

FINDINGS OF THE STUDY AND DISCUSSION

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FINDINGS OF THE STUDY AND DISCUSSION

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CHAPTER - VI

FINDINGS OF THE STUDY AND DISCUSSION

6.1 INTRODUCTION

In the previous chapter data collected from the three mathematics textbooks of standard V, VI and VII of Gujarat State Board of School textbooks (V, VI published in 1989 and VII published in 1990) has been analysed and interpreted with help of content analysis to arrive at a number of positive aspects and inadequacies of the textbook with respect to objectives of the study. For objective one to four whole study was mainly based on sample of students (above average below average and average) and practising teachers in the English medium primary schools of Gujarat where government textbooks were used. The data obtained using questionnaires and semistructured interviews with students and teachers have been analysed and interpreted to arrive at number of positive aspects as well as inadequacies of the textbooks of standard V, VI and VII. Fifth objective of the study was on assessment of the textbook on the basis of prescribed syllabus of Gujarat State. To this objective attempts was made on to give an overall picture (of the present mathematics textbooks of standard V, VI and VII) by comparing it to the syllabus framed by Gujarat State Board of School textbooks.

Any process of evaluation has to considered with the qualitative and quantitative measurements as well as value judgement. The present evaluative study of the textbook by

its very nature is basically qualitative. In the previous chapters several issues were discussed based on the criteria decided by NCERT for the mathematics textbooks.

In this chapter, first the findings of the study are presented separately for standard V, VI and VII followed by some of the salient features of the general and controversial issues arising by students and teachers and finally there will be an overall discussion.

6.2 FINDINGS RELATED TO THE TEXTBOOK OF STANDARD V

Findings based on the responses and opinions of the students, teachers and content analysis carried out by the investigator keeping in mind the objectives one to five related to various aspects of textbook of standard V published by Gujarat State Board of school textbooks in June 1989 has been presented by the investigator in lines to follow.

6.2.1 ACADEMIC ASPECTS (FINDINGS RELATED TO OBJECTIVE 1)

A. CONTENT

1. The textbook of standard V course all the topics and subtopics given in the syllabus. It consists of the instructional material which is based on the predetermined course of study.
2. The topics were properly integrated with the textbook of the previous and succeeding class which brought about unity in the subject.

3. The selected content for standard V is adequated in respect of duraton of the course and the periods allotted for the subject.
4. The Geometry part in standard V textbook is very well presented and it was easy to follow. The concept of each and every chapter of geometry was clear.
5. The scope of the topics and selected contentis in accordance with the intended age group except 'Area' topic. This topic was too difficult for the students to understand.
6. The content in the textbook was adequate, terms used were correct.
7. The information included in the book was up to date and as per the syllabus of Gujarat State.
8. The content included provides the needs for average, below average and above average students.

B. ORGANISATION

1. The subject matter was properly organised in to suitable units and chapters.
2. The chapters in the textbook were in sequence and there was a continuity of ideas in chapters were related to each other.
3. The length of the chapters in standard V was appropriate keeping in mind the age group of students, but 80% of the teachers felt that the chapters were lengthy.

4. The headings of the chapter were appropriate and conveyed the central idea of chapter concerned.

C. PRESENTATION

1. The subject matter was presented in the increasing order of complexity i.e. simple to complex in most of the chapters; only in the chapters like 'area' and 'percentage' it was found little difficult.
2. The concept and subject matter of the topic was developed and explained on the basis of the previous knowledge and experience of the students with the help of common and familiar examples except 'area' topic did not create any interest but the same topic when repeated in different terms in standard VII it is liked by students.
3. The definitions given in the textbook were logically deducted with the help of specific facts and concepts.
4. The interest of the students in standard V was sustained, throughout the book leaving the 'Area' topic standard V.

D. LANGUAGE

1. The language used in the textbook of standard V was simple and easy to understand. As the textbook was first written in Gujarati and then translated in English, some of the problem sums were exactly translated and gave out different meaning or say meaning was not clear.

2. There were spelling mistakes in the book but they were very minor. There was a consistency of certain spellings throughout the book.

E. ILLUSTRATIONS

1. The illustrations were properly placed, accurate and adequate in number for arithmetic section but geometry portion carried very less examples.

6.2.2 PHYSICAL ASPECTS OF THE TEXTBOOK (FINDINGS RELATED TO OBJECTIVE 2)

1. Size and typography, printing were satisfactory but the paper and cover binding were not satisfactory. The binding of the book should have been with end paper which increases the durability of the textbook.
2. Cutting and brushing of the paper not smooth. It was rough.
3. The design of cover page was appropriate and attractive. i.e. photograph of great mathematician Bhaskaracharya but nowhere the name of mathematician was given. Therefore students did not find any importance of the picture given.
4. The typo size for the main text bindings captions was appropriate except at one or two places the exercise numbers were wrongly printed.
5. Spacing between lines was proper in the textbook under study.
6. Spacing between words was proper in the textbook under study.

7. According to the teachers opinion the volume of the textbook was not appropriate, the number of pages were one hundred and fifty two including answers with extra pages.
8. The cost of the textbook was reasonable but teachers and students felt that the binding was so poor that book was to be bound again to increase durability which added the extra cost.

6.2.3 EXERCISES AT THE END OF THE CHAPTERS (FINDINGS RELATED TO OBJECTIVE 3)

1. End of the chapter exercises were well graded.
2. There were very few examples of high ability. Most of the problems were of knowledge level. Higher cognitive level examples were less.
3. The examples given in some of the exercises were okay for knowing the examples but they were not enough for practice purpose i.e. to get grip over the example so the students had to go for extra practice books and work books published by private publishers for standard V according to the latest syllabus of Gujarat State Board of School textbooks.

6.2.4 STUDENTS AND TEACHERS OPINION REGARDING THE SUITABILITY OF THE TEXTBOOKS (FINDINGS RELATED TO OBJECTIVE 4)

1. The textbook was not helpful as self study material to the students as they had to depend on teachers and parents for solving the examples.

2. The length of the chapters of the textbook were average. The students did not find bore to learn the chapter.
3. The students felt that it was must to make use of the practice books apart from textbook which was double the cost of the school textbook.
4. More than 50% of the teachers perceived that the content did not take in to consideration the needs of the students of all levels i.e. average, above average and below average.
5. 100% of the teachers felt that the content was related to previous knowledge of the pupils.

6.2.5 ASSESSMENT OF THE TEXTBOOK ON THE BASIS OF THE PRESCRIBED SYLLABUS OF GUJARAT STATE (FINDINGS RELATED TO OBJECTIVE 5)

1. LISTING OF THE CONTENT

The textbook of standard V covered all the topics and sub-topics given in the syllabus of Gujarat state.

2. INTRODUCTION TO EACH CHAPTER

The chapter headings were appropriate and conveyed the central idea of the whole chapter as mentioned in the syllabus of Gujarat State for standard V.

3. INADEQUACY OF THE CONTENT

The textbook covered all the topics in standard V as per syllabus of Gujarat State but approximately 30% of the teachers felt content is inadequate in Grometry.

6.2.6 OVERALL VIEW IN GENERAL

The mathematics textbook of standard V did not contain any introduction i.e. there was no entry behaviour, there was no expected outcomes of the study of the chapter nor the fulfilment at the end of the chapter. The chapters were started directly with the topics. Thus there were no objectives of the study of the chapter nor activities.

The examples in the textbook of standard V set the pattern for the learner. The exercises along with the classroom discussions involved the learners. The exercises were well framed so that they could be easily adopted for the class room discussion but as expected outcomes were neglected one could not judge the learning of the topic.

6.3 FINDINGS RELATED TO THE TEXTBOOK OF STANDARD VI

Finding based on the responses and opinions of the students, teachers and content analysis carried out by the investigator keeping in mind the objective one to five related to various aspects of textbooks in June 1989 has been presented by the investigator in lines to follow.

6.3.1 ACADEMIC ASPECTS (FINDINGS RELATED TO OBJECTIVE 1)

A. CONTENT

1. The textbook of standard VI covered all the topic and sub-topics given in the syllabus but the topics were very short. It consists of the instructional material

which is based on the predetermined course of the study.

2. The topics were properly integrated with the textbook of the previous and the succeeding class.
3. The selected content for standard VI is not adequate in respect of duration of the course and the periods allotted for the subject. The content is too less for that class.
4. The 80% of the teachers felt that geometry portion in the textbook was adequate as the textbook of standard VI contained three parts arithmetic, algebra and geometry.
5. The scope of the topics and selected content was in accordance with the intended age group.
6. The content in the textbook under study is proper and upto date.
7. The information included in the textbook was upto date and as per syllabus.
8. The content included provides the needs of average students, above average as well as below average students.

B. ORGANISATION

1. The subject matter was properly organised into suitable units and chapters in the textbook.
2. The chapters in the textbook were in sequence and there was a continuity of ideas.

3. The length of the chapters of standard VI were very short. Teachers and students both found that each an every chapter was very short and 'Bracket' chapter was so short that it left the impression of incomplete chapter.
4. The headings of the chapter were appropriate and conveyed the central idea of the chapter concerned.

C. PRESENTATION

1. The subject matter was presented in the increasing order of complexity i.e. simple to complex, except 'Bracket'. This chapter was found little confusing as it was in the heart of the book and without any entry behaviour as such.
2. The concept and subject matter of the topic was developed and explained on the basis of the previous knowledge and experienced of the students with the help of common and familiar examples but algebra portion was completely new for the students of standard VI and they found algebraic signs very confusing.
3. The definitions were logically deduced with the help of specific facts and concepts.
4. The interest of the 50% of the students sustained throughout the book while other 50% of the students liked only few chapters and disliked algebra topics.

D. LANGUAGE

1. The language used in the mathematics textbook of standard VI was simple and easy to understand.

2. There were spelling mistakes in the textbook but they were very minor. There was a consistency of spellings except one or two in the whole book.

E. ILLUSTRATIONS

1. The illustrations in the textbook of standard VI were properly placed and accurate but they were inadequate in number in most of the chapters.
2. The students were not clear with algebra chapters. The illustrations for these chapters were not very clear. The teachers in their general opinion found that students get confused with +ve and -ve signs in addition and subtraction chapters of integers.

6.3.2 PHYSICAL ASPECTS (FINDINGS RELATED TO OBJECTIVE 2)

1. Size and typography, printing were satisfactory but paper and cover bindings was not satisfactory. The binding of the book should have been with end paper which increases the durability of the textbook.
2. Cutting and brushing of the paper was not smooth. It was rough.
3. The design of cover page was appropriate and attractive. There was a photo of great mathematician Einstein on the cover page but nowhere the name of the mathematician was given. Therefore the students did not find any importance of the picture given.
4. The typography and size for the main text binding was appropriate except at one or two places the exercise

numbers were wrongly printed, i.e., exercise eight was printed as exercise five.

5. Spacing between the lines were proper in the textbook of standard VI.
6. The volume of the textbook of standard VI was not appropriate as per teachers. There were only one hundred and thirty six pages in which one hundred and eighteen pages were including answers and one hundred and nineteen onwards as introduction of the topics like decimal fractions, percentage and triangles.
7. The cost of the textbook was reasonable but the binding was so poor that book was to be bound again to increase the durability.

6.3.3. EXERCISES AT THE END OF THE CHAPTERS (FINDINGS RELATED TO OBJECTIVE 3)

1. End of the chapter exercises were brief in the textbook of standard VI some of exercises had only ten to fifteen examples which were just not enough for the practice. 'Brackets' chapter eight had only eleven examples though the chapter was introduced for the first time.
2. There were very few examples of high ability. Most of the problems were of knowledge level. Higher cognitive level examples were very less.
3. The practice examples were not sufficient in any of the exercises of any of the chapters, therefore students had to go for extra practice books and work books

published by private publishers for standard VI according to the latest syllabus of Gujarat State Board of School textbooks.

6.3.4 STUDENTS AND TEACHERS OPINION REGARDING THE SUITABILITY OF THE TEXTBOOKS (FINDINGS RELATED TO OBJECTIVE 4)

1. The textbook was not very helpful as self study material to the students as they had to depend on teachers and parents for solving the examples. The students could not solve the examples completely on their own.
2. The length of the chapters of the standard VI textbook was found to be very short. Some of the chapters were very short. "Brackets" chapter was so short that it looked as the chapter was incomplete. The examples given in this chapter were only eleven which were not enough as different brackets were introduced for the first time.
3. The students felt that it was must for them to make the use of extra book for practice as there were very few examples. The cost of the practice of private publishers was very high almost double the price of the textbook.
4. While interviewing the mathematics teachers of class VI 50% of the teachers felt that the content doesn't take into consideration the needs of the students while other 50% group felt that content of the textbook was up to the marks per the need of the students.

5. 100% of the teachers and students perceived that the content was related to the previous knowledge of the students.
6. The exercises at the end of the chapter for following chapters were inadequate 'Simple Interest' 'Volume' 'Bracket' 'perpendicular lines' and 'parallellines'

6.3.5 ASSESSMENT OF THE TEXTBOOK ON THE BASIS OF THE PRESCRIBED SYLLABUS OF GUJARAT STATE (FINDING RELATED TO OBJECTIVE 5)

1. LISTING OF THE CONTENT

The investigator thoroughly went through the content of the textbook of standard VI and found that all the topics and subtopics were as per the syllabus of Gujarat State. The topics and subtopics were in sequence.

2. INTRODUCTION TO EACH CHAPTER

The chapters were well introduced. The chapters had no entry behaviour questions. All the chapters were introduced by taking previous knowledge into consideration and this previous knowledge was taken as entry behaviour questions. But where the chapter was completely new there the explanations was given with the help of the examples.

3. INADEQUACY OF THE CONTEST

While going through the textbook investigator found that the textbook of standard VI covered all the topics as per the syllabus of Gujarat State but content was found less and inadequate in standard VI textbook.

6.3.6 OVERALL VIEWS IN GENERAL

The investigator felt that the mathematics textbook of standard VI didn't contain any entry behaviour questions in the introduction neither anything was mention regarding expected outcomes of the chapter nor the fulfilment at the end of the chapter. Most of the linked chapters were started with the help of previous knowledge and new chapters were directly introduced with explanation of examples.

As per washington D.C.(1970) the examples in a textbook should set the pattern for the learner. The exercises along with the class room discussions must involve the learner. So the exercises must be so framed that they can be easily adopted for the class room discussion. This aspect had been neglected by the authors. In this respect, the examples and exercises were inadequate.

If the objectives for each lesson are stated at the begining it helps both the teacher and the students to provide insight to the pupils. All the topics should be spirally structured. Each new concept should be gradually introduced. For this good number of examples are needed, then only it can help the teacher and the taught.

6.4 FINDINGS RELATED TEXTBOOK OF STANDARD VII

Findings based on the responses and opinions of the students, teachers and content analysis carried out by the investigator, keeping in mind the objectives one to five

related to various aspects of textbook of standard VII published by Gujarat State Board of School textbooks in June 1990 has been presented by the investigator in lines to follow (positive and negative aspects).

6.4.1 ACADEMIC ASPECTS (FINDINGS RELATED TO OBJECTIVE 1)

1. The textbook of standard VII included all the topics and sub topics given in the syllabus. Some of the topics in the textbook were previously taught in the secondary classes course. The topics of algebra like 'Expansion' 'Factors' were previously taught in secondary. So the authors found an easy way by incorporating the material as found in their intermediate i.e. secondary textbook.
2. The topics were properly integrated with the textbook of the previous class. The succeeding class had been using old textbook and the textbook was to be changed in 1991 so the topics of standard VII and standard VIII were found to be similar in the year of 1990-91 (School academic year).
3. The selected content for standard VII was adequate in respect of duration of the course and the periods allotted for the subject.
4. The Geometry part in standard VII was inadequate. The textbook contained fourteen chapters out of which, only two chapters were denoted for Geometry i.e. chapter thirteen and chapter fourteen i.e. 'Quadilaterals' and 'Types of quadilaterals'. Both the chapters were linked

to each other. This showed that Geometry part was given less importance. On the whole Geometry was only 14.28% approximately which was not at all enough.

5. The scope of the topics and selected content was in accordance with the intended age group. Geometry portion was found to be little low for the standard VII.
6. The information included in the book was up to date and as per the syllabus prescribed by Gujarat State Board of School textbooks.
7. The content included provided insight to the students of standard VII. In the chapters like 'expansion' and factors number of examples were given before the exercises. This had helped the teacher and the students both, but if there had been objectives for each lesson stated in the beginning, then teachers and students would have been able to understand how far they have understood the topic.

B. ORGANISATION

1. The subject matter was properly organised into suitable units and chapters in the textbook of standard VII.
2. The chapters were arranged in a sequence, so there was unity brought out in the subject matter. The formulae and definitions were arranged in sequence as per the topic concerned. Therefore there was a continuity in the subject.

3. The length of the chapters of standard VII textbook was appropriate except few chapters like 'Compound interest' , Profit and loss 'quadrilateral' 'histogram' were found to be short.
4. The headings of the chapters was appropriate and conveyed the central idea of the chapter concerned.

C. PRESENTATION

1. The subject matter was clear and easy to follow for more than 80% topics. Chapter four 'surface area of a cylinder' and chapter seven 'Rational numbers' were not very clearly presented. Otherwise except these two topics the subject matter was presented in the increasing order of complexity.
2. The concept and subject matter of the topic was developed and explained on the basis of the previous knowledge and experience of the students with the help of common and familiar examples except in chapter four 'Surface area of a cylinder' 90% students felt that chapter does not create liking for learning.
3. The definitions were logically deduced with the help of specific facts and concepts.
4. The interest of the students of standard VII was sustained throughout the book. The chapters like 'Compound Interest' 'Profit-Loss' 'Histogram' 'Square and square root' were liked more. 'Surface area of a cylinder' was of a very little interest whereas other remaining chapters were average both to teachers and students.

D. LANGUAGE

1. The language used in the textbook was simple and easy to understand. The language used was mathematical and cleared the concept. The teachers and the students, both found the language used in the textbook was easily understandable. As the textbook was translated from Gujarati to English in certain exercises the problem sums gave different meaning at first sight., i.e. the problem sums were not clear at first sight because of slight difference in the language while translating it.
2. There were spelling mistakes but very minor. There was consistency of spellings throughout the book.

E. ILLUSTRATIONS

1. The illustrations examples in a textbook set the pattern for the learner, this was properly followed by the authors. The illustrations were properly placed and accurate but they were inadequate in number.
2. The illustrations for the chapters like 'Expansion' 'Factors' and other algebraic topics were enough but for arithmetic chapters like 'Profit-Loss' 'compound interest' 'Area of triangles and circles' they were very few.
3. The illustrations though they were few, they helped for solving the problems and seems in the exercises.

6.4.2 PHYSICAL ASPECTS (FINDING RELATED TO OBJECTIVE 2)

1. The present size of the mathematics textbook was found to be satisfactory. There were typographical errors but minor. These may be due to carelessness in proof reading and hasty printing. The size of the pages and the printing was satisfactory. But it would have been better if the book would have been printed on a larger size paper, like the NCERT textbooks.
2. Cutting and brushing of the paper was not smooth, it was rough.
3. The binding of the book should have been with end paper which increases the durability of the textbook.
4. The design of cover page was attractive. There was a design made with difference figures but as the binding paper was rough the design didn't look good.
5. The typography size for the main text bindings captions was appropriate except at four places the exercise numbers were wrongly printed.
6. Spacing between lines was proper.
7. Spacing between words was proper.
8. The cost of the textbook was found to be reasonable but the binding was so poor that students had to get the book binded again to increase durability.

6.4.3 EXERCISES AT THE END-OF THE CHAPTERS (FINDINGS RELATED TO OBJECTIVE 3)

1. End of the chapter exercises for 'Compound Interest' 'Profit-Loss' 'volume' 'quadrilateral' types of

quadrilateral were very brief. There was only one exercise with few examples which were just not enough for the practice.

2. There were examples of all level. Some examples were of high ability, some were knowledge level. Most of the problem sums were found of knowledge level and students found it to be very easy. The examples belonging to higher cognitive level were very less.
3. The practice examples were inadequate in all the chapters except for the chapter no. seven, eight and ten.
4. Due to inadequacy in the examples in the text, the student had to go for extra practice book of the private publishers for standard VII according to latest syllabus of Gujarat State Board of School textbooks. This was the most neglected aspect of the textbook under study.

6.4.4 STUDENTS AND TEACHERS OPINION REGARDING THE SUITABILITY OF THE TEXTBOOK (FINDINGS RELATED TO OBJECTIVE IV)

1. The textbook was not very helpful as self study material to the students as they had to depend on teachers and parents for solving the examples. The students could not solve the examples completely on their own.
2. The length of the chapters of the standard VII textbook was appropriate so far discussion of the chapter and clearing of concept was concerned. The exercises given were very short for almost 75% topics.

3. The students had to make the use of extra practice book of private publisher, due to inadequate examples in the textbook. The students felt that the cost of practice book was double the cost of the mathematics textbook but as textbook did not give extra practice, the extra practice book became must.
4. While interviewing the mathematics teachers of class VII, more than 90% of the teachers felt that content was proper and up to the mark and as per the need of the students.
5. 100% population of the teachers and students perceived that the content was related to the previous knowledge of the students.
6. The exercises at the end of the chapter were adequate but the examples in each exercise were inadequate except in chapter seven, eight and ten.

6.4.5 ASSESSMENT OF THE TEXTBOOK ON THE BASIS OF THE PRESCRIBED SYLLABUS OF GUJARAT STATE (FINDINGS RELATED TO OBJECTIVE 4)

1. LISTING OF THE CONTENT

The investigator thoroughly went through the content of the textbook of standard VII and found that all the topics and sub-topics were as per the syllabus of Gujarat State. The topics and the sub-topics were inadequate.

2. INTRODUCTION TO EACH CHAPTER

The chapters were well introduced. There were no entry behaviour questions. All the chapters were introduced by

taking previous knowledge into consideration, and this previous knowledge into consideration was taken as entry behaviour questions. But where the chapter was completely new there the explanation was with the help of the examples.

3. INADEQUACY OF THE CONTENT

While going through the textbook investigator found that the textbook of standard VII covered all the topics as per the syllabus of standard VII of Gujarat State but content was found less and inadequate though the concept was clear.

6.4.6 GENERAL

As per Washing D.C. (1970) the examples in a textbook should set the pattern for the learning. The exercise alongwith the class room discussions must involve the learner. So the exercises must be so framed that they can be easily adopted for the class room discussion. This aspect had been neglected by the authors. In this respect, the exercises were inadequate.

Textbook should contain entry behaviour questions in the introduction itself and expected outcomes after completion of the topic so that learner is able to judge and know how much he has grasp from the topic but no topic had any type of entry behaviour questions or expected outcome. In all the topics previous knowledge of the learner was taken as entry behaviour questions for introduction of the chapter.

If the objectives for each lesson are stated at the beginning it helps both the teacher and the students. To provide insight to the pupils all the topics should be spirally structured. Each new concept should be gradually introduced for this good number of examples are needed, then only it can help the teacher and the taught.

GENERAL

6.5 DISCUSSION BASED ON THE FINDINGS ON ACADEMIC ASPECTS OF THE TEXTBOOKS

The academic aspects of the textbook is an important part in textbook evaluation process. When one looks in to the academic aspects it means the content, organisation presentation, language, illustrations in the textbook. It seems that authors have not adopted an uniform policy regarding the splitting of chapters into sections/topics. Some of the chapters in each textbook are very lengthy. Some are very short few are average. Because of this type of arrangement it was very difficult for the investigator to make any sort of positive or negative comment.

The standard V textbook content was good, even standard VII content was average but there, some topics were given a lot of importance while topic like compound interest was ended with just few examples. (There should have been some sort of uniformity). Again if you look into content of standard VI textbook it was really sad. 'Brackets' chapter was explained with few of brackets and there was only one

single exercise with eleven examples on brackets. Thus investigator was bit confused but it did consist of the instructional material which was based on the predetermined course of study. Even geometry part in standard VII textbook was inadequate. The standard VII textbook contained fourteen chapters out of which only two chapters were devoted for Geometry. Moreover both the chapters were of similar type i.e. 'Quadrilaterals' and 'Types of quadrilaterals'. No doubt subject matter was properly organised, but because of the gap in length of the chapter in different chapters there arose a slight need for proper organisation. De Berghs (1989) in his study of gas laws in Australian chemistry textbooks supports the textual presentation from simple to complex, qualitative to quantitative and verbal to algebraic, based on learning theories. According to this the presentation of the content should be simple to complex, general to specific. The mathematics textbooks did stick to this except for one or two chapters. The presentation of each chapter was appropriate at later stage but the presentation of introduction was not very attractive. Of course in some of the arithmetic chapters like ratio-proportion in standard V, Profit-loss in standard VI was with practical illustrations and easy to understand. The main introduction could have easily been made more effective by adding some entry behaviour questions. Learning outcomes was totally neglected in all the three textbooks. In standard VII textbook the concept of rational numbers was introduced. As per the note on planning and teaching of the textbook on the pre-text pages it was written that concept of rational

number was introduced and one gradually developed but if you look into the chapter on rational numbers the scene was different. Students had lot of difficulties in understanding this chapter. There was small revision test for self evaluation after each section but test was so small that it hardly serve the purpose.

Having discussed the content, organisation and presentation aspects, the next important question is whether textbooks were successful in establishing proper communication between them (books) and the users. This comes under the language aspect. Textbooks are suppose to speak to the learners and this is possible only if the language used in the textbook is easy. The investigator supported to the statement made by students and teachers. "The language was easy and simple". This shows that there was no communication gap. Of course as the books ere translated from Gujarati to English at some of the places language used was found awkward and bit funny and gave a different meaning but at times students could follow it. Overall language used in the presentation of content in order to explain was suitable to the young learners of the textbook. The investigator too found the language used was simple keeping in mind the level of the students-learners. Moreover the language was mathematical. So though the language was not very effective but it solved the purpose of understanding. Language helps to frame proper questions in the textbook. Whether it is language textbook or mathematics textbook in English,

critical reading skills are necessary for a student to learn effectively, this is possible only if the textbooks are written with proper usage of English language and at the appropriate level. As discussed earlier language used in the textbooks was too simple and understandable but investigator found the usages were very poor so there was lack of effectiveness. In general the language used in the textbooks was easy to follow.

Illustrations in the textbooks also play its own role in communicating to the learners the method of solving the examples in the textbook given at the end-of-chapters exercises. Illustrations should be explained properly and they should be effective. The illustrations in all the three textbooks for all the chapters were not uniform. The illustrations ranged from two to twelve. This showed that there was no uniformity in illustrations. The investigator found that no where the illustrations contained two methods for solving. The books stucked to only one solving method due to this students could not think beyond it. The investigator felt that there was an absolute necessity to solve one example in two different ways.

Moreover it was noted that illustrations though they matched with the exercises they were not satisfactory. At certain places illustrations were directly started. Due to this students were found to be more interested in practice books of the private publishers. The investigator found 100% of the students and teachers making use of extra practice

book and work book of 'Vikas Publishers or Navneet Publishers'. This was mainly due to inadequate examples in the textbook. If the textbooks were like NCERT there would have been no need for extra textbooks where illustrations and end of chapters exercises are enough. Even illustrations are solved in two different ways. Looking to the overall illustrations the investigator strongly feels that there is need for change. The formulae given in illustrations were okay.

6.6 DISCUSSION BASED ON THE FINDINGS ON PHYSICAL ASPECT OF THE TEXTBOOKS

The physical aspect of the textbook is also important in textbook evaluation process. Though their importance can never be of least concern the investigator feels that the first impression of the textbook is its coverage. The design of the cover page was attractive. The photographs of great mathematician were given on standard V and VI textbook but the names of the mathematicians were not given. Since the name of the mathematician was not given in the text students had very little importance of it. Standard VII textbook had geometrical designs and they were related to the topics in the text. The investigator was not at all in favour of the paper used for binding. The binding was found to be very poor. Normally end paper is suggested for binding but the binding of all the three textbooks was so poor that it did not stay even for six months. Most of the students got it bind with extra cost otherwise a second book was needed in one year course.

The paper used was of poor quality not smooth. The cutting and brushing done was very rough. The textbooks were not very attractive at first sight.

Chapter numbers, chapter headings section headings were all printed in standard size. Thus size and typography, printing were found to be satisfactory in all the three books. Textbook design is one of the factors in its over all effectiveness. Hickey (1984) studied the relationship between textbook structure and students achievement in seventh grade science and found that altering textbook designs suitable resulted in better achievement. This shows that especially at priamary level students have more attraction towards colourful designs. If textbooks have colourful cover bindings then student will get attracted and will have more interest towards the subject. The mathematics textbooks were not bad but the investigator feels it would have definitely created more interest for the subject if the bindings were attractive. Hartley (1990) elaborations on textbook design rightly warns us that this issue cannot be pushed aside as if it is not much academic. Verghese (1991) investigated the influence of text design in the case of middle school pupils by monitoring expository text comprehension, in this study investigator defined monitoring as a process in which good readers recognise comprehension failure. Further it was concluded that text design in exposition can be a resource for students to monitor their own comprehension.

In chapter-II based on Von Restorff's (1933) studies isolation effect or 'Von Restorff effect' has already been referred to, and Panda's (1990) study based on this effect, has also been cited in connection with isolation effects on learning among elementary children in India, based on these researches, the textbooks could have kept in view the importance of certain isolations using coloured background, underlining, enclosures in box, circle, especially for formulae, new terms because they are very much meaningful at primary level. According to Marton & Salja (1934) and Entwistle & Wasterson (1988) there are surface readers those who skim the text, retain only isolated facts and do not bother about overall structure or argument present in the text, whereas the deep readers search for the underlying structure of the text, question it, relate ideas to their own entry behaviour and so on. Anyway in the case of mathematics there is nothing like surface reading and deep reading but in the cases of formulae and important terms it does help the students to learn. These isolations may help in improving 'First Impression' of the textbook too. Thus formulae could have been put by isolating it from other matter. On the whole in the case of physical aspects, the technically suitable standards based on the experts opinion and as per the requirements of good textbook stated in 'General guidelines for textbook production' by NCERT do not fully meet the requirements. A study of the evaluation of the textbook, NCERT product elaborates very systematically the developments of textbooks starting from ancient period to the modern

period in India and gives the concept of a modern model textbook but Gujarat State Board of School textbooks is not successful in producing and publishing such model books for mathematics on such upper primary section. This is one of the reasons why private publishers could become very successful in getting their books (similar to textbooks in use) out in the market.

6.7 DISCUSSION ON THE END-OF-CHAPTER EXERCISES

As discussed in chapter two the conceptual framework of end of the chapter exercises is that of a self evaluation for a student. When textbook is considered as an 'assistant teacher in print', end of chapter exercises may be considered as an examiner in print. Pedagogically, instructional objectives should be equivalent to evaluation objectives, assuming that instructional objectives have been taken care of while producing a textbook which is one of the important major instructional packages, the end of chapter exercises should reflect on the taxonomy of educational objectives (Bloom-1956). In addition to this major criteria end of chapter exercises have been discussed in terms of some more important aspects related to their structure and nature, to suit the overall efficiency of learning of mathematics and self evaluation. The end of chapter exercises in all the three textbooks (standard V, VI and VII) are in general and more academically similar to the content in the chapter. The investigators have found very few discrepancies in the answers obtained and the answers given at the end of the each

textbook by the authors - this is ofcourse a credit for those authorswho worked very hard to collct difficult types of numerical problems, solve them and find out their answers before printing. There are some discrepancies in numerical at some places in the decimal places of the answers given, but they are minor and can be ignored.

The investigator is of the opinon that it would be better if there is ratio between the weightages in end-of-chaptre activity oriented, knowledge, application, essay and short questions. All the three mathematics textbooks showed a different picture. If chapters are seen separately, the position is discouraging altogetherbecause there are thirirteen chapters in standard V textbook, Twelve in standard VI textbook and Fourteen in standard VII texbook but none of chapters had activity oriented questions, Puzzles to create interest for the subject. There were other questions as said before application level, knowledge level and short questions but some of the chapters contained mainly a large number of numerical exercises and very few objective type questions i.e. fill in the blanks, solve orally, multiple choice. As the textbooks were produced in great hurry (as admitted by one of the authorities) perhaps there was no time to construct activity type objective type multiple choice matching an fill in the blanks items.

In advance countries normally every new curriculum is accompanied by sets of standardized tests which could be used for feedback or self evaluation or for continuous evaluation.

In India NCERT prepare some material wise objective type items and uses it as a try out stage in some schools in the process of some sort of standardization. In Gujarat textbooks were tried out but the try out was done in some Gujarati medium schools. As the books are used in different mediums of primary section, the material should have also been tried in other languages or at least in English medium schools. Though the pre-text pages indicate that the books had gone under try-out the investigator when consulted concerned authorities it was found that textbooks were tried out but in Gujarati language and Gujarati medium schools. Moreover material of the textbooks being same except the language (translation in different languages) they did not find any need to do so. Thus the books used during try-out and at later stage had no difference.

The overall weightage given to knowledge level objective was good, comprehension objective was less because of the subject as such and there were very few examples where students had to apply much of their knowledge as such and activity was zero, that too it may be due to subject as such. Though end-of-chapter exercises are mainly for self evaluation of what has already been learnt after going through the content in the chapter, if there are little difficult or puzzled type examples then average and above average students will find interest in doing the end of chapter exercises at the same time even below average students will struggle to solve the examples and compete with other average students.

There were a few examples related to daily life situations in arithmetic part of the subject i.e. 'ratio and proportion', 'percentage', 'area' in standard V, 'Profit-Loss', 'simple interest' in standard VI and 'compound interest', 'profit-loss' in standard VII. But these type of exercises are needed more in number in a good mathematics textbook so that students would stick only to the textbook.

Lately, the investigator feels that the general structure and nature of exercises do not appear to be same in all the chapters. Of course there can't be exactly the same in all as it depends on the particular structure and nature of the topics in the chapter. However there could have been some sort of general framework for all the chapters, in giving the exercises at the end of the chapter. On the whole it is very difficult to say that these end-of-chapters exercises serve the purpose of effective self evaluation altogether.

6.8 DISCUSSIONS ARISING OUT OF IMPORTANT ISSUES NOTED AMONG THE OPINION OF STUDENTS, TEACHERS AND INVESTIGATOR

As discussed in the previous section, there are several findings of the study which get support from the students, teachers and experts. Instead of repeating the same in this section only a few salient features of the opinions, especially where ever they differ from that of the investigator were highlighted with an intention of giving a further better picture of overall evaluation of mathematics

textbooks for standard V, VI (published in 1989) and standard VII in 1990 by Gujarat State Board of School textbooks under study. In this study it was very strange to note that the sampled students as well as teachers who responded to separate questionnaires with the response pattern being 'Yes' or 'No' ended with several cases of average rating scores as shown in table one, two, four, five, seven and eight in chapter V. This shows that both students and teachers as group were not very clear about number of aspects connected with indepth as well as suitability of the present textbooks. This decision in the case of students is understandable to some extent but not in the case of teachers. Even among students it may be recalled that sample was chosen in such a way that there were average and above average students. When above average and average students. When above average and average students also showed indecision it may mean that they are confused about the textbooks under use. The mathematics textbooks were used by all the schools of Gujarat having syllabus of Gujarat State. Although the students and teachers found the syllabus to be appropriate and even investigator but one common observation by all three was, only textbooks did not solve the purpose. There was a need for extra practice book. The efforts of writing new textbooks or revised textbook is of no use unless being followed by intensive inservice programme with suitable orientation of teachers.

It is worth noting the experiences of Philippines reported in a paper by Guzman II (1989) in the worlds EDI

Seminar series under the title "Textbooks in the Developing World" immediately after writing textbooks, the concerned authorities proposed two in service teacher training programme one for orienting teachers on the use of textbook and second for studying the leaving effects of the new textbooks on students, according to the report the teachers were specially trained to (I) Apply their skills in curriculum analysis to the use of the textbooks in the classroom. (II) Idetify and demonstrate teaching startegies appropriate to specific lessons. (III) Manage instructional resources so as to create effective teaching and learning situations and increase the useful life of educational materials. (IV) Integrate curricular areas for the development of specific skills.

There was some resistance to this inservice training concept in the beginning, because some of the bureucrats in the Ministry of Education in Manila thought that there was an need for such expensive programme, as their teaching force with high level of qualifications was traditionally familiar with textbooks. However, the progressive educationists in charge of the world bank assistd textbook project, could convince them regarding the usefulness of he gaining and conducted the same for 5-10 days throughout the country. Though this programme was of somewhat shorter duration, it must have helped all the teachers in the country at least to some extent. India needs to learn from experiences of Philippines in this regard, then only the spirit behind the

NPE (1986) could truly get reflected in the classroom based on the use of the textbooks.

Though as groups, the students and teachers were separate but still they have given several interesting additional responses as presented in chapter V. In the case of experts, though they kept the textbooks for quite sometime, they hardly had anything to say except the pages and binding of the books that too at the time of collecting the books.

6.8.1 OPINION OF THE STUDENTS

Many students in standard V, VI and VII indicated several difficult topics, which by and large agree with the findings by the investigator. Some of them have expressed their serious problems related to mathematics and even of language, but in the case of language the investigator does not agree with those students. The language used in the textbook in general was very easy to understand and simple without any complex sentences. The language in most of the cases was mathematical, details were presented and developed. It might have confused some of the students, so they blamed the language aspects. But reverse was the case in questionnaire. Almost all the students wrote that the language was simple and easy to follow. The students did not like the papers used in the textbook. The students of standard V and VII felt that exercises in the textbook were enough but examples in most of the topics were few. standard

VI students felt that topics were less, exercises were less, examples were less. This opinion of the students was just matching with the views of the investigator. Most of the standard VI students requested for additional sums as they found end of the exercises were not enough. The students found present textbooks to be good and interesting whereas investigator felt the book to be without activities. There were more positive aspects and less negative aspects. They were two common statements made by many students i.e. "The textbook is very cheap but practice book is very costly, and looking to the cover of the textbook "The textbook is cheap but one has to get it bind". These two statement gives a common view of the students.

Most of the students felt that they have to depend on the other practice books of private publishers. The investigator on the whole looks at the textbooks positively. There are many good things in the txtbooks though there are many loop holes. First of all; teachers have to be properly oriented to guide the students to make use of textbook effectively then only students will know how to make maximum use of the textbook at primary level.

6.8.2 OPINION OF THE TEACHERS

The teachers pointed out positive as well as negative aspects of the textbook. The list of difficult topic for the majority of their students, by and large agrees with the findings of the study by the investigator. They have certain

grievences regarding physical aspects, end-of-chapter exercises, language used etc. the teachers felt that binding of the book and papers used in the textbook are of very poor quality. The investigator fully agrees with the teachers. Some of the teachers have very frankly accepted the fact that present educational system is examination oriented and their students as well as themselves use other private publishers books for their major purpose as textbook had very few examples in the exercises. Some of the teachers felt that textbook of standard VI was found to be too short. But the investigator feels that present textbooks of standard V, VI and VII do not require any major change as such except adding few more examples in the exercises and little improved quality of paper with good binding. Only students opinion is of no use, as students come and go in the system but teachers remain for long years and are proper users of the book. The language was simple easy though mathematical. The teachers were able to explain the concepts very clearly. The investigator too found the concept to be clear but there were no entry behaviour questions, expected outcomes which are very necessary. The chapters were started with taking previous knowledge as entry behaviour questions. The investigator is of the opinion that there is a strong need to experient try-out even the textbook for English medium schools on experiment basis. This is not at all difficult, moreover you get several opinions before implementation the textbooks. This is not against the nature because you are definitely going to get something out of it. Try-out of the

textbook ensures its suitability. The mathematics textbooks of V, VI and VII in Gujarati were tried for some of the Gujarati Medium schools of Gujarat but English medium books were not tried out before publication.

The main controversial treatment and the major weakness of the mathematics textbooks of standard V, VI and VII according to the teachers were the activities. There were hardly any activities found.

The 'Area' chapter of standard V textbook was found to be difficult by 100% teachers and students. The teachers made a remark that this chapter was too difficult to teach for standard V students similarly students felt that it was difficult for them to understand easily. Investigator too supported this statement., at the same time investigator felt that the students and teachers would not have found the chapter to be difficult if the chapter had enough activities.

While going for personal interview with the teachers, the investigator found that most of the mathematics teachers teaching in primary section were not conversant with new mathematics textbooks due to lack of orientation programme in English medium schools. The orientation programme arranged by Nagar Prathmik Schools in most of the cities were carried out in Gujarati Language, therefore teacher from English Medium schools could not attend it. The teachers in standard V, VI and VII were conversant with Arithmetic and Geometry, but they were not conversant with 'Algebra'. Especially in 1990-

91 teachers of standard VII found algebra to be bit difficult as most of the topics were from standard VIII. The teachers opined that after using the book for two years they have become familiar with the book. In general the investigator found the teachers teaching Mathematics in standard V, VI and VII were happy with the textbooks in use.

Illustrations were present for in all the exercises of all the chapters in all three books. But in all the chapters they were not adequate. In standard V textbook there were enough exercises, similarly in standard VII there were enough exercises though in some of the exercises there were very few examples but standard VI textbook was lacking in exercises and examples too.

6.9 DISCUSSION BASED ON ASSESSMENT OF THE TEXTBOOKS ON THE BASES OF THE PRESCRIBED SYLLABUS OF GUJARAT STATE BOARD OF SCHOOL TEXTBOOKS

Finally, one concluded here by briefly referring to the fulfilment of the fifth broad objective on assessment of the textbooks on the bases of the prescribed syllabus of Gujarat State Board of School textbooks. The investigator found that all the three textbooks under study covered all the topics and subtopics given in the syllabus of Gujarat State. The topics were in logical sequence. The textbooks were found to be up-to-date in content though it was short. The average and above average students were benefited by the books but even below average students were not at a loss. The books

contained all types of examples. The investigator therefore found that if the textbooks had contained more of examples for practice purpose then students could have stucked only to the textbooks. The work practice examples take an important place in the subject like mathematics. One of the reasons for students to go for other books was this. Otherwise the investigator found the textbooks of all the three standards average. This might be due to lack of time or textbook board policy of sticking to limited number of pages.

6.10 DISCUSSION REGARDING METHODOLOGY USED IN THE STUDY

As discussed in chapter-IV on 'Methodology the investigator has made the use of questionnaires, interviews and content analysis' as a major tools for collecting data.

The questionnaire for teachers and students was mainly for knowing their views on academic aspects physical aspects and end of chapter exercises. The investigator in some of the cases found their students responses to be inconclusive as the students were of primary classes. Specially in standard V students were just ten years or ten plus but the answers were not firm. Of course standard VII students were little matured compared to standard V. But students and teachers being the main users of the textbook there should be no doubt about the usefulness of the opinions of the users. The investigator found the teachers of all the school under study were very co-operative. Almost all the teachers returned the questionnaires duly filled with extra notes in general. Even

at the time of interview with teachers and then with students the schools were very co-operative thus data could be collected with ease. Ofcourse in some of the cases investigator had to send certain reminders, made personal visits or telephone calls but ultimately the purpose was served. One of the reasons for some of the delay was though the questionnaire was very simple, teachers were confused with some of the items which were later on clarified to them. Moreover there were so many questions and it was bit time consuming too. Hansa (1990) embarked on a very ambitious doctoral research work at the university of Bombay by posting to the experts and others in the field, a printed questionnaire containing forty one quarter size pages with over two hundred and fifty items. Her booklet contained a brief writeup and a model for each of the forty techniques investigated though for writing a textbook of mathematics. She sought the opinions for each through five ratings, in addition, she expected reactions for each from the experts for which she provided some space on each page. The investigator took around two hours just to go through that booklet, still investigator felt need to go again through it. It means when questionnaire is too long respondents sometimes neglect it.

Investigator did not opine that lengthy questionnaire means a very impressive questionnaire but put combining two three questions together made one single question. Moreover certain questions at the last were general where teachers can

give their general opinion as they are the users of the textbooks. Responding lengthy questionnaire, investigator feels it to be almost a boring job which normally attracts some sort of honorarium, but if it is voluntary, either there will be poor response or the responses will be without much reliability and validity, because completing the questionnaire just for the sake of completing shows lack of interest in research and development activity. In the present study questionnaires for students and teachers was main tool but investigator herself made use of content analysis in an attempt to establish some sort of external validity for the whole study. In an ideal situation, opinions of actual users of textbooks in any evaluative study is very important because it is afterall students and the teachers who are real clientele in the use of these textbooks as one of the major tools in teaching learning process.

Even meeting the experts in the field for finalising questionnaires and for various purpose was a difficult task as they were all busy people in their own field. But they were very much supportive and investigator could collect a lot of information from them. The process did take lot of time as the sample was from all over Gujarat (users of the textbooks). Investigator was well experienced with the primary students and teachers so this study was found to be interesting to the investigator as the evaluation of mathematics textbooks were of primary classes i.e. of standard V, VI and VII.

Content analysis a scientific method and a research technique was used by the investigator as discussed in chapter IV. It is a process for categorizing verbal or behavioural data for the purpose of classification, summarization and tabulation (Fox-1969) and the content analysis of the mathematics textbooks have been carried out at manifest as well as latent level. At manifest level the analysis is strictly bound by what the textbooks contain without assuming anything more about it. Whereas at latent level the investigator had to go beyond transcription of what was said directly and sought to infer what was implied or meant. Based on the nature and structure of mathematics as a subject, content analysis at manifest level was found to be suitable specially for objectives connected with content, academic aspects, physical aspects end-of chapter exercises. Fox (1969) is of the opinion that the content analysis at the manifest level can be accomplished reliability and validity but not at the latent level. Kirppendarff (1980) defined content analysis as a research technique for making replicable and valid inferences from data to their content. But the criteria for evaluating suits well to the manifest level but sometimes vaguely to the latent level. The investigator would like to mention that in carrying out content analysis at latent level the investigator had used her several years of experience in teaching mathematics in primary classes. The investigator had the opportunity of making use of her experience of teaching primary classes. Fox (1969) writes in a sense, "content analysis is a personal

statement by the researcher of his perception of the data". Perhaps these perceptions would very based on researcher's background and experience of teaching mathematics at primary level. Krippendorff's (1980) book on content analysis discusses issues with the quantitative orientation. The investigator was mainly guided by qualitative studies in India and abroad at th time of conceptualization of the study for the evaluation of mathematics textbooks of standard V, VI and VII But later on the investigator read some reports about quantitative studies outside India. Qualitative studies in textbook research, have their own merits but if quantitative approach can supplement information in textbooks field it will be really worth.