical thinking abilities	1	2		1	1.75
8.	Incorporated contents for developing expected knowledge, skills and attitudes	4				3.00
9.	Incorporation of the concept of numbers, in the primary mathematics curriculum	4				3.00
10.	Four fundamental operations in mathematics towards development of thinking abilities of children.	4				3.00
11.	The lessons for developing awareness about unit of money, length, weight, area, square, measure and time in terms of using them in daily life.	3			1	2.25
12.	Fractions in developing of concepts	3	1			2.75
13.	Basic geometrical figures in the developing concepts in children		3	1		1.75
14.	Competencies for developing awareness among children to solve their day to day problems.	2	1	1		2.25
15.	Content in the context of the specified objectives	2	2			2.50
16.	Methodology prescribed in the curriculum in the context of the specified objectives		3		1	1.50
17.	The difficulty level of the contents, to the learners		2		2	1.00
18.	Class wise vertical articulation of the contents	3	1			2.75
19.	Class wise competencies	4				3.00
20.	Sequential arrangement of content from the concrete to the abstract	3	1			2.75
21.	Sequential arrangement of content from the specific to general	3	1			2.75

The data of table-5.21 were analyzed and interpreted as follows:

1. All the four respondents agreed that the objectives of primary mathematics were suitable for the selected grades to a great extent. The mean score of these responses is 3.00 showing that the objectives of the curriculum are suitable for the selected grades to *a great extent* (ReferTable-5.21).
2. All the respondents were of the opinion that the objectives for developing basic skills and understanding of numerical concepts were suitable to a great extent. The mean score of these responses is 3.00 indicating that the objectives are suitable for developing basic skills and understanding of numerical concepts *to a great extent.*
3. All the four respondents agreed that the objectives were suitable for developing learning skills and attitudes, to a great extent. The mean score of these responses is 3.00 showing that the objectives are suitable for developing learning skills and attitudes *to a great extent.*
4. Two of the respondents held the opinion that the objectives were suitable for developing the habit of solving problems through scientific methods as well as developing a scientific outlook on life, to a great extent. Two of the respondents indicated that the objectives were suitable to a Little extent. The mean score of these responses is 2.50. From the tabe-5.21, it could be interpreted that the value 2.50 lies in the interval [2.50, 3.00] hence the objectives are suitable *to a great extent.*
5. Three respondents indicated that the objectives were suitable for developing the skill of translating verbal statements in mathematical forms using appropriate symbols and diagrams, to a great extent. One of respondents was of the opinion that the objectives were suitable to some extent. The mean score of these responses is 2.75 indicating that the objectives are suitable *to a great extent.*
6. Two of the respondents indicated that the objectives were suitable for making reasonably good approximations and estimating measurements to a great extent. One of the respondents opined that the objectives were suitable to some extent only. One respondent indicated that the objectives were suitable only to a little extent. The mean score of these responses is 2.25 indicating that the

objectives are suitable for making reasonably good approximations and estimating measurements *to some extent.*

7. One of the respondents indicated that the objectives were suitable for inculcating reasoning and critical thinking abilities to a great extent. Two respondents opined that the objectives were suitable to some extent. One respondent indicated that they were not suitable at all. The mean score of these responses is 1.75 indicating that objectives are suitable for inculcating reasoning and critical thinking abilities at least *to some extent.*
8. All the four respondents agreed that the incorporated contents were suitable for developing expected knowledge, skill and attitudes to a great extent. The mean score of these responses is 3.00 indicates that the contents are suitable for developing expected knowledge, skills and attitude *to a great extent* only.
9. All the four respondents agreed that the concept of numbers were suitable to a great extent. The mean score of these responses is 3.00 indicates that the concept of numbers are suitable for children *to a great extent* only.
10. All respondents agreed that the four fundamental operations in mathematics were suitable for developing the thinking abilities of children, to a great extent. The mean score of these responses is 3.00 showing that the four fundamental operations in mathematics are suitable *to a great extent* only.
11. Three respondents indicated that the units of money, length, weight, area, square, measure and time were suitable for developing awareness in terms of using in daily life, to a great extent. One respondent indicated that the lessons were not suitable at all. The mean score of these responses is 2.25 indicating that the lessons are suitable *to some extent.*
12. Three respondents agreed that fractions were suitable for developing the concepts in children to a great extent. One respondent opined that the fractions were suitable to some extent. The mean score of these responses is 2.75 indicates that fractions in mathematics are suitable for developing concepts in the children *to a great extent.*
13. Three respondents opined that the basic geometrical figures were suitable for developing the concepts of the children to some extent. One respondent opined that they were suitable to a little extent. The mean score of these responses is 1.75 showing that the basic geometrical figures are suitable for developing concepts *to some extent.*

14. Two respondents indicated that competencies were suitable for developing awareness among children to solve their day to day problems to a great extent. One respondent indicated that competencies were suitable to some extent. Another respondent expressed the opinion that they were suitable to a little extent. The mean score of these responses is 2.25 indicates that the competencies are suitable *to some extent.*
15. Two of the respondents were of the opinion that the contents were suitable in the context of the specified objectives to a great extent. The remaining two respondents indicated that the contents were suitable to some extent. The mean score of these responses is 2.50 indicates that the contents are suitable in the context of the specified objectives *to a great extent.*
16. Three respondents expressed that the methodologies prescribed in the curriculum were suitable to some extent only. One respondent indicated that they were not suitable at all. The mean score of these responses is 1.50 indicates that the methodologies prescribed in the curriculum are suitable in the context of the specified objectives to *some extent.*
17. Two of the respondents indicted that the contents were difficult to some extent. Remaining two respondents expressed the opinion that the contents were not difficult at all. The mean score of these responses is 1.00 which indicates the contents are difficult for the learners *to a little extent* only.
18. Three of the respondents indicated that the class wise vertical articulation of the contents were suitable to a great extent. One respondent indicated that the contents were vertically articulated to some extent. The mean score of these responses is 2.75 indicating that the contents are vertically articulated class wise *to a great extent.*
19. All the four respondents agreed that the class wise competencies were suitable to a great extent. The mean score of these responses is 3.00 showing that the class wise competencies are suitable *to a great extent.*
20. Three of the respondents indicated that the contents were arranged sequentially from the concrete to the abstract to a great extent. One respondent opined that they were sequential to some extent. The mean score

of these responses is 2.75 indicates that the contents are arranged sequentially from the concrete to the abstract *to a great extent.*

21. Three respondents expressed the opinion that the contents were arranged sequentially from specific to general to a great extent. One respondent indicated that they were arranged to some extent. The mean score of these responses is 2.75 indicating that the contents are arranged sequentially from the specific to general *to a great extent.*

5.4.2.2 Analysis of the Data Obtained from Item II

In item II, the opinions of subject specialists related to the appropriateness/inappropriateness of objectives, competencies and content-areas in primary mathematics curriculum were obtained. In this respect three of the respondents were of the opinion that objectives, competencies and content in the primary mathematics curriculum are appropriate. One did not opine for this item.

5.4.2.3 Analysis of the Data Obtained from Item III

In item III, the experts' (subject specialists) opinion was sought on whether socio-cultural aspects of the learners' society are reflected in the content areas of primary mathematics curriculum in grades I-V. Further, the experts (subject specialists) were requested to give their suggestions for any modifications required in the curriculum in this context.

All the subject specialists, except one, expressed the opinion that *class wise content areas in the primary mathematics curriculum reflect the socio-cultural aspects of the learners' society* in the following manner:

Grade – I: Counting of concrete objects, reading of numbers (from 1 to 50); Through figures and pictures for counting; Addition, subtraction (reflected the socio-cultural aspect to a Great extent e.g. National flag, National fruit, flower, fish, etc.); Big-Small, Long-Short, Thick-Thin, Far-Near, Heavy-Light; Currency and Name of Week.

Grade – II: Counting of concrete objects, reading of number (from 51 to 100); Knowing and using names of the days and months; Through figure and pictures for counting; Addition – subtraction; Numbers: Place value, Comparison; Multiplication – division; Measurement (Length, mass, capacity); Fractions and Geometrical shapes.

Grade – III: Knowing metric units of Length, mass and capacity; Numbers: Place value, comparison; Four fundamental operations; Currency; Fractional numbers; Time (day, month); Geometry and Solving problems.

Grade – IV: Knowing different units of measuring length, mass and liquid; Numbers: Roman numbers, place value, comparison of numbers, odd – even numbers; Four fundamental operations; Fractions and decimals; LCM and HCF; Time (day, month); Geometry and Solving problems (involving four fundamental operations).

Grade – V: Knowing the names of Hijri months, English and Bengali months; Numbers: Place value; Four fundamental operations; LCM and HCF; Knowing different units of measuring length, weight, volume and area; Percentage; Fractions; Time (day – month – year); Capital-expenditure, Cash-memos; Geometry and Solving problems.

Three of the four subject specialists suggested that *new contents in the curriculum for covering socio-cultural aspects of the learners' society be incorporated* in the following manner :(i) The socio-cultural aspects of the learners' society can be adequately reflected, if the author/teacher draws the same from within the existing curricular contents. (ii) Existing subject-matter of mathematics curriculum is appropriate for children. It is further necessary to teach content on the basis of socio-cultural aspects. (iii) Awareness of aids should be introduced.

5.4.2.4 Analysis of the Data Obtained from Item IV

In item IV, the subject specialists highlighted the need for introducing illustrative examples for explaining mathematics content and ascertaining whether those reflect cultural aspects of the society.

All the four respondents *highlighted the need for illustrative examples for explaining mathematics content which reflect different cultural aspects of the society* in the following manner: (i) Mathematics is an abstract subject. Here scope of inclusion of cultural aspects of the society is very limited, except in case of figures and pictures vis-à-vis putting same name of persons and occasions in problems. (ii) The cultural aspect of mathematics is now universally recognized and it has given rise to what is known as "ethno mathematics". In the Indian sub-continent, the cultural aspect is deep-rooted and well-appreciated. (iii)

Sufficient number of illustrative examples should be included in the existing content to make it more interesting for the children. This will enlighten them regarding different cultural aspects of the society. (iv) Illustrative examples are needed for explaining mathematics content. Because it will enable children to learn content appropriately.

5.4.2.5 Analysis of the Data Obtained from Item V

In item V the experts (subject specialists) were requested to list major strengths of the mathematics curriculum. All the four subject specialists indicated the *major strengths of the present mathematics curriculum* in the following manner: (i) Objectives are clearly formulated. (ii) Socio-cultural aspects are well developed through the solved problems.(iii) Awareness about writing and counting number with help of concrete objects.(v) Concepts of number are well articulated from grade I to grade-V.

5.4.2.6 Analysis of the Data Obtained from Item VI

In item VI, the experts (subject specialists) were requested to identify weaknesses of the curriculum that needed immediate attention. All the four subject specialists opined in the following manner: (i) There is no scope for developing the skill of translating verbal statements into mathematical forms and vice versa. (ii) Compartmentalization of the mathematics curriculum into "competencies" may result in a fragmented view of the subject. (iii) Problems related to four fundamental operations, percentage and fractions were complex and complicated. (iv) Lack of content articulation (vertical) from grade II to grade III.

5.4.2.7 Analysis of the Data Obtained from Item 'VII'

In item VII the experts (subject specialists) were requested to suggest measures for more effective implementation of the mathematics curriculum. All the four subject specialists gave the following suggestions for the successful implementation of the mathematics curriculum: (i) Effective implementation of the mathematics curriculum depend, to a very great extent upon the availability of competent teachers. (ii) Needs trained and skilled teacher.(iii) Needs to eliminate the high rate of dropout. (iv) To implement the evaluation and

assessment properly for promoting students in next class. (v) Supervision system should be properly implemented for betterment of classroom situation.(vi) Word problems should be selected from real-life situation. (vii) Four fundamental operations, fractional number and its operation and unitary method should be learned very deeply and clearly for its further applications in real-life situation. (viii) In-service training on mathematics should be made obligatory and lucrative at least after every five years trainees should be well equipped. (ix) Authority should be appointed only such mathematics teachers who themselves have studied mathematics.

5.4.3: Analysis and Interpretation of Data Gathered from Curriculum Specialists of west Bengal from Opinionnaire

The opinionnaire was distributed to six curriculum specialists of West Bengal. All the respondents reflected their opinions to all the sub-items of item-I of part-I and all the items of part-II. In fact, part-I consists of only one item while part-II (of opinionnaire) consists of items-II to VII.

5.4.3.1 Analysis of the Data Obtained from Part-I

The responses given by curriculum specialists to all the statements of sub-items in part-I are represented through table-5.22. Later the data given in table-5.22 are analyzed and interpreted in this subsection.

Table-5.22: Opinions of the Curriculum Specialists of West Bengal

	Statements of the sub-items:	Frequency of responses				Mean of Scale values
	Suitability / appropriateness of -	TGE	TSE	TLE	NAA	
1.	Objectives of primary mathematics curriculum as incorporated in the selected grades / classes	4	2			2.67
2.	Objectives for developing basic skills and understanding of numerical concepts.	5		1		2.67
3.	Objectives for developing learning skills and attitudes	3	3			2.50
4.	Objectives for developing the habit of solving problems through scientific methods as well as developing a scientific outlook on life.	3	2		1	2.17
5.	Objectives for developing the skill of translating verbal statement (a) in mathematical forms using appropriate symbols and (b) diagrammatically	3	2	1		2.33
6.	Objectives for making reasonably good approximation and estimating measurements	3	1	2		2.17
7.	Objectives for inculcating reasoning and critical thinking abilities	3	2		1	2.17
8.	Incorporated contents for developing expected knowledge, skills and attitudes	4	2			2.67
9.	Incorporation of the concept of numbers, in the primary mathematics curriculum	4	2			2.67
10.	Four fundamental operations in mathematics towards development of thinking abilities of children.	4	1	1		2.50
11.	The lessons for developing awareness about unit of money, length, weight, area, square, measure and time in terms of using them in daily life.	5	1			2.83
12.	Fractions in developing concepts	3	2	1		2.33
13.	Basic geometrical figures in the development of concepts in children	1	2	3		1.67
14.	Competencies for developing awareness among children to solve then day to day problems.	4	2			2.67
15.	Content in the context of the specified objectives	3	3			2.50
16.	Methodology prescribed in the curriculum in the context of the specified objectives	3	3			2.50
17.	The difficulty level of the contents, to the learners	2	3	1		2.17
18.	Class wise vertical articulation of the contents	2	4			2.33
19.	Class wise competencies	5	1			2.83
20.	Sequential arrangement of contents from the concrete to the abstract	5		1		2.67
21.	Sequential arrangement of content from the specific to general	4	1		1	2.33

The data of table-5.22 were analyzed and interpreted as follows:

1. Four of the respondents indicated that the objectives of the primary mathematics curriculum were suitable for the selected grades to a great extent. Two respondents were of the opinion that the objectives were suitable to some extent. The mean score of these responses is 2.67 indicates that the objectives of the curriculum are suitable for the selected grades *to a great extent* (Refer Table-5.22).
2. Five of the respondents were of the opinion that the objectives for developing basic skills and understanding of numerical concepts were suitable for the children to a great extent. One respondent indicated that the objectives were suitable to a little extent. The mean score of these responses is 2.67.From the table-5.22, it could be interpreted that the value 2.67 lies in the interval [2.5, 3.00] hence the objectives are suitable for developing basic skills and understanding of numerical concepts *to a great extent.*
3. Three of the respondents were of the opinion that the objectives were suitable for developing learning skills and attitudes, to a great extent. Three respondents expressed that the objectives were suitable to some extent. The mean score of these responses is 2.50 showing that the objectives are suitable for developing learning skills and attitudes *to a great extent.*
4. Three of the respondents indicated that the objectives were suitable for developing thehabit of solving problems through scientific methods as well as developing a scientific outlook on life, to a great extent. Two of the respondents were of the opinion that objectives were suitable to some extent. One respondent opined that the objectives were not suitable at all. The mean score of these responses is 2.17 indicates that objectives are suitable for the learners *to some extent.*
5. Three of the respondents indicated that the objectives were suitable for developing the skill of translating verbal statements into mathematical forms using appropriate symbols and diagrams, to a great extent. Two of the respondents were of the opinion that objectives were suitable to some extent. One of the respondents thought that the objectives were suitable to a little extent. The mean score of these responses is 2.33 showing that the objectives are suitable.

6. Three of the respondents held the opinion that the objectives were suitable to a great extent. One of the respondents thought that the objectives were suitable to some extent. Remaining two respondents thought that the objectives were suitable for making reasonably good approximations and estimating measurements, to a little extent. The mean score of these responses is 2.17 indicating that the objectives are suitable *to some extent.*

7. Three of the respondents indicated that the objectives were suitable for inculcating reasoning and critical thinking abilities to a great extent. Two respondents opined that the objectives were suitable to some extent. One respondent opined that the objectives were not suitable at all. The mean score of these responses is 2.17 indicates that the objectives are suitable for the learners *to some extent.*

8. Four of the respondents indicated that the incorporated contents were suitable for developing expected knowledge, skills and attitudes to a great extent. Two respondents thought that the contents were suitable to some extent. The mean score of these responses is 2.67 which indicates that the contents are suitable for developing expected knowledge, skills and attitudes *to a great extent.*

9. Four of the respondents indicated that the concept of numbers were appropriate in the primary mathematics curriculum to a great extent. Two of the respondents were of the opinion that the concepts of numbers were suitable to some extent. Thus, it was found that all the six respondents were of the opinion that concept of numbers were suitable for children. The mean score of these responses is 2.67 indicating that the incorporation of the concept of numbers are appropriate in the primary mathematics curriculum *to a great extent.*

10. Four of the respondents were of the opinion that the four fundamental operations were appropriate for developing of thinking abilities of children to a great extent. One of the respondents indicated that they were appropriate to some extent while one of the respondents opined that they were appropriate to a Little extent. The mean score of these responses is 2.50 showing that the four fundamental operations in mathematics are appropriate for developing the thinking abilities of children *to a great extent.*

11. Five of the respondents indicated that the units of money, length, weight, area, square, measure and time were suitable for developing awareness in terms of using in daily life to a great extent. One of the respondents held the opinion that the lessons were suitable to some extent for developing the said awareness. The mean score of these responses is 2.83 indicates that the lessons are suitable for developing awareness in terms of using children in daily life *to a great extent.*

12. Three of the respondents held the opinion that the fractions were suitable for developing concepts in children to a great extent. Two respondents thought that fractions were suitable to some extent while one of the respondents thought that it were suitable to a Little extent. The mean score of these responses is 2.33 which indicates that the fractions in primary mathematics are suitable for developing concepts for the pupils *to some extent.*

13. One of the respondents held the view that geometrical figures were suitable to a great extent. Two of the respondents opined that the developments of concepts of basic geometrical figures were suitable to some extent. Three respondents indicated that they were suitable to a little extent. The mean score of these responses is 1.67 which indicates that basic geometrical figures are suitable for developing concepts *to some extent.*

14. Four of the respondents indicated that competencies were suitable for children to a great extent. Two respondents thought that competencies were suitable to some extent. The mean score of these responses is 2.67 indicates that the competencies are suitable for developing awareness among children to solve their day to day problems *to a great extent.*

15. Three of the respondents were of the opinion that the contents were suitable in the context of the specified objectives to a great extent. The remaining three respondents opined that contents were suitable to some extent. The mean score of these responses is 2.50 indicating that the contents are suitable in the context of the specified objectives *to a great extent.*

16. Three of the respondents indicated that the methodologies prescribed in the curriculum were suitable in the context of the specified objectives to a great extent and the remaining three respondents indicated they were suitable to some extent. The mean score of these responses is 2.50 indicating that the

methodologies prescribed in the curriculum are suitable in the context of the specified objectives *to a great extent.*

17. Two of the respondents indicated that the contents were difficult for the learners to a great extent. Three respondents opined that contents were difficult to some extent. One of the respondents indicated that it were suitable to a little extent. The mean score of these responses is 2.17 indicating that the contents are difficult for the learners *to some extent.*

18. Two of the respondents indicated that the class wise vertical articulation of the contents were suitable to a great extent. Four respondents opined that they were suitable to some extent. The mean score of these responses is 2.33 indicates that class wise vertical articulations of the contents are suitable *to some extent.*

19. Five of the respondents indicated that the class wise competencies were suitable to a great extent. One respondent indicated that they were suitable to some extent. The mean score of these responses is 2.83 showing that the class wise competencies are suitable *to a great extent.*

20. Five of the respondents indicated that the sequential arrangements of contents were suitable to a great extent from the concrete to the abstract. One of the respondents indicated that it were suitable to a little extent. The mean score of these responses is 2.67 showing that sequential arrangements of contents are suitable form the concrete to the abstract *to a great extent.*

21. Four of the respondents indicated that the sequential arrangement of contents from the specific to general were suitable to a great extent. One of the respondents indicated that sequential arrangements of contents were suitable to some extent and the remaining one respondent indicated that it were not suitable at all. The mean scale score of these responses is 2.33 indicating that sequential arrangements of content are suitable from the specific to general *to some extent.*

5.4.3.2 Analysis of the Data Obtained From Item II

In item II, opinions of curriculum specialists (West Bengal) regarding appropriateness/inappropriateness of objectives, competencies and content-areas in primary mathematics curriculum was obtained. In this respect, five of the

respondents were of the opinion that objectives, competencies and content in the primary mathematics curriculum are appropriate. One did not opine in this item.

5.4.3.3 Analysis of the Data Obtained From Item III

In item III, the curriculum specialists' opinion was sought on whether Socio-Cultural aspects of the learners' society are reflected in the content areas of primary mathematics curriculum in grades I-V. Further, the experts were requested to give their suggestions for any modifications required in the curriculum in this context. All the experts, except one, opined that *content areas in primary mathematics curriculum reflected the socio – cultural aspects of the learners' society* in the following manner:

The opinion of **three** experts: - The content areas in almost all the chapters for grades I-V reflect the socio-cultural aspects of the learners' society. One of the respondents expressed the opinion that the general principles and objectives which are mentioned in the curricula do reflect the socio-cultural aspects of the learners' society but it is up to the textbook author to include and select suitable content to match these objectives and to focus the same in the prevailing socio-cultural context.

One of the experts clearly mentioned about socio-cultural aspects of the curriculum, grade wise. According to this expert, in grade-I, the process of learning the content number, acquaintance with coins and time reflect the socio-cultural aspects of the learners' society. In grade-II, the content related to number and units reflect socio-cultural aspects. The same expert did not opine about grade III. Later, he has opined that the content of geometry and units in grade-IV reflect socio-cultural aspects. Further in grade-V, unitary system, accounts, percentage, area and graph reflect socio-cultural aspects.

One of these six experts did not opine any thing related to socio-cultural aspects of primary mathematics curriculum.

Four of the six experts suggested that *new contents in the curriculum for covering socio-cultural aspects of the learners' society be incorporated* in the following manner: (i) Unitary method may be included in grade IV instead of grade-V. (ii) Calculation of the volume of wood would be included in grade-V. (iii) Examples chosen should be familiar to the child and so should be chosen from his own and familiar environment. (iv) In all grades, children's play is the

best tool for teaching elementary mathematics. It is not necessary to include new content but it is essential that the existing ones be used effectively.

5.4.3.4 Analysis of the Data Obtained From Item IV

In item IV, the experts highlighted the need for introducing illustrative examples for explaining mathematics content and determine whether these reflect cultural aspects of the society. Four respondents out of the six experts *highlighted the need for illustrative examples for explaining mathematics content which reflects cultural aspects of the society* in the following manner: (i) Illustrative examples help the pupils to comprehend arithmetic at the primary stage. Therefore, such examples are essential in a textbook. (ii) As these are already included, there is no need for more inclusion. (iii) This is a matter be left to the discretion of the textbook author. (iv)Illustrations focus on interest areas of the girls and games - generally played by the children.

5.4.3.5 Analysis of the Data Obtained From item V

In Item V, the curriculum specialists were requested to list major strengths of the mathematics curriculum. Four of the six experts indicated *major strengths of the present mathematics curriculum* in the following manner: (i) It consciously integrates mathematics with daily life situations. (ii) The curricula prescribed are in accordance with the Bloom's taxonomy of objectives. (iii) It is child – centred. (iv) It is activity oriented. (v) It takes into account the socio-cultural basies of mathematics learning. (vi)It emphasizes the basic numerical concepts and operations.

5.4.3.6 Analysis of Data Obtained from Item VI

In Item VI, the experts were requested to identify weaknesses of the curriculum that needed immediate attention. Three respondents out of six experts *identified weaknesses of the present mathematics curriculum identifying areas that need immediate attention,* in as follows: (i) Use of play way method has been almost ignored. (ii) Word problems are complex. (iii) Introductions to mathematical concepts are abstract. (iv) More emphasis is on arithmetic and less on geometry. (v) Teaching of mathematics is dull and boring.

5.4.3.7 Analysis of Data Obtained from Item VII

In Item VII, the experts (curriculum specialists) were requested to suggest ideas for more effective implementation of the mathematics curriculum. Four experts out of six gave the following suggestions in this regard: (i) Play way approach, an effective method of teaching elementary mathematics, can be used and some suggestions for using common local games and sports which need almost no equipment may be used for the implementation. (ii) More examples from daily life are to be given. (iii) Text books are to be revised on the basis of latest information. (iv)Introduction of effective teacher education programmes. (v) Incentives to be given to teachers to motivate them to be more committed and devoted. (vi) Introduce B.Ed. and M.Ed. courses for primary school teachers for better professional exposure and professional development.

One expert has given further suggestions grade wise as follows:

Grade – I

(i) Cardinal numbers be introduced first. For this, handling and grouping of objects. (ii) Then ordinal numbers to be introduced and stressed. This also may be done with the help of concrete objects. (iii) Numbers which are greater than 9 to be introduced as groups of 10. (iv) Numbers to be displayed in columns (Thousands, hundreds, tens, units). (v) Number bonds of addition (+) not to be memorized, but internalized through use.

Grade – II

(i) Addition to be introduced by grouping objects.(ii) Subtraction to be introduced simultaneously as an inverse operation. (iii) Multiplication to be introduced by simple examples (verbal) and then as repeated addition (+). Tables not to be memorized. (iv) Patterns to be discovered by tracing on the dotted patterns. More ideas on shapes and directions are necessary for understanding number patterns and shapes and puzzles.

Grade – III

(i) In fractions– just the idea needs to be introduced in concrete ways.(ii) Multiplication tables must not be memorized. Tables only up to 11 are needed.(iii) Basically, there is an inclination to memorize which should be avoided. Children are not encouraged to be enquiry oriented.

Grade – IV

(i) Long multiplication (×) to be introduced in steps e.g. × 25 meaning × 20 + ×5. This is not to be made repetitive or too long in the age of calculators. (Similarly long division to be introduced in steps). (ii) Equivalent fractions to be introduced by concrete means. (iii) Decimals +, –, × and ÷ to be introduced in a phased manner and logically. LCM, HCF to be introduced not before class-V and that too by linking to patterns.

Grade – V

(i) Percentage (%) to be introduced practically and connected to decimals and fractions. Hence fractions are needed to be dealt with before this grade.(ii) Idea of angles as rotation and direction needed.(iii) Idea of simple coordinates may be introduced.

5.4.4 Analysis and Interpretation of Data Gathered from Subject Specialists of West Bengal from Opnionnaire

The opinionnaire was distributed to four subject specialists of West Bengal. All the respondents reflected their opinions to all the sub-items of item-I of part-I and all the items of part-II. In fact, part-I consists of only one item while part-II (of opinionnaire) consists of items-II to VII.

5.4.4.1 Analysis of the Data Obtained From Part-I

The responses given by subject specialists to all the statements of sub-items in part-I are represented through table-5.23. Later the data given in table-5.23 are analyzed and interpreted in this subsection.

Table-5.23: Opinion of the Subject Specialists of West Bengal

	Statements of the sub-items:	Frequency of responses				Mean of Scale values
	Suitability / appropriateness of -	TGE	TSE	TLE	NAA	
1.	Objectives of primary mathematics curriculum as incorporated in the selected grades / classes	1	3			2.25
2.	Objectives for developing basic skills and understanding of numerical concepts.	3	1			2.75
3.	Objectives for developing learning skills and attitudes	2	2			2.50
4.	Objectives for developing the habit of solving problems through scientific methods as well as developing a scientific outlook on life.		3	1		1.75
5.	Objectives for developing the skill of translating verbal statement (a) in mathematical forms using appropriate symbols and (b) diagrammatically	1		2	1	1.25
6.	Objectives for making reasonably good approximation and estimating measurements		2	2		1.50
7.	Objectives for inculcating reasoning and critical thinking abilities		1	3		1.25
8.	Incorporated contents for developing expected knowledge, skills and attitudes	2	1	1		2.25
9.	Incorporation of the concept of numbers, in the primary mathematics curriculum	3		1		2.50
10.	Four fundamental operations in mathematics towards development of thinking abilities of children.	2	1	1		2.25
11.	The lessons for developing awareness about unit of money, length, weight, area, square, measure and time in terms of using them in daily life.	2	2			2.50
12.	Fractions in developing concepts		4			2.00
13.	Basic geometrical figures in the development of concepts in children	1	2	1		2.00
14.	Competencies for developing awareness among children to solve their day to day problems.	1	2	1		2.00
15.	Content in the context of the specified objectives	1	3			2.25
16.	Methodology prescribed in the curriculum in the context of the specified objectives	1	3			2.25
17.	The difficulty level of the contents, to the learners		3	1		1.75
18.	Class wise vertical articulation of the contents	1	2	1		2.00
19.	Class wise competencies	1	2	1		2.00
20.	Sequential arrangement of content from the concrete to the abstract		2		2	1.00
21.	Sequential arrangement of content from the specific to general		1	1	2	0.75

The data of table-5.23 were analyzed and interpreted as follows:

1. One respondent indicated that the objectives of primary mathematics curriculum were suitable for the selected grades to a great extent. Three respondents indicated that the objectives were suitable to some extent. The mean score of these responses is 2.25 indicating that the objectives of the curriculum are suitable for the selected grades *to some extent* (Refer Table-5.23).
2. Three of the respondents were of the opinion that the objectives for developing basic skills and understanding of numerical concepts were suitable for the children to a great extent. One respondent indicated that the objectives were suitable to some extent. The mean score of these responses is 2.75. From table-5.23, it could be interpreted that the value 2.75 lies in the interval [2.5, 3.00] hence the objectives are suitable for developing basic skills and understanding of numerical concepts *to a great extent.*
3. Two of the respondents were of the opinion that the objectives were suitable fordeveloping learning skills and attitudes to a great extent. Two respondents expressed that the objectives were suitable to some extent. The mean score of these responses is 2.50 showing that objectives are suitable for developing learning skills and attitudes *to a great extent.*
4. Three of the respondents held the opinion that the objectives were suitable for developing habit of solving problems through scientific methods as well as developing a scientific outlook on life, to some extent. One of the respondents opined that objectives were suitable to a little extent. The mean score of these responses is 1.75 showing that the objectives are suitable for developing the habit of solving problems through scientific methods as well as developing a scientific outlook on life *to some extent.*
5. One respondent indicated that the objectives were suitable for developing the skill of translating verbal statements into mathematical forms using appropriate symbols and diagrams, to a great extent. Two of the respondents were of the opinion that objectives were suitable to a Little extent. One respondent opined that the objectives were not suitable at all. The mean score of these responses is 1.25 indicating that the objectives are suitable *to a little extent.*

6. Two respondents opined that the objectives were suitable for making

reasonably good approximations and estimating measurements to some extent. Remaining two respondents indicated that the objectives were suitable to a little extent. The mean score of these responses is 1.50 indicates that objectives are suitable for making reasonably good approximations and estimating measurements *to some extent.*

7. One respondent indicated that the objectives were suitable for inculcating reasoning and critical thinking abilities to some extent. Three respondents opined that the objectives were suitable to a little extent. The mean score of these responses is 1.25 which indicates that objectives are suitable *to a little extent.*
8. Two of the respondents indicated that the incorporated contents were suitable for developing expected knowledge, skills and attitudes to a great extent. One respondent opined that the contents were suitable to some extent. Remaining respondents opined that the contents were suitable to a little extent. The mean score of these responses is 2.25 indicating that the contents are suitable for developing expected knowledge, skills and attitudes *to some extent.*
9. Three of the respondents indicated that the concept of numbers were suitable for incorporating in mathematics curriculum to a great extent. One respondent opined that the concepts of numbers were suitable to a little extent. The mean score of these responses is 2.50 indicating that the concepts of numbers are suitable for the children *to a great extent.*
10. In this respect two of the respondents were of the opinion that the four fundamental operations were suitable for developing the thinking abilities of children, to a great extent. One of the respondents indicated that they were appropriate to some extent while one of the respondents indicated that they were appropriate to a little extent. The mean score of these responses is 2.25 showing that the four fundamental operations in mathematics are appropriate for developing the thinking abilities of children *to some extent.*
11. Two of the respondents indicated that the units of money, length, weight, area, square, measure and time were suitable for developing awareness in terms of using in daily life, to a great extent. Two of the respondents held the opinion that the lessons were suitable to some extent. The mean score of these responses is 2.50 which indicates that the lessons are suitable *to a great extent.*

12. All the four respondents agreed that fractions were suitable for developing the concepts in children to some extent. The mean score of these responses is 2.00 indicating that fractions in mathematics are suitable for developing concepts the pupils *to some extent.*
13. One of the respondents held the view that the basic geometrical figures were suitable to a great extent for developing the concepts of the children. Two respondents expressed that they were suitable to some extent. One respondent that they were suitable to a little extent. The mean score of these responses is 2.00 which indicates that basic geometrical figures are suitable for developing concepts *to some extent.*
14. One respondent indicated that competencies were suitable for children to a great extent. Two respondents opined that competencies were suitable to some extent. One of the respondents expressed the opinion that they were suitable to a little extent. The mean score of these responses is 2.00 showing that the competencies are suitable for developing awareness among children to solve their day to day problems to *some extent.*
15. One of the respondents was of the opinion that the contents were suitable in the context of the specified objectives to a great extent. The remaining three respondents indicated that contents were suitable to some extent. The mean score of these responses is 2.25 which indicates the contents are suitable in the context of the specified objectives *to some extent.*
16. One respondent expressed that the methodologies prescribed in the curriculum were suitable in the context of the specified objectives to a great extent and the remaining three respondents indicated they were suitable to some extent. The mean score of these responses is 2.25 which indicates that the methodologies prescribed in the curriculum are suitable in the context of the specified objectives *to some extent.*
17. Three of the respondents indicated that the contents were difficult to some extent. One respondent expressed the opinion that the contents were difficult to a little extent. The mean score of these responses is 1.75 which indicates that the contents are difficult for the learners *to some extent.*

18. One of the respondents indicated that the class wise vertical articulation of

the contents were suitable to a great extent. Two respondents indicated that the contents were articulated to some extent. One respondent opined that they articulated to a little extent. The mean score of these responses is 2.00 which indicates that the contents are articulated vertically class wise *to some extent only.*

19. One respondent expressed the opinion that the class wise competencies were suitable to a great extent. Two of the respondents indicated that the class wise competencies were suitable to some extent and remaining one respondent indicated that they were suitable to a little extent. The mean score of these responses is 2.00 showing that class wise competencies are suitable *to some extent* only.

20. Two of the respondents indicated that the contents were arranged sequentially from the concrete to the abstract to some extent. Two respondents opined that they were not sequential from the concrete to the abstract at all. The mean score of these responses is 1.00 indicating that sequential arrangements of contents from the concrete to the abstract are suitable *to a little extent* only.

21. One of the respondents expressed the opinion that the contents were arranged sequentially from the specific to general to a great extent. One respondent indicated that they were suitable to some extent while two respondents indicated that they were not arranged sequentially from the specific to general at all. The mean score of these responses is 0.75 showing that the contents are arranged sequentially from the specific to general *to a little extent.*

5.4.4.2 Analysis of the Data Obtained from Item II

In item II, opinion of subject specialists (West Bengal) regarding the appropriateness/inappropriateness of objectives, competencies and content-areas in primary mathematics curriculum was obtained. In this respect, all the four respondents expressed the opinion that objectives, competencies and content in the primary mathematics curriculum are appropriate.

5.4.4.3 Analysis of the Data Obtained from Item III

In item III, experts' (subject specialists) opinion was sought on whether socio-cultural aspects of the learners' society are reflected in the content areas of

primary mathematics curriculum in grades I-V. Further, the experts were requested to give their suggestions for any modifications required in the curriculum in this context.

All the four subject specialists expressed the opinion that *class wise content areas in the primary mathematics curriculum reflect the socio-cultural aspects of the learners' society* in the following manner:

Grade-I: Acquaintance with monetary system; Addition and subtraction.

Grade-II: Acquaintance with monetary system; Four fundamental operations; Acquaintance with length, height and weight; Different Units such as measures of length, mass, capacity and time.

Grade-III: Deeper acquaintance with monetary system ; Four fundamental operations ; Different units such as measures of length, measures of mass, measures of capacity and measures of time ; Decimals fractions ; Geometrical concepts .

Grade-IV: Acquaintance with monetary system; four fundamental operations; Measures of length, mass and capacity; mean; fractions and Geometry.

Grade-V: Four fundamental operations; Measures of length, mass and capacity; Decimals / fractions; mean; Geometry; Unitary method; Percentages; Area; Graph, Bar graph and Maintenance of accounts for school functions.

All the four experts (subject specialists) suggested that *new contents in the curriculum for covering socio-cultural aspects of the learners' society be incorporated* in the following manner: (i) Unitary method (Simple application in time and work, time and distance) may be included in grade – III. (ii) Measurement of land, work and wages (by drawing figures) may be included in grade IV and V. (iii) Numerical problems should be realistic and should be drawn from daily life.(iv) Numerical problems should be realistic and should cover both the rural and urban aspects of life from grade II onwards. The problems should relate to banking, industry, agriculture, activities of different types of cooperatives, insurance, health, education, social and welfare activities, environment, removal of superstitions, good and bad habits, moral values etc.

5.4.4.4 Analysis of the Data Obtained from Item IV

In item IV, the subject specialists highlighted the need for introducing illustrative examples for explaining mathematics content and ascertaining whether those reflect cultural aspects of the society.

In this respect, all of the four respondents *highlighted the need for illustrative examples for explaining mathematics content which reflect different cultural aspects of the society* in the following manner: (i) The books for different grades should contain sufficient number of practical illustrative problems which may help to explain the role of mathematics in different cultural contexts of the society. These problems will make mathematics more interesting for the students. (ii) Some problems relating to the cultural functions held in a school should always be included in the text book; such problems could be regarding the statement of accounts or even regarding the items in the function such as the time schedule for songs, recitation or dramas or speeches in the entire function. (iii) The books for different grades may contain sufficient number of examples which are related to problems of our daily life. The problems must not be abstract. (iv) Examples based on mathematical processes used by farmers, weavers, fisherman, cobblers, etc. may be included to relate mathematical problems to daily life situations.

5.4.4.5 Analysis of the Data Obtained from Item V

In item V, the experts' (subject specialists) were requested to list major strengths of the mathematics curriculum.

All the four experts indicated the *major strengths of the present mathematics curriculum* in the following manner: (i) Understanding of numerical concepts (integers, fractions, decimals representations) are well developed. (ii) Learners' grasp over four fundamental operations and their use to solve various problems of everyday life. (iii) Acquaintance with the units for measuring objects used in our everyday life and relations between different units. (iv) Awareness about units of money, length, weight, area, square, measure and time. (v) Partial development of concepts about basic geometrical figures. (vi)The following concepts are well developed; mean, LCM, HCF, accounting, percentage, graph, geometrical figures, and measurement of land. (vii) An attempt has been made to make mathematics life-centred, child-centred and environment centred.

5.4.4.6 Analysis of the Data Obtained from Item VI

In item VI, the experts (subject specialists) were requested to identify weaknesses of the curriculum that needed immediate attention.

All the four subject specialists identified the following weaknesses of the present mathematics curriculum that needed immediate attention: (i) There is no attempt to arrange the content-matter, sequentially, from concrete to abstract. (ii) There is no attempt made in the present curriculum for developing the skill of translating verbal statements into mathematical forms, using appropriate symbols. (iii) There is no emphasis on differentiating between digits and numbers. (iv) There is no attempt to introduce the concepts of set and its operations. (v) The idea of numbers is insufficient. (vi) Similar and dissimilar things are not clear.(vii) The criteria for confirming the use of operation of addition and multiplication. For example similar things can be added; dissimilar things can not be added, etc. (viii) Less emphasis laid on concepts of LCM, HCF, manipulation in fractions, decimals, etc.

5.4.4.7 Analysis of the Data Obtained from Item VII

In item VII, the subject specialists were requested to suggest measures for more effective implementation of the mathematics curriculum. The success of any curriculum depends on its successful implementation.

For this all the four experts (subject specialists) gave the following suggestions: (i) Sufficient infrastructure such as proper school building, sufficient number of class rooms, library, models, black-boards, etc. should exist. (ii) At least six teachers should be appointed in a primary school, from class I to V with one section each. (iii) The teacher-student ratio should be appropriate, i.e., no section should contain more than 40 students. (iv) The most important tool for the successful implementation of the mathematics curriculum is the teacher and his/her dedication to teaching. The teacher should have an aptitude in mathematics and should encourage the students to ask questions and to take part in the discussions in the class. (v) The books should be free from errors and be well-written. (vi)The idea of numbers should be given by real objects and not by a mere symbol. (vii) Stress should be given on four fundamental operations. (viii) Sufficient number of examples on each topic should be given. (ix) More

activities are necessary. (x) Evaluation of mathematics work should be frequently made. (xi) More simple verbal problems should be practiced for developing creative and logical thinking. (xii) More stress should be given on using drawing instruments for geometric figures – like lines, triangles, circles, designs with use of circles, angle bisectors, comparing and measuring angles.

On the basis of the above analysis **(sections 5.4.1, 5.4.2, 5.4.3, 5.4.4)** the following interpretations may be drawn with regard to the suitability of objectives, content and competencies (item I & II); socio-cultural aspect (item III & IV); and strength and weaknesses (item V & VI) of mathematics curriculum in Bangladesh and West Bengal.

Analysis shows that mean score of sub-items 1, 2, 3, 8, 9, 10, 12 & 19 of item-I in part-I fall into the interval [2.5, 3.00]. It means that according to Bangladesh experts (curriculum and subject specialists) objectives in general for primary mathematics curriculum and specifically the objectives for developing basic skills, understanding and attitudes are suitable to a great extent. Also, content incorporated for developing mathematical knowledge, thinking (specifically for content: concept of number, FFOs and fraction), skills and attitudes are suitable to a great extent. It was also found that class-wise competencies are suitable to a great extent.

The mean score for sub-items 4,5,6,7, 11, 13, 14, 15,16,17,18, 20 & 21 of item-I in part-I fall into interval [1.5, 2.5). It means that in the opinion of Bangladesh experts the objectives for developing habit (of solving problems through scientific methods as well as developing a scientific outlook on life), skills (of translating verbal statement in mathematical forms using appropriate symbols and diagram),appropriate approximation and estimation, critical thinking and reasoning are suitable to some extent. Also, contents are suitable to some extent for developing awareness (about unit of money, length, weight, area, square, measure and time in terms of using them in daily life) , for developing concepts (in the context of geometry, specified objectives) while difficulty level of content and sequential arrangement of content are also suitable to some extent. It was found that competencies for developing awareness (among children to solve their day to day problems) are suitable to some extent. Similar responses are obtained

through the analysis of item-II in part-II (Refer 5.4.1.2 & 5.4.2.2) which indicates that curriculum specialists (67%) and subject specialists (75%) from Bangladesh opine that objectives, content and competencies of the curriculum are suitable.

While analyzing opinions given by experts in West Bengal, it is found that the mean score for sub-items 2, 3, 9 & 11 fall into interval [2.5, 3.00]. It means that in the opinion of West Bengal experts objectives for developing basic skills (understanding of numerical concepts), and attitudes are suitable to a great extent. Also, content incorporated for developing (concept of numbers) awareness (about unit of money, length, weight, area, square, measure and time in terms of using them in daily life) are suitable to a great extent ,Hence, it could be interpreted that sub-items 2, 3, 9 & 11 of item-I are suitable to a great extent.

The mean score for sub-items 1,4 ,5,6,7,8, 10, 12,13, 14, 15, 16, 17, 18, 19, 20 & 21 of item-I in part-I fall into interval [1.5, 2.5), it means that in the opinion of West Bengal experts objectives in general primary mathematics curriculum, specially for developing habit (of solving problems through scientific methods as well as developing a scientific outlook on life), skills (of translating verbal statement in mathematical forms using appropriate symbols and diagram),appropriate approximation and estimation, critical thinking and reasoning are suitable to some extent. Also, analysis shows that content incorporated for developing mathematical knowledge, thinking (specifically for content: FFOs and fraction and geometrical figures), skills and attitudes are suitable to some extent. It was found that content (in the context of specified objectives, difficulty level, vertical articulation and sequential arrangement) are suitable to some extent. It was also found that competencies (class-wise) for developing awareness (among children to solve their day to day problems) are suitable to some extent. Similar responses are obtained through the analysis of item-II in part-II (Refer 5.4.3.2 & 5.4.4.2) which indicates that curriculum specialists (83%) and all subject specialists from west Bengal opine that the objectives, content and competencies of the curriculum are suitable.

According to curriculum specialists and subject specialists from Bangladesh, concept of numbers, currency, time, four fundamental operations, measurement, percentage, capital-expenditure, cash-memos reflect the socio-cultural aspects of Bangladesh across the grade I to V (refer 5.4.1.3 and 5.4.2.3). Further, no suggestions were found from them to incorporate new contents in the

curriculum for covering more socio-cultural aspects of the learners' society. However, curriculum specialists (50%) and subject specialists (75%) emphasized to include adequate socio-cultural aspects in the existing content of the textbook, because it is needed for explaining mathematics content through illustration and to make it more interesting and comprehensive for the pupils. It is also found that subject specialists of Bangladesh have given wide list, encompassing specific topics of the content (such as big- small, long-short, currency, addition, subtraction, place value, fraction, geometry, Hijri, English and Bengali month capital-expenditure, cash-memos etc.) that reflects socio- cultural aspect of the society.

According to curriculum specialists and subject specialists of West Bengal, addition, subtraction, currency, time, four fundamental operations, measurement, fraction, decimals, geometry, mean, unitary method, percentage, area and graph reflect the socio-cultural aspects of the learners' society across the grades-I to V. No suggestions are found from curriculum and subject specialists to incorporate new contents covering socio-cultural aspects of the learners' society. However, suggestions have been received to shift content from one grade to another grade (according to learners' age). Subject specialists suggested to include numerical problems from learners' society/environment because illustrative examples are essential for explaining mathematics contents and to make it more interesting and comprehensive for the pupils.

From the analysis, it could be also interpreted that more or less similar mathematical topics from the textbooks of both the countries reflect socio-cultural aspect of the corresponding society. The representations of socio-cultural aspect in textbook of both the countries differ only in terms of the illustrations and the level (grade-wise) at which they are introduced.

According to curriculum specialists of Bangladesh major strength of mathematics curriculum lies in its unified curriculum throughout the country which maintain horizontal (with other subjects) and vertical (within itself) co-ordination of well-graded content related to pupils, and life-oriented situations.

According to subject specialists major strengths of Bangladesh curriculum are due to clearly formulated objectives, illustrations of solved problems through socio-cultural aspects and manipulation of concrete objectives (especially for writing and counting number).

According to curriculum specialists of West Bengal strength of the mathematics curriculum lies in well prescribed objectives (according to Bloom's taxonomy), integration of mathematical topics with daily life situations, child-centred activities, socio-cultural basis of mathematics and more focus on basic numerical concepts and operations.

According to subject specialists of West Bengal major strengths of curriculum are due to well-developed numerical concepts (integers, fractions, decimals representation) leading to better understanding of pupils, FFOs and their use to solve various problem of everyday life, units for measuring objects used in everyday life and its relation, concepts of money, length, weight, area, square, measurement and time, development of basic geometrical concepts through figures, mean, 'LCM & HCF', counting, percentage, graph, measurement of land with illustrations to make mathematics subject life-centred, child-centred and environment-centred.

Weaknesses of Bangladesh mathematics curriculum (based on curriculum specialists' opinion) are teachers lack of proficiency in mathematics, less illustrations used in classroom; as a result, mathematics curriculum is not being implemented properly. Subject specialists from Bangladesh opined that lack of content articulation from grade-II to III and no scope for developing skills of translating verbal statements into mathematical form and vice versa are the major weaknesses of mathematics curriculum.

According to West Bengal curriculum specialists' ignorance of play way method, more content coverage in short period, less geometry, difficult word problems are considered as weaknesses of mathematics curriculum. Findings from subject specialists, indicates that no attempt to organize content from concrete to abstract and lack of using appropriate symbols for developing the skills of translating verbal statements into mathematical forms, insufficient concepts of number, lack of clarity of similar and dissimilar things are the major weaknesses.

Curriculum specialists from Bangladesh suggested that for more effective implementation of mathematics curriculum, teachers have to be trained in teaching technique and on content. Also, suggestions have been provided for teaching topics simple to complex, continuous assessment, regular classes and remedial teaching.

Subject specialists from Bangladesh suggest that for more effective implementation of mathematics curriculum, trained and competent teachers are required. Also, suggestions have been provided for evaluation and assessment of the pupils and supervision in classroom situation. Further, they suggest that teachers should be recruited who have studied mathematics.

According to curriculum specialists of West Bengal, it can be interpreted that effective methods of teaching, teachers' training and use of low-cost equipment are the most important for effective implementation of mathematics curriculum. Also, they provided suggestions to include latest in formations and more examples in the textbook.

According to subject specialists of West Bengal, it is clear that sufficient resource (such as school building, classroom, library, teaching aids and appropriate proportion of teacher-student), dedicated and trained mathematics teachers and their suitable activities are very much necessary for implementing of the mathematics curriculum. Also, they suggest to include sufficient examples in textbook and stress to give existing topic/contents for developing creative and logical thinking through teaching.

5.5 Analysis and Interpretation of Data based on Classroom Observations

Mathematics is an exciting and dynamic area of study that offers pupils the chance to use the power of their mind. It is essential that teachers engage pupils in tasks that exemplify the beauty and usefulness of mathematics. What teachers know and believe about mathematics strongly influence what they do in their classrooms and ultimately what pupils learn about mathematics (Artzt. 2002). Teaching methods are important aspects of the teaching / learning process that contributes to a great extent to an effective curriculum. Therefore, it was decided to attend some teaching periods, and to observe various activities in the mathematics class. The purpose of the observation of the present study was to know the existing teaching methods, techniques, resources used and the interaction with pupils followed by mathematics teachers at the primary stage in Bangladesh and West Bengal of India and to compare the same in both the countries.

Prior to the actual observation in classrooms, the investigator had designed the observation schedule and finalized the same with the help of the expert. The investigator observed 120 mathematics classes (60 classes from Bangladesh and 60 from West Bengal) in 24 schools (12 from each country), 5 periods have been observed in each school for each grade. The data obtained through the investigator's observations have been summarized and presented grade wise in tables – 1, 2, 3, 4 and 5 under appendix-F.

The analyses and interpretations of data have been made based on the responses grade wise in both the countries. The responses are converted into percentages to facilitate the analyses and interpretation of the data obtained on an individual item of the observation schedule. The same is presented on the basis of number of periods / classes as well as number of topics observed in both the countries. Grade-wise presentation of the data is further analyzed item-wise as follows; where the number of periods and the corresponding number of teachers (who taught a particular topic) are exactly equal.

Analysis for Grade-I

1. Duration of a Mathematics Period

It was found that (vide table-1in appendix-F) the duration of mathematics periods (for grade-I) in the schools of Bangladesh is of 30 minutes, while the duration of mathematics periods in the schools of West Bengal is of 35 minutes.

2. Use of Lesson Plan / Outline

In Bangladesh, the investigator found through his observations (vide table-1in appendix-F) that for 17% of periods observed for the topic 'addition', the teachers have used the lesson plan/out line of the plan while for the topic 'number', 83% of the periods are taught by the teachers without using the lesson plan/out line of the plan. Obviously, it could be interpreted further that 17% of teachers of Bangladesh used lesson plans/out line for teaching topic 'addition' while rest of the teachers have not used any lessons plan/ outline for teaching rest of the topics observed by the investigator.

In west Bengal, the investigator found through his observations that for 17% of periods observed for the topic 'number', the teachers have used the lesson plan/out line of the plan while for the topic 'subtraction', 83% of the periods are taught by the teachers without using the lesson plan/out line of the plan. Obviously, it could be interpreted further that 17% of teachers of West Bengal used lesson plans/out line for teaching topic 'number' while rest of the teachers have not used any lessons plan/ outline for teaching rest of the topics observed by the investigator.

3. Use of Mathematics Textbook

It was observed that all the teachers and pupils from both countries used mathematics textbook while teaching 'number', 'addition' and 'subtraction' topics (vide table-1in appendix-F).

4. Introduction of the Lesson

The Lessons were introduced with relevant activities by 17% teachers from Bangladesh while teaching the topic 'number'. It was also found that

42% (8%+17%+17%) teachers from Bangladesh introduced the lessons based on previous knowledge while teaching topics 'number', 'addition' and 'subtraction' respectively. It was also observed that 42 % (17%+ 25%) teachers introduced the lesson arbitrarily while teaching 'number' and 'addition' in the same country. On the contrary, all the teachers from West Bengal introduced the lessons based on relevant activity (vide table-1in appendix-F) while teaching topics 'number', 'addition' and 'subtraction'.

5. Teaching Approach

It was found that the mathematics teachers in the schools of Bangladesh 42% and all the teachers of West Bengal used the teaching approach from concrete to abstract while teaching topics 'number', 'addition' and 'subtraction'. It was also found that 42% (25%+17%) mathematics teachers from Bangladesh used teaching approach from general to specific while teaching topics 'number' and 'addition'. The remaining 8% teachers used teaching aids from specific to general while teaching topic 'addition'(vide table-1in appendix-F).

6. Pupils' Participation

It was found from the observation (vide table-1in appendix-F) that the pupils' participation, in 83% (33%+33%+16%) of the schools of Bangladesh and 59% (25%+17%+17%) of the schools of West Bengal was moderate while teaching topics 'number', 'addition' and 'subtraction' respectively. It was also found that 42 %(8%+17%+17%) pupils from the schools of West Bengal participated in the classroom activities to a great extent while teaching topics 'number', 'addition' and 'subtraction'.

7. Pupils' Response

It was found from the observation that the response of the pupils (76 %) in the schools of Bangladesh was satisfactory because of correct answer (vide table-1in appendix-F). Among the respondents, 17 % pupils responded orally while teaching topic 'number', 25 % and 17 % pupils orally and in written while teaching topic 'addition', and 17 % pupils gave written response while teaching topic 'subtraction'. On the contrary, all pupils' response in the schools of West Bengal was satisfactory

because 50 % pupils responded orally and 58 % pupils gave written response while teaching topics 'number', 'addition' and 'subtraction'.

8. and 9. Language and Audibility

It was viewed that almost all teachers in the schools of Bangladesh and West Bengal used clear understandable language through specific words with and without illustration (vide table-1in appendix-F) while teaching topics 'number', 'addition' and 'subtraction'. Similarly, audibility of the 83% mathematics teachers in the schools of Bangladesh and all mathematics teachers in the schools of West Bengal was also clear in the classroom while teaching topics 'number', 'addition' and 'subtraction'.

10. Frequency of Blackboard Usage

It was found that 75 % (42%+ 33%) mathematics teachers in the schools of Bangladesh used the blackboard rarely while teaching topics 'number' and 'addition', and 25 % (8%+17%) teachers used the blackboard always while teaching topics 'addition' and 'subtraction'. On the contrary, 67% (33 %+17%+ 17%) mathematics teachers in the schools of West Bengal used the blackboard frequently while teaching topics 'number', 'addition' and 'subtraction', and 33 % teachers in the schools of West Bengal used the blackboard rarely while teaching topics 'addition' and 'subtraction'(vide table-1in appendix-F).

11. Quality of Blackboard Work Done by Teacher

It was observed that the quality of blackboard work done by 75%(33%+42%) mathematics teachers in the schools of Bangladesh was not effective because of content written on board inappropriately, teaching point written in a disorganized manner and did not focus on the important points by the use of colour chalks while teaching topics 'number', 'addition' and 'subtraction' (vide table-1in appendix-F).

It was also observed that the quality of blackboard work done by mathematics teachers (25 %) in the schools of Bangladesh was effective because of content written on board appropriately while teaching number and subtraction. On the contrary, quality of blackboard work done by all mathematics teachers (33%+33%+33%) in the schools of West Bengal was effective because of content written on blackboard appropriately, while teaching topics 'number', 'addition' and 'subtraction'.

12. Use of Teaching Aids

A close observation revealed that 8% mathematics teachers in the schools of Bangladesh used appropriate and effective teaching aids while teaching topic 'number'. 25% mathematics teachers in the schools of West Bengal used appropriate teaching aids and for this reason pupils observed keenly and asked questions frequently while teaching topic 'number'. It was also viewed that 92% and 75% mathematics teachers in the schools of Bangladesh and West Bengal respectively have not used any teaching aids at all in the classroom instruction while teaching topics 'number', 'addition' and 'subtraction'(vide table-1in appendix-F).

13. Nature of Teaching Aids

It is observed that all mathematics teachers from Bangladesh and West Bengal have not used any teaching aids at all, in classroom instruction, like film projector, over-head projector, slide-projector, tape recorder, models, charts and diagrams while teaching topics 'number', 'addition' and subtraction(vide table-1in appendix-F).

14. Assignments to the Pupils in Classroom

It was viewed that almost all the teachers in the schools of Bangladesh and all the teachers in the schools of West Bengal respectively gave some assignments to the pupils to workout in the classroom either oral or written while teaching topics 'number', 'addition' and 'subtraction'. Only 17% teachers in the schools of Bangladesh did not give any assignment to the pupils to workout in the classroom while teaching topics 'number' and 'addition'(vide table-1in appendix-F).

15. Home Task

It was viewed that 33 % mathematics teachers in the schools of Bangladesh and 25% teachers in the schools of West Bengal assigned home task to the pupils based on content taught, before ending the period while teaching topics 'addition' and 'subtraction'. It was also viewed that 67 %(42%+25%) teachers have not assigned home task while teaching topics 'number' and 'addition'. 75 %(33%+25%+17%) teachers in the schools of West Bengal have not assigned home task to the pupils while teaching topics 'number', 'addition' and 'subtraction'(vide table-1in appendix-F).

16. Summarizing of the Lesson

It was observed that the mathematics teachers in 42% and 67% in the schools of Bangladesh and West Bengal respectively summarized / reviewed the lesson at the end of the class through questing or problem solving while teaching topics 'number', 'addition' and 'subtraction'. It was also found that mathematics teachers in the schools of Bangladesh (58%) and West Bengal (33%) did not summarize / review the lesson at all while teaching respective topics(vide table-1in appendix-F).

17. Methods of Teaching Used by the Mathematics Teachers in the Classroom

Here, method-wise analysis and interpretation of the data for grade-I is done (vide table-1.1 under appendix-F), which are as follows:

Lecture Method

It is observed (vide table-1.1 in appendix-F) that 17% mathematics teachers in the schools of Bangladesh used the lecture method appropriately for 11 – 20 minutes while teaching topic 'number'. 50 %(33%+17%) teachers used lecture method appropriately for less than 10 minutes while teaching topics 'addition' and 'subtraction'. Only 8 % teachers in the schools of West Bengal used lecture method appropriately for less than 10 minutes while teaching topic 'addition'.

Question-Answer Method

It was observed (vide table-1.1 in appendix-F) that 50 % mathematics teachers in the schools of Bangladesh and all mathematics teachers in the schools of West Bengal used the question-answer method while teaching topics 'number', 'addition' and 'subtraction'. Out of 50 % mathematics teachers in Bangladesh, 17 %, 25 % and 8 % teachers used question – answer method appropriately for 11 – 20 minutes, involvement with pupils for less than 10 minutes and appropriately for less than 10 minutes while teaching topics 'number', 'addition' and 'subtraction' respectively.

Out of all mathematics teachers of West Bengal, 33% teachers used question – answer method for less than 10 minutes appropriately while teaching topic 'subtraction'. 33% teachers used this method for less than 10 minutes interestingly and 33% teachers used the same method for less than 10 minutes with involvement of pupils while teaching topics 'number' and 'addition'.

Problem-Solving

It was observed that 67 % mathematics teachers in the schools of Bangladesh used problem-solving method appropriately (33%) for 21-30 minutes and with pupils involvement (33%) for 11 - 20 minutes while teaching topics 'addition' and 'subtraction' respectively (vide table-1.1 in appendix-F). On the contrary, 67 % mathematics teachers in the schools of West Bengal used problem-solving method with involvement of pupils for 11- 20 minutes while teaching topics 'addition' and 'subtraction'.

Team -Teaching

It is obvious that only 8 % mathematics teachers in the schools of Bangladesh used team- teaching appropriately for less than 10 minutes while teaching topic 'number'. On the contrary, 67 % mathematics teachers in the schools of West Bengal used team-teaching method for less than10 minutes with involvement of pupils, while teaching topics 'number' and 'addition'.

Analysis for Grade – II

1. Duration of a Mathematics Period

It was found (vide table-2 in appendix-F) that in all schools of Bangladesh, the duration of a mathematics periods (for grade-II) of 30 minutes while the duration of mathematics periods in the schools of West Bengal is of 35 minutes.

2. Use of Lesson Plan / Outline

In Bangladesh, the investigator found through his observations (vide table-2 in appendix-F) that for all of periods observed for the topics 'number', 'addition', 'subtraction' and 'multiplication'; the teachers have taught the lesson without using the lesson plan/out line of the plan. Obviously, it could be interpreted further that all teachers of Bangladesh have not used any lessons plan/ outline for teaching above mentioned topics observed by the investigator.

In west Bengal, the investigator found through his observations that for 33% of periods observed for the topics 'number', 'addition' and 'subtraction' the teachers have used the lesson plan/out line of the plan. 67% of the periods are taught by the

teachers without using the lesson plan/out line of the plan while teaching topics 'number', 'addition', 'subtraction' and 'multiplication'. Obviously, it could be interpreted further that 33% of teachers of West Bengal used lesson plans/out line for teaching topic 'number' while rest of the teachers have not used any lessons plan/ outline for teaching of the respective topics observed by the investigator.

3. Use of Mathematics Textbook

It was viewed that all the teachers and pupils from both the countries used the mathematics textbook while teaching number, addition, subtraction and multiplication (vide table-2 in appendix-F).

4. Introduction of the Lesson

It was observed that the lesson was introduced with a reference to previous knowledge while teaching topics 'number' and 'subtraction' by 33%(17%+17%) teachers from Bangladesh. It was also found that 67 %(25%+33%+8%) teachers from Bangladesh introduced the lesson arbitrarily while teaching topics 'number', 'addition' and 'multiplication'. On the contrary, 83 % teachers from West Bengal introduced the lesson based on relevant activity (vide table-2 in appendix-F)while teaching topics 'number', 'addition', 'subtraction' and 'multiplication'. 17% teachers from West Bengal introduced the lesson based on previous knowledge, while teaching topic 'multiplication'.

5. Teaching Approach

It was observed that 50% mathematics teachers in the schools of Bangladesh used the teaching approach from concrete to abstract while teaching topics 'number', 'addition', and 'subtraction'. Remaining 50% teachers from Bangladesh used the teaching approach from general to specific while teaching topics 'number', 'addition' and 'multiplication'. 58% teachers from West Bengal used the teaching approach from concrete to abstract while teaching topics 'addition', 'subtraction' and 'multiplication'. It was also found that 42% teachers used the teaching approach from specific to general while teaching topic 'number'(vide table-2 in appendix-F).

6. Pupils' Participation

It was found from the observation that all pupils'(42%+33%+17%+8%) participation in the classroom activities in the schools of Bangladesh was moderate while teaching topics 'number', 'addition', 'subtraction' and 'multiplication'. On the contrary, it was found from the observation that 58 %(25%+8%+17%+8%) pupils' participation in the classroom activities in the schools of West Bengal was moderate while teaching topics 'number', 'addition', 'subtraction' and 'multiplication'. It was also found that 42 %(17%+17%+8%) pupils participated in classroom activities to a great extent while teaching topics 'number', 'addition' and 'multiplication'(vide table-2 in appendix-F).

7. Pupils' Response

It was observed that the response of the pupils (67 %) in the schools of Bangladesh was satisfactory because of correct answer (vide table-2 in appendix-F). Among the respondents, 42 % pupils responded orally while teaching 'number', 'addition' and 'multiplication'; 25 % pupils responded in written while teaching 'addition' and 'subtraction'. It was also found that the response of the pupils (33 %) was unsatisfactory because of wrong answer and silence while teaching topics 'number' and 'addition'.

On the contrary, 92 % pupils' response in the schools of West Bengal was satisfactory because of correct answer. Among the respondents, 50 % pupils responded orally while teaching topics 'number', 'addition' and 'multiplication'; 42 % pupils gave written response while teaching 'addition', 'subtraction' and 'multiplication'. It was also found that 8 % pupils' response was unsatisfactory because of silence.

8. and 9. Language and Audibility

It was viewed that all teachers in the schools of Bangladesh and West Bengal used clear understandable language through specific words with and without illustrations (vide table-2 in appendix-F) while teaching topics 'number', 'addition', 'subtraction' and 'multiplication'. Also, audibility of all teachers in the schools of Bangladesh and West Bengal was clear in the classroom while teaching topics 'number', 'addition', 'subtraction' and 'multiplication'.

10. Frequency of Blackboard Usage

It was observed that all teachers in the schools of Bangladesh used the blackboard (vide table-2 in appendix-F). Among the respondents, 42 % respondents used the blackboard rarely while teaching topic 'number', 33 % used always while teaching topics 'addition, and 'multiplication', 25 % used frequently while teaching 'addition' and 'subtraction'. On the contrary, all teachers in the schools of West Bengal used the blackboard. Among them, 75 % used the blackboard frequently while teaching topics 'number', 'addition' and 'subtraction'; 8 % used always while teaching topic 'multiplication'; 17 % used rarely while teaching topics 'number' and 'multiplication'.

11. Quality of Blackboard Work done by Teacher

It was observed that the quality of blackboard work done by mathematics teachers (50%) in the schools of Bangladesh was effective (for grade-II) because of topic written on board appropriately while teaching topics 'number' and 'multiplication'. But it was observed that the quality of blackboard work done by the teachers (50 %) were not effective because of topics written on board inappropriately, disorganize teaching point on board and did not focus on the important points by the use of colour chalks while teaching topics 'addition', and 'subtraction'(vide table-2 in appendix-F).

On the contrary, quality of blackboard work done by mathematics teachers (92 %) in the schools of West Bengal was effective because of topic written on board appropriately while teaching topics 'number', 'addition', 'subtraction' and 'multiplication'. It was also observe that 8 % teachers did work effectively by proper organization of teaching points on blackboard.

12. Use of Teaching Aids

It was viewed that 25% teachers in the schools of Bangladesh used appropriate teaching aids while teaching topics 'number' and 'multiplication'. Among the respondents, 17 % teachers used teaching aids while teaching 'number', for these reason pupils observed their classes keenly. A close observation that a vast majority (75 %) of the teachers did not use teaching aids in classroom instruction.

On the contrary, teachers (75 %) in the schools of West Bengal used appropriate and effective teaching aids and for this reason pupils observed keenly and

asked questions frequently, while teaching topics 'number', 'addition' and 'multiplication'. It was also observed that 25 % teachers from West Bengal did not use teaching aids at all while teaching topics 'addition' and 'subtraction'(vide table-2 in appendix-F).

13. Nature of Teaching Aids

A close observation revealed that teachers from Bangladesh (92 %) and West Bengal (75%) did not use teaching aids at all in classroom instruction (for grade-II), like film projector, over-head projector, slide projector, tape recorder, models and diagrams. It was also found that teachers (8 %) in the schools of Bangladesh used teaching aids, like chart, while teaching topics 'number'. On the other hand, 25 % teachers in the schools of West Bengal used teaching aids like charts, while teaching topics 'number' and 'multiplication facts'(vide table-2 in appendix-F).

14. Assignments to the Pupils in Classroom

A close observation revealed that 75%(50%+25%) teachers in the schools of Bangladesh and all teachers(75%+25%) in the schools of West Bengal gave some assignments to the pupils to workout in the classroom, either oral or written while teaching topics 'number', 'addition', 'subtraction' and 'multiplication'. 25 % teachers in the schools of Bangladesh did not give any assignment to the pupils to workout in the classroom, while teaching topic 'number'(vide table-2 in appendix-F).

15. Home Task

A close observation revealed that 33 % teachers in the schools of Bangladesh assigned home task to the pupils based on content taught, before ending the period, while teaching topics 'addition', 'subtraction' and 'multiplication'. In contrast, 75 % teachers in the schools of West Bengal assigned home task to the pupils based on content taught, before ending the period, while teaching topics 'number', 'addition', 'subtraction' and 'multiplication'. It was also observed that 67% teachers from Bangladesh and 25 % teachers from West Bengal did not assign any home task to the pupils (vide table-2 in appendix-F).

16. Summarizing of the Lesson

It was observed that the mathematics teachers (92 %) in the schools of Bangladesh did not summarize the lesson while teaching topics 'number' 'addition',

'subtraction' and 'multiplication'. However, only 8% teachers of Bangladesh summarized the lesson while teaching topic 'number'. On the contrary, 67% teachers in the schools of West Bengal summarized the lesson at the end of the class through questing and problem solving while teaching 'number', 'addition' and 'multiplication'. It was also observed that 33 % teachers did not summarize the lesson while teaching topic 'subtraction' (vide table-2 in appendix-F).

17. Methods of Teaching Used by the Mathematics Teachers in the Classroom

Here, method-wise analysis and interpretation of the data is done (vide-2.1 under appendix-F), which are as follows:

Question -Answer Method

It was observed (vide table-2.1 in appendix-F) that 83 % teachers in the schools of Bangladesh used question-answer method while teaching topics 'number', 'addition', 'subtraction' and 'multiplication'. Among them, 58 % teachers used this method for 11 – 20 minutes with pupils' involvement while teaching topics 'number' and 'subtraction'; 75 % teachers used this method for 11-20 minutes appropriately while teaching topics 'number', 'addition' and 'multiplication'.

On the contrary, all teachers in the schools of West Bengal used question-answer method while teaching topics 'number', 'addition', 'subtraction' and 'multiplication'. Among them, 67 % teachers used question-answer method with pupil involvement for 11– 20 minutes while teaching topics 'number' and 'addition'; 33 % teachers used this method for 11 – 20 minutes appropriately while teaching topics 'subtraction' and 'multiplication'.

Problem-Solving

It was observed that 58 % teachers in the schools of Bangladesh used problem-solving method appropriately (25%) for 11 – 20 minutes and with pupils' involvement (17%) for 21 – 30 minutes while teaching topics 'addition', 'subtraction' and 'multiplication'. It was also observed that 17 % teachers used problem-solving method appropriately for less than 10 minutes while teaching topic 'subtraction'.

On the other hand, 59 %(25%+ 17%+17%) teachers in the schools of West Bengal used problem-solving method with pupils' involvement for 21 – 30 minutes while teaching topics 'addition', 'subtraction' and 'multiplication'.

Analysis for Grade – III

1. Duration of a Mathematics Period

It was found that the duration of mathematics period (for grade-III) in the schools of Bangladesh was of 35 minutes while teaching topics 'currency' and 'Four Fundamental Operations (FFOs)'. It was also found that in 25 % and 8 % schools of Bangladesh, the duration of mathematics periods were 40 minutes and 45 minutes respectively while teaching topic 'FFOs'. On the contrary, the duration of mathematics period in the schools of West Bengal is of 40 minutes while teaching topics 'currency', 'FFOs', 'fraction' and 'prime and composite number' (vide table-3 in appendix-F).

2. Use of Lesson Plan / Outline

It was found that (vide table-3 in appendix-F) all teachers in the schools of Bangladesh and 67 % teachers in the schools of West Bengal did not use lesson plan / outline during the mathematics classroom instruction. However, 33 % teachers from West Bengal used lesson plan / outline during the class, while teaching topics 'currency' and 'fractions'.

3. Use of Mathematics Textbook

It was found that all the teachers and pupils in the schools of Bangladesh used the textbook while teaching topics 'currency' and 'FFOs'. On the contrary, it was also found that all the teachers and pupils in the schools of West Bengal used textbook while teaching topics 'currency', 'FFOs', 'fraction' and 'prime and composite number' (vide table-3 in appendix-F).

4. Introduction of the Lesson

A close observation revealed that 25% teachers in the schools of Bangladesh introduced the lesson through demonstration while teaching topic 'currency'. It was also observed that 50 % teachers introduced the lesson based on previous knowledge and 25 % teachers introduced the lesson through arbitrarily while teaching topic 'FFOs'. On the other hand, 83% teachers in the schools of West Bengal introduced the lesson with relevant activity while teaching topics 'currency', 'FFOs', 'fractions',

and 'prime and composite numbers'. It was also found that 17% teachers introduced the lesson arbitrarily while teaching topic 'FFOs'.

5. Teaching Approach

A close observation (vide table-3 in appendix-F) revealed that 50 % teachers in the schools of Bangladesh used the teaching approach from concrete to abstract while teaching topic 'FFOs'. Remaining 50% teachers used the teaching approach from specific to general while teaching topics 'currency' and 'FFOs'. On the contrary, 42 % teachers in the schools of West Bengal used the teaching approach from concrete to abstract while teaching topics 'currency' and 'fraction'. Remaining 58 % teachers in the schools of West Bengal used teaching approach from specific to general while teaching topics 'FFOs' and 'prime and composite number'.

6. Pupils' Participation

On close observation, it was found from the observation that 25 % pupils in the schools of Bangladesh participated in the classroom activities (for grade-III) to a great extent while teaching topic 'FFOs'. Remaining 75 % pupils participated moderately in the classroom activities while teaching topics 'currency' and 'FFOs'. In contrast, 50 % pupils in the schools of West Bengal participated in the classroom activities to a great extent while teaching topics 'currency', 'FFOs' and 'fraction'. Remaining 50% pupils' participation was moderate while teaching topics 'currency', 'FFOs', 'prime and composite numbers'.

7. Pupils' Response

It was observed that 67% pupils' response in the classroom of Bangladesh was satisfactory because of correct answer. Out of 67 %, 17 % pupils answered orally while teaching topic 'currency'; 50 % pupils answered through solution to given problem while teaching topic 'FFOs'. It was also observed that 33% pupils' responses in the classroom were unsatisfactory because of wrong answer while teaching topics 'currency' and 'FFOs'.

On the contrary, 92% pupils response in the schools of West Bengal was satisfactory because correct answer; orally (42 %) while teaching topics 'currency' and 'fraction'; in written (33 %) while teaching topics 'currency' and 'fraction' and 25 % pupils answered through solution to given problems while teaching topic

'FFOs'. It was also found that 8% pupils' response was unsatisfactory because of wrong answer while teaching 'FFOs' (vide table-3 in appendix-F).

8. and 9. Language and Audibility

It was found (vide table-3 in appendix-F) that all teachers in the schools of Bangladesh and West Bengal used clear understandable language through specific words with and without illustrations, while teaching topics 'currency' and 'FFOs' by teachers of Bangladesh and 'currency', 'FFOs', 'fraction' and 'prime and composite numbers' by teachers of West Bengal.

Similarly, audibility of all the teachers in the schools of Bangladesh was clear in the class while teaching topics 'currency' and 'FFOs'. It was also observed that audibility of all the teachers in the schools of West Bengal was clear while teaching topics 'currency', 'FFOs', 'fraction' and 'prime and composite numbers'.

10. Frequency of Blackboard Usage

It was observed (vide table-3 in appendix-F) that all the teachers in the schools of Bangladesh and West Bengal used blackboard. Among the respondents from Bangladesh, 50 % used the blackboard always while teaching topic 'FFOs'; 33 % used frequently while teaching topics 'currency' and 'FFOs'; and 17% used rarely while teaching currency. While among the respondents from West Bengal, 42 % teachers used the blackboard always while teaching topics 'fraction' and 'prime and composite number'; 42 % used the board frequently while teaching 'FFOs' and 'fractions'; 17 % used the board rarely while teaching 'currency'.

11. Quality of Blackboard Work Done by Teacher

A close observation revealed that all the teachers in the schools of Bangladesh wrote the topics on blackboard appropriately while teaching topics 'currency' and 'FFOs'. On the other hand all the mathematics teachers in the schools of West Bengal wrote the topics on blackboard appropriately while teaching topics 'currency', 'FFOs', 'fractions' and 'prime and composite number'.

12. Use of Teaching Aids

On close observation, it was found that 83 % teachers in the schools of Bangladesh did not use teaching aids at all while teaching topics 'currency' and

'FFOs'. It was also observed that only 17% teachers used appropriate and effective teaching aids and for this reason pupils observed keenly and frequently asked questions while teaching topic 'currency'.

On the contrary, it was observed that teachers (58 %) in the schools of West Bengal did not use teaching aids at all while teaching 'FFOs' and 'prime and composite numbers'. Further, it was found that teachers (42 %) in the schools of West Bengal used appropriate and effective teaching aids while teaching topic 'currency' and 'fraction', for these reason pupils observed keenly and asked question frequently.

13. Nature of Teaching Aids

It was apparent that a vast majority of teachers in the schools of Bangladesh and West Bengal did not use teaching aids like film projector, over-head projector, slide projector, tape recorder, models and diagrams in classroom instruction while teaching respective topic (vide table-3 in appendix-F). It is also apparent that teachers in 8% and 33% from Bangladesh and West Bengal used teaching aids like charts while teaching currency and fractions respectively.

14. Assignments to the Pupils in Classroom

On close observation, it was found that a vast majority of teachers in the schools of Bangladesh and West Bengal gave some assignments to the pupils to workout in the classroom, either oral or written while teaching respective topics (vide table-3 in appendix-F). It was also found that only 8 % teachers from Bangladesh did not assign to the pupils to workout in the classroom while teaching 'currency' and 17 % teachers from West Bengal did not give assignment to the pupils to workout in the classroom while teaching topic 'fraction'.

15. Home Task

It was observed that 67 % teachers in the schools of Bangladesh assigned the home task to the pupils based on the content taught, before ending the period while teaching topics 'currency' and 'FFOs'. It was also observed that 33 % teachers did not assign any home task to the pupils (vide table-3 in appendix-F).

On the contrary, 92 % teachers in the schools of West Bengal assigned home task to the pupils based on content taught before ending the period while teaching

topics 'currency', 'FFOs', 'fractions' and 'prime and composite numbers'. Only 8 % teachers did not assign the home task to the pupils while teaching topic 'currency'.

16. Summarizing of the Lesson

It was observed that 42% teachers in the schools of Bangladesh summarized / reviewed the lesson at the end of the class through questing and problem solving while teaching topics 'currency' and 'FFOs'. It was also observed that 58% teachers did not summarize the lesson at the end of the class while teaching same (for grade-III). On the contrary, all the teachers in the schools of West Bengal summarized the lesson at the end of the class through questing and problem solving while teaching topics 'currency', 'FFOs', 'fraction' and 'prime and composite number'(vide table-3 in appendix-F).

17. Method of Teaching Used by Mathematics Teachers

Here, method-wise analysis and interpretation of data is done (vide table-3.1 under appendix-F), which are as follows:

Discussion Method

It was observed (vide table-3.1 in appendix- I) that all the teachers in the schools of Bangladesh used discussion method appropriately for less than 10 minutes while teaching topics 'currency' and 'FFOs'. In contrast, all the teachers in the schools of West Bengal used discussion method appropriately for less than 10 minutes while teaching topics 'currency', 'FFOs', 'fractions and 'prime and composite number'.

Question-Answer Method

It was observed that 25 % teachers in the schools of Bangladesh used question-answer method appropriately for less than 10 minutes while teaching topic 'currency'. On the contrary, 75 % teachers in the schools of West Bengal used question-answer method. Among of them, 58%(33%+25%) teachers used question-answer method appropriately for less than 10 minutes while teaching topics 'FFOs' and 'fractions'; 17% teachers used this method with involvement of pupils for less than 10 minutes while teaching topic 'currency'.

Problem-Solving

It was observed(vide table-3.1 in appendix-F) that 25 % teachers in the schools of Bangladesh used problem-solving method appropriately for less than 10

minutes while teaching topic 'currency'. It was also observed that 75 % teachers in the schools of Bangladesh used problem-solving method appropriately for 11 – 20 minutes and involvement of pupils for 11 – 20 minutes while teaching topic 'four fundamental operations'. On the contrary, 33 % teachers in the school of West Bengal used problem-solving method with pupils' involvement for 11 – 20 minutes while teaching topic 'four Fundamental Operations'. It was also found that 50 % teachers in the schools of West Bengal used same method with pupils' involvement for less than 10 minutes while teaching topics 'fractions' and 'prime and composite numbers'.

Analysis for Grade – IV

1. Duration of a Mathematics Period

It was found (vide table- 4 in appendix-F) that the duration of mathematics periods (for grade-IV) in the schools of Bangladesh and West Bengal is of 40 minutes while teaching topics 'measurement', 'simplification', 'decimals' and 'mean'.

2. Use of Lesson Plan / Outline

It was observed that all the teachers in the schools of Bangladesh did not use lesson plan /outline while teaching topics 'measurement', 'simplification' and 'decimals'. On the contrary, 33 % teachers from the schools of West Bengal used the Lesson plan / outline while teaching topics 'measurement' and 'Decimals' whereas 67 % teachers did not use lesson plan / outline while teaching topics 'measurement', 'decimals' and 'mean'(vide table- 4 in appendix-F).

3. Use of Mathematics Textbook

It was observed that all the teachers in the schools of Bangladesh and West Bengal used textbook, while teaching respective topics (vide table - 4 in appendix -I).

4. Introduction of the Lesson

It was observed that 17 % teachers in the schools of Bangladesh introduced the lesson with relevant activities (for grade-IV) while teaching topic 'decimals'. It was also found that 33 % teachers introduced the lesson based on previous knowledge

while teaching topics 'measurement' and 'decimals' and 50% teachers introduced the lesson arbitrarily while teaching topics 'measurement' and 'simplification'.

On the contrary, 67 % teachers in the schools of West Bengal introduced the lesson with relevant activity while teaching topics 'measurement' and 'mean'. Also, it was observed that 33 % teachers introduced the lesson based on previous knowledge while teaching topic 'decimal'.

5. Teaching Approach

It was found that 50 % teachers in the schools of Bangladesh used teaching approach from concrete to abstract while teaching topics 'measurement' and 'simplification'. Remaining 50 % teachers used teaching approach from general to specific while teaching topics 'measurement' and 'decimals'. On the other hand, 50 % teachers in the schools of West Bengal used the teaching approach from concrete to abstract while teaching topics 'measurement' and 'decimals'. Remaining 50 % teachers applied teaching technique from general to specific while teaching topics 'decimal' and 'mean'(vide table- 4 in appendix-F).

6. Pupils' Participation

It was observed (vide table- 4 in appendix-F) that all the pupils in the schools of Bangladesh participated moderately in the classroom activities while teaching topics 'measurement', 'simplification' and 'decimals'. In contrast, 83 % pupils in the schools of West Bengal participated moderately in the classroom activities while teaching topics 'measurement', 'decimals' and 'mean' and 17 % pupils participated to a great extent while teaching topic 'decimals'.

7. Pupils' Response

It was found from the observation that the response of the pupils (50 %) in the schools of Bangladesh was satisfactory because of correct answer. Among the respondents, 25% pupils responded orally while teaching topics 'measurement' and 'decimals'; 25% pupils responded in written while teaching topics 'simplification' and 'decimals'. Remaining 50% pupils' response was unsatisfactory. Among the respondents, 17% pupils answered incompletely while teaching topic 'simplification', and 33% pupils were given wrong answer while teaching topic 'measurement' and 'decimals'.

On the contrary, all the pupils' response in the schools of West Bengal was satisfactory because of correct answer; Among the respondents, 17 % in written while teaching topic 'decimals' and 83 % pupils responded through solution to given problems while teaching topics 'measurement', 'decimals' and 'mean'.

8. and 9. Language and Audibility

It was observed that all the teachers in the schools of Bangladesh and West Bengal used clear understandable language through specific words with and without illustrations while teaching respective topics (vide table-4 in appendix - I). Similarly audibility of all the teachers in the schools of both countries was clear in the classroom while teaching respective topics.

10. Frequency of Blackboard Usage

It was observed that all the teachers in the schools of Bangladesh and West Bengal used blackboard. Among the respondents of Bangladesh, 33% teachers used always blackboard while teaching topic 'simplification', 50 % used frequently while teaching topics 'measurement' and 'decimals', and 17% used rarely while teaching topic 'decimals'. Among the respondents of West Bengal, 83% teachers used blackboard frequently while teaching topics 'measurement', 'decimals' and 'mean', and 17 % used rarely while teaching topic 'measurement'.

11. Quality of Blackboard Work Done by Teacher

It was found from the observation that all the teachers in the schools of Bangladesh worked on blackboard effectively because content written on board appropriate while teaching topics 'measurement', 'simplification' and 'decimals'. In contrast, quality of blackboard work done by all the teachers in the schools of West Bengal were effective because of content written on blackboard appropriately while teaching topics 'measurement', 'decimals' and 'mean'(vide table- 4 in appendix-F)

12. Using of Teaching Aids

It was observed that 25 % teachers in the schools of West Bengal used appropriate and effective teaching aids, for these reason pupils observed keenly and asked the questions frequently while teaching topic 'measurement'. It was also observed that all the teachers from Bangladesh and 75 % teachers from West Bengal

did not use teaching aids at all while teaching respective topics (vide table-4 in appendix – I).

13. Nature of Teaching Aids

It was apparent from table-4 that all the teachers in the schools of Bangladesh and 83 % teachers in the schools of West Bengal did not use teaching aids at all in classroom instruction like film projector, over-head projector, slide projector, tape recorder, model, chart and diagrams while teaching respective topics(vide table-4 in appendix-F). Only 17 % teachers from West Bengal used chart while teaching topic 'measurement'.

14. Assignment to the Pupils in Classroom

It was observed that all the teachers in the schools of Bangladesh gave some assignments to the pupils to workout in the classroom, either oral or written, while teaching topics 'measurement', 'simplification', and 'decimal'. In contrast, all the teachers in the schools of West Bengal gave some assignments to the pupils to workout in the classroom, either oral or written, while teaching topics 'measurement', 'decimal' and 'mean'.

15. Home Task

It was observed that 83 % teachers in the schools of Bangladesh assigned home task to the pupils (for grade-IV) based on content taught, before ending the period, while teaching topics 'measurement', 'simplification' and 'decimals'. 17 % teachers of Bangladesh did not assign the home task to the pupils while teaching topic 'measurement'. It was also viewed that all the teachers in the schools of West Bengal assigned home task to the pupils based on content taught, before ending the period, while teaching topics 'measurement', 'decimal' and 'mean'.

16. Summarizing of the Lesson

It was observed that 33 % teachers in the schools of Bangladesh reviewed the lesson at the end of the class while teaching topics 'measurement' and 'decimal'. It was also observed that 67% teachers did not review the lesson at the end of the class while teaching topics 'measurement', 'simplification' and 'decimal'. On the contrary, all the teachers in the schools of West Bengal summarized the lesson at the end of the

class either through questioning or problem solving while teaching topics 'measurement', 'decimal' and 'mean' (vide table- 4 in appendix-F).

17. Methods of Teaching Used by the Mathematics Teachers in the Classroom

Here, method-wise analysis and interpretation of the data is done (vide table- 4.1 under appendix-F), which are as follows:

Lecture Method

It was observed (vide table- 4.1 in appendix-F) that all the teachers in the schools of Bangladesh used lecture method appropriately for less than 10 minutes while teaching topics 'measurement', 'simplification' and 'decimal'. On the other hand, all the teachers in the schools of West Bengal used Lecture method appropriately for less than 10 minutes while teaching topics 'measurement', 'decimal' and 'mean'.

Question-Answer

It was observed (vide table- 4.1 in appendix-F) that 67 % teachers in the schools of Bangladesh used question-answer method with involvement of pupils for less than 10 minutes while teaching topics 'measurement' and 'decimal'. On the contrary, 67 % teachers in the schools of West Bengal used question-answer method with involvement of pupils for 11- 20 minutes while teaching topics 'measurement' and 'decimal'.

Problem-Solving

It was observed (vide table- 4.1 in appendix-F) that 33 % teachers in the schools of Bangladesh used problem-solving method with involvement of pupils for 11-20 minutes while teaching topic 'measurement'. It was also found that 67 % teachers used problem-solving method appropriately for 11 - 20 minutes while teaching topic 'decimal' and for 31 - 40 minutes while teaching topic 'simplification'. On the contrary, 33 % teachers in the schools of West Bengal used problem-solving method appropriately for less than 10 minutes while teaching topic 'mean'. It was also found that 67 % teachers used problem-solving method with involvement of pupils for 11 - 20 minutes while teaching topics 'decimal' and 'mean'.

Analysis for Grade – V

1. Duration of a Mathematics Period

It was found that the duration of mathematics periods (for grade-V) in the schools of Bangladesh and West Bengal is of 40 minutes while teaching respective topics (vide table-5 in appendix-F).

2. Use of Lesson Plan / Outline

It was observed (vide table-5 in appendix-F) that all the teachers in the schools of Bangladesh did not use the lesson plan/outline in the classroom instruction while teaching topics 'fraction', 'unitary method' and 'percentage'. On the other hand, 17% teachers in the schools of West Bengal used the lesson plan while teaching topic 'fraction'. It was also observed that 83% teachers in the schools of West Bengal did not use the lesson plan / outline while teaching topics 'fraction', 'unitary method', 'geometry' and 'measurement'.

3. Use of Mathematics Textbook

It was found from the observation that all the teachers and pupils from both the countries used mathematics textbook while teaching respective topics (vide table-5 in appendix-F).

4. Introduction of the Lesson

It was observed that 67 % teachers in the schools of Bangladesh introduced the lesson based on previous knowledge (for grade-V) while teaching topics 'fractions', 'unitary method' and 'percentage'. 33% teachers introduced the lesson arbitrarily while teaching topics 'fraction' and 'percentage' in the same country. On the other hand, all the teachers in the schools of West Bengal introduced the lesson based on relevant activity while teaching topics 'fraction', 'unitary method', 'geometry' and 'measurement'.

5. Teaching Approach

It was observed that 17 % teachers in the schools of Bangladesh adopted the teaching approach from specific to general while teaching topic 'percentage'. It was

also observed that 83 % teachers adopted the teaching approach from general to specific while teaching topics 'fraction', 'unitary method' and 'percentage'. On the contrary, it was observed that all the teachers in the schools of West Bengal adopted the teaching approach from concrete to abstract while teaching topics 'fraction', 'unitary method', 'geometry' and 'measurement'(vide table-5 in appendix-F).

6. Pupils' Participation

It was found that all the pupils' participated in the schools of Bangladesh classroom activities (for grade-V) was moderate while teaching topics 'fraction', 'unitary method' and 'percentage'. On the other hand, 92 % pupils' participated in the schools of West Bengal was moderate while teaching topics 'fraction', 'unitary method' 'percentage' and 'geometry'. It was also observed that 8 % pupils participated in classroom activities to a great extent while teaching topic 'measurement'.

7. Pupils' Response

It was observed that 75 % pupils' response in the school of Bangladesh was satisfactory because they responded correctly through solution to given problem while teaching topics 'fraction', 'unitary method' and 'percentage'. It was also observed that 25 % pupils' response was unsatisfactory because of they responded incomplete and wrong answer while teaching topic 'fraction'.

On the contrary, 83 % pupils' response in the schools of West Bengal was satisfactory because of correct answer and drawing. Among the respondents, 58 % pupils' responded through solution to given problem while teaching topics 'fraction', 'unitary method' and 'measurement'; 25 % pupils responded through drawing while teaching topic 'geometry'. It was also observed that 17 % pupils' response in the classroom was unsatisfactory because of wrong answer while teaching topic 'fraction'.

8. and 9. Language and Audibility

It was observed that all the teachers in the schools of Bangladesh and West Bengal used clear, understandable language through specific words with and without illustrations while teaching respective topics (vide table-5 in appendix-F). Also,

audibility of all the teachers in the schools of both countries was clear while teaching respective topics.

10. Frequency of Blackboard Usage

It was found that 67 % teachers in the schools of Bangladesh used blackboard always while teaching topics 'unitary method' and 'percentage'. It was also observed that 33 % teachers used blackboard frequently while teaching topic 'fraction'. On the contrary, 25 % teachers in the schools of West Bengal used blackboard always while teaching topic 'unitary method'. 58 % teachers used blackboard frequently while teaching topics 'fraction', 'unitary method', 'geometry' and 'measurement'. It was also observed that 17 % teachers used blackboard rarely while teaching topic 'fraction'.

11. Quality of Blackboard Work Done by Teacher

It was observed (vide table-5 in appendix-F) that the quality of blackboard work done by the 33 % teachers in the schools of Bangladesh were effective because of topic written on blackboard appropriately while teaching topics 'fraction' and 'unitary method'. It was also observed that quality of blackboard work done by the 67 % teachers in the schools of Bangladesh were not effective because of topic written on board inappropriately, and did not focus on the important points and in a disorganized fashion while teaching topics 'fraction', 'unitary method' and 'percentage'.

On the contrary, quality of blackboard work done by all the teachers in the schools of West Bengal was effective because of content written on blackboard appropriately while teaching topics 'fraction', 'unitary method', 'geometry' and 'measurement'.

12. Use of Teaching Aids

It was viewed that all the teachers in the schools of Bangladesh did not use teaching aids (for grade-V) at all while teaching topics 'fraction', 'unitary method' and 'percentage'. On the contrary, 58 % teachers in the schools of West Bengal used appropriate and effective teaching aids and for this reason pupils observed keenly and asked questions frequently while teaching topics 'fraction' and 'geometry'. It was also observed that 42 % teachers in the schools of West Bengal did not use teaching aids at all while teaching topics 'unitary method' and 'measurement'.

13. Nature of Teaching Aids

It was observed that all the teachers in the schools of Bangladesh and 67 % teachers in the schools of West Bengal did not use teaching aids at all like film projector, over-head projector, slide-projector, tape recorder; models, charts and diagrams while teaching respective topics (vide table-5 in appendix-F). It was also observed that 33 % teachers in the schools of West Bengal used charts while teaching topics 'fraction' and 'geometry'.

14. Assignments to the Pupils in Classroom

It was observed that 17 % teachers in the schools of Bangladesh gave some assignments to the pupils orally while teaching topic 'fraction' and 83 % teachers gave some assignments to the pupils in written while teaching topics 'fraction', 'unitary method' and 'percentage'.

On the contrary, 58 % teachers in the schools of West Bengal gave some assignments to the pupils to workout orally while teaching 'fraction' and 'geometry' and 42 % teachers gave assignment in written to workout in the classroom while teaching topics 'fraction', 'unitary method' and 'measurement'.

15. Home Task

It was observed that all the teachers in the schools of Bangladesh assigned home task to the pupils (for grade-V) based on content taught, before ending the period while teaching topics 'fraction', 'unitary method' and 'percentage'. On the contrary, all the teachers in the schools of West Bengal assigned home task to the pupils based on content taught before ending the period while teaching topics 'fraction', 'unitary method', 'geometry' and 'measurement'.

16. Summarizing of the Lesson

It was observed (vide table-5 in appendix-F) that 17 % teachers in the schools of Bangladesh summarized the lesson through questing at the end of class while teaching topic 'fraction' and 83% teachers did not summarize the lesson at the end of the class while teaching topics 'fraction', 'unitary method' and 'percentage'.

On the contrary, all the teachers in the schools of West Bengal summarized the lesson at the end of the class through questing and problem solving while teaching topics 'fraction', 'unitary method', 'geometry' and 'measurement'.

17. Methods of Teaching Used by the Mathematics Teachers in the classroom

Here, method-wise analysis and interpretation of the data is done (vide table-5.1 in appendix-F), which are as follows:

Lecture Method

It was observed (vide table-5.1 in appendix-F) that 67% teachers in the schools of Bangladesh used lecture method appropriately for less than 10 minutes while teaching topics 'unitary method' and 'percentage'. On the other hand, 33 % teachers in the schools of West Bengal used lecture method appropriately for less than 10 minutes while teaching topic 'unitary method'.

Question-Answer Method

It was found from observation that 33 % teachers in the schools of Bangladesh used question-answer method with pupils' involvement for 21-30 minutes while teaching topic 'fraction'. 33 % teachers used question-answer method appropriately for less than 10 minutes while teaching topic 'unitary method' and 33% teachers used the same method with pupils' involvement for less than 10 minutes while teaching topic percentage.

On the contrary, all the teachers in the schools of West Bengal used question-answer method appropriately and involvement with pupils. Among them 33 % teachers used question-answer method appropriately for 21-30 minutes while teaching topic 'fraction'. 33 % teachers used this method with pupils' involvement for less than 10 minutes while teaching unitary method. Remaining 33 % (25%+8%) teachers used same method with pupils' involvement for 11- 20 minutes while teaching topics 'geometry' and 'measurement'.

Problem Solving Method

It was found from observation that all the teachers in the schools of Bangladesh used problem-solving method with involvement of pupils. Among of them 33 % teachers used problem-solving method for less than 10 minutes while teaching 'fraction'. 33 % teachers used this method for 21- 30 minutes while teaching topic 'unitary method'. Remaining 33 % teachers used same method for 31- 40 minutes while teaching topic 'percentage'.

On the contrary, 33 % teachers in the schools of West Bengal used problem-solving method with pupils' involvement for 21 – 30 minutes while teaching topics 'unitary method' and 8% teachers used the same method with pupils' involvement for 31-40 minutes while teaching topic 'measurement'(vide table-5.1 in appendix-F).

Discussion Method

It was observed (vide table-5.1 in appendix-F) that 33 % teachers in the schools of Bangladesh used discussion method appropriately for less than 10 minutes while teaching topic 'fraction'. On the other hand, 33 % teachers in the schools of West Bengal used discussion method for less than 10 minutes while teaching fraction and 25 % teachers used this method for 11 – 20 minutes while teaching topic 'geometry'.

The above analysis of the data leads to the following conclusions:

(1) On an average in West Bengal, mathematics teachers get more time for teaching of mathematics (each periods of 35 minutes duration in grades I-II level and 40 minutes duration in grades III-V level) than that of the Bangladesh mathematics teachers.

(2) Majority of mathematics teachers (96.6%) from Bangladesh do not use the lesson plan / out line in the classroom instruction while mathematics teachers in West Bengal (73.4%) do not use the lesson plan / out line in the classroom instruction

(3) It was found that all teachers and pupils from both countries use mathematics textbook during teaching-learning process in the classroom.

(4) 45% teachers from Bangladesh introduced the lesson with reference to previous knowledge of the pupils while 43.4% teachers did not use previous knowledge for introduction of the lesson. In contrast, a vast majority of teachers from West Bengal (87%) introduced the lesson based on the previous knowledge of the pupils and the relevant activities.

(5) 45% teachers in the schools of Bangladesh adopted the teaching approach from general to specific while 58.4% teachers of West Bengal adopted the teaching approach from concrete to abstract while teaching respective topics.

(6) On an average, it was found that pupils' participation to the moderate extent was observed 71.6% in Bangladesh and 55% in West Bengal. On the other hand, it was found that pupils' participation to the great extent was observed 5% in Bangladesh and 44.8% in West Bengal. Thus, further, it could be interpreted

that by and large the pupils' participation in classroom of Bangladesh is to 'moderate extent' while the same in West Bengal classroom is to the 'great extent'.

(7) On an average, responses of the pupils in the schools of West Bengal (93.4%) were satisfactory because of correct answers obtained (orally or written) than those of the pupils in the schools of Bangladesh (66.8%).

(8) Most of the mathematics teachers in the schools of Bangladesh and West Bengal of India used clear understandable language through specific words with and without illustrations, and their audibility remained clear through out their teaching in the classroom.

(9) All the mathematics teachers in the schools of Bangladesh and West Bengal used blackboard. On an average, among the respondents of Bangladesh 41.6% used the blackboard 'always', 28.2% used blackboard 'frequently' and 30% used blackboard 'rarely'. Whereas in West Bengal; on an average, among the respondents, 15% used the blackboard 'always', 65% used blackboard 'frequently' and 30% used blackboard, rarely'. Thus, in West Bengal large number of mathematics teachers use blackboard 'frequently' while small number of teachers in Bangladesh use blackboard 'frequently'.

(10) On an average 10% teachers from Bangladesh and 45% teachers from West Bengal used teaching aids, for this reason pupil observed keenly and asked the questions frequently. It was also observed that 90% teachers from Bangladesh and 55% teachers from West Bengal did not use teaching aids at all while teaching respective topics.

(11) It was found that a vast majority of teachers in the schools of Bangladesh (90%) and West Bengal (96.6%) gave some assignments (either oral or written) to the pupils to workout in the classroom; while teaching mathematics topics.

(12) It was found that (on an average) 63.2% mathematics teachers in the schools of Bangladesh and 78.4% mathematics teachers in the schools of West Bengal assigned home task to the pupils based on content taught before ending the mathematics period.

(13) It was observed that on average 71.8% mathematics teachers in the schools of Bangladesh did not summarize the lesson while teaching. On the other hand, it was found that 86.6% mathematics teachers in the schools of West Bengal

summarized the lesson at the end of the class through questioning and problem solving while teaching.

(14) On an average 85% mathematics teachers in the schools of Bangladesh used problem-solving method in teaching of mathematics in the primary classes (grades I-V). Most of the teachers in the schools of Bangladesh covered the major portion of a period by using the problem-solving method. Another method used by teachers of Bangladesh was the question-answer method (58.4%).In contrast, 83.4% mathematics teachers in the schools of West Bengal used question-answer technique in teaching of mathematics in the primary classes (grades I to V). Another method used by the teachers of West Bengal was the problem- solving method (68.4%).