CHAPTER-1
CHAPTER - I

INTRODUCTION

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References
1.0 Introduction

Of all the subjects in the curriculum the subject of mathematics poses a problem in understanding its content. The understanding of number, the concepts and signs used in subject are major bottlenecks experienced by the pupils. Faced with the above bottlenecks, the cognitive apparatus of the pupils is not functioning due to lack of maturation.

Mathematics is the core-subject of secondary school education. This subject seems to be the hardest subject for the pupils. The pupils take less interest in this subject because of the difficult concepts of the content. The content in the textbooks is also expressed in such a vocabulary and sentence patterns as would make difficulty in grasping the meaning by the pupils who have no reading skills to handle such matters requiring conceptual understanding. This means that without the conceptual understanding, one cannot have the full mastery over the subject of mathematics.

Pupils are found to be very poor in mathematics. Their achievement in this subject is so poor as to speak of their ill-conception of some or few mathematical concepts. Though the most logical, calculative, exact and also interesting subject, this subject is being considered to be the most difficult one.
May be because conception and application of the basic concepts of this subject requires high intelligence or may be because anxiety in one or the other form hinders the pupils in some way or the other. It is also possible that demographic and other factors may be coming in way of making this subject so interesting and easy as to bring out high achievers.

All these possibilities have so far remained to be scientifically tested. It is necessary that a systematic probe be entertained into the factors coming in way of high achievement in mathematics.

Interest in the subject as also in the pupil achievement there in has made way to the research under proposal.

Therefore the investigator collected the average scores of all compulsory subjects in S.S.C. examination of five different schools of Mehsana Taluka from 1985 to 1991, see which school subject has the minimum average in comparison to other subject the data are given in table 1.1.
TABLE 1.1: THE AVERAGE SCORES OF FIVE DIFFERENT SCHOOLS OF ALL COMPULSORY SUBJECTS IN S.S.C. EXAMINATION.

<table>
<thead>
<tr>
<th>YEAR</th>
<th>GUJ HIN ENG</th>
<th>S.S</th>
<th>MAT</th>
<th>SCI</th>
<th>GUJ HIN ENG</th>
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<td>1991</td>
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The investigator got average score in each subject from table 1.1, the average score of each subject is in table 1.2.

Table 1.2: The Average scores of all compulsory subjects in S.S.C. Examination.

<table>
<thead>
<tr>
<th>Year</th>
<th>Gujarati</th>
<th>Hindi</th>
<th>English</th>
<th>Social Studies</th>
<th>Maths</th>
<th>Science</th>
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<td>38</td>
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<td>51</td>
<td>46</td>
<td>41</td>
<td>58</td>
<td>33</td>
<td>51</td>
</tr>
</tbody>
</table>

\[
\bar{X} = 341 \quad 273 \quad 262 \quad 373 \quad 227 \quad 341
\]

Mean: 48.71 39 37.43 53.29 32.43 48.71

S.D.: 3.41 4.78 3.42 3.69 3.74 4.13
Observing the contents of the table 1.2 the averages of the achievement of different school subjects are in the following descending order:

Social Studies : 53.29  
Science : 48.71  
Gujarati : 48.71  
Hindi : 39.00  
English : 37.43  
Maths : 32.43

Looking to the above data of seven years and means thereof, it can be said that the performance in mathematics was very poor as compared to the other school subjects. This evidence had also compelled the investigator to probe deeper as to why the pupils performed very poorly in the mathematics.

1.1 Rationale

There may be many reasons for defective learning in mathematics by the children but the glaring inadequacy in children is the basic conceptual understanding. Some variables also play important role for low achievement in mathematics.

1.1.1 Intelligence

The conceptual understanding comes from maturity. Moreover, it is the natural product of intelligence. One of the determining factors of success in mathematics is pupils'
intelligence. Mathematical achievement or success in various subject matter fields generally correlates about 0.5 with intelligence scores.

Low intelligence can apparently be compensated for, in part at least, by grading learning tasks to pupils' current achievement levels. When this is done for arithmetic materials, no significant differences are found among children of low average, and high IQ in learning, retention, and transfer (Klausmeier and check 1962). Intelligence level also influences qualitative aspects of achievement. For one thing, individuals who score high on intelligence tests are likely to score high on mathematical achievement tests.

More prominent as a problem in the public schools are the children of dull-normal and borderline intellectual level. Those children whose intelligence deviates from normal in an upward direction, the bright and superior children present a problem of great social significance. They need learning mathematics planned for their level no less than does the dull-normal group. Because of their speed in accomplishing usual mathematic learning, these children may find time passing slowly in the school, and unless they are stimulated by challenging situations many from habits of work that are not conducive to the proper development of their mathematical abilities.
Children with IQ's lower than those of the least successful children in mathematics can be identified early enough to keep them from going through the regular educational channels with the result that they would keep falling further and further behind until they would become so out of adjustment with the curriculum that they would be left to fend for themselves.

Tests of general intelligence tend to yield scores for boys and girls that are not significantly different in average total score. There is some evidence of more variability of ability in the male than in the female, which would provide a greater number of very dull as well as very bright boys. The results of school achievement, if these can be taken as relative measurements of ability in mathematics, do not indicate the superiority of boys over girls because on the contrary, girls tend to get better grades throughout school, highschool and college. Boys commonly exceed girls when tests of arithmetic or other mathematical ability are administered. This difference in favour of the male is not one that is apparent early in life as is the linguistic ability of the female. Initially, little girls learn to count and form number concepts earlier than little boys. It is not until they are near adolescence that the numerical ability of boys tends to gain and maintain its superiority over that of girls. The gain in arithmetic ability for the boys seems to be rather constant through the elementary school until they eventually surpass the girls.
The presence of conceptual understanding is the precursor of arithmetical ability. And the intelligence is necessary for conceptual understanding in mathematics. It is hypothesized that those pupils who have high intelligence would be able to understand the logic inherent in mathematics. Those pupils who have low intelligence do not acquire proper conceptual understanding in mathematics. Without proper conceptual understanding pupils could not achieve good score in mathematics. So intelligence is the prime factor for conceptual understanding and achievement in mathematics. Intelligence is related with anxiety. Anxiety has also a negative effect on conceptual understanding and achievement in mathematics.

1.1.2 Anxiety

Anxiety in general and school anxiety in particular hampers the pupils mathematical ability. The pupil can not learn mathematic well if he is distracted by anxieties or frustrations or the sense of failure. The Mathematical ability of the pupil is adversely affected by severe anxieties. The lack of anxiety may bring the sense of security on the part of the pupils. Fundamental to healthy personal development is a feeling of security. It is essential, therefore, that the school program promote feeling of security rather than of anxiety or worry in the learner; nor should the learners' worries be transferred to their teachers. School-age learners need a sense of security as they work together.
How can the school promote in all the people connected with it, a sense of security in these days, which can be characterized as "an age of anxiety" as realistically now as when the John Dewey Society so titled their 1953 year book? How can the school promote the freedom in education that the year book recommends and also maintain a substantial degree of emotional security?

The relationship between anxiety and learning mathematics is complicated by the fact that although high anxiety individuals exhibit more than average motivation, (that is, although they tend originally to manifest an excess of ego-enhancement drive and are further driven to achieve as the only practicable means of reducing anxiety), their high level of anxiety also tends to have a disruptive effect on problem solving. Thus, it has been generally found that anxiety facilities rote and less difficult kinds of meaningful reception learning mathematics.

In high school, as the motivational effects of anxiety become stronger relative to its disruptive effects, the negative correlation between anxiety and academic achievement decreases particularly in boys, it is either weaker or entirely absent when grades are used as an index of achievement (Sarson, 1961, 1963). In highly structured learning tasks such as programmed instruction, a positive relationship has been reported between
anxiety and achievement (Kight and Sassenrath 1966, Tra week, 1964).

Research evidence indicates almost uniformly that there is a low but significant negative correlation between anxiety and intelligence (Spencer 1957). A less likely interpretation is that anxiety may actually depress the development of intelligence rather than merely depress performance on an intelligence test.

Anxiety may have effect on mathematical concept and mathematical achievement. It could be hypothesized that the pupils having low anxiety are found to be better in mathematics to those pupils having high anxiety.

1.1.3 Need for Achievement

Mathematical concept and mathematical achievement had positive relation with the pupil's n-Ach, academic achievement and intelligence. Pupils having low n-Ach seem to have low achievement in mathematics. Pupils having high n-Ach generally behave as successful, rationalized learners.

According to Prof. David C. McClelland, "it is that men can shape their own destiny, that external difficulties and pressures are not nearly so important in shaping history as some people have argued. It is how people respond to those challenges that matters and how they respond depends on how strong their concern for achievement is. So the question of what happens to
our civilization or to our business community depends quite literally on how much time tense of thousand or even millions of us spend thinking about achievement, about setting moderate achievable goals, taking calculated risks, assuming personal responsibilities and finding out how well we have done our job. The answer is upto us."

n-Ach may have effect on mathematical concept and mathematical achievement. It is hypothesized that high n-Ach are superior in mathematical concept and mathematical achievement to low n-Ach.

The home-conditions of the pupils also play a very important role in learning mathematics.

1.1.4 Caste

The Central Government, hitherto, encourages the socially economically backward class to promote the education it receives. The nation spends a lot for upgrading the educational level of the B.C. pupils.

All possible educational facilities and incentives are provided to the B.C. pupils, but what, after all, is the result? The target aimed at by the Central Government and State Government as regards this has not, yet, been achieved is a reality. Incidences of social boycott on the part of the B.C. people grieve us. On the other hand, the target laid down in our
Indian Constitution has not, yet, been fulfilled as far as free, compulsory and universal elementary education of the nation's children from age group 6 to 14 is concerned. This all has resulted in stagnation and wastage in the present day education. There prevails mass illiteracy in the country which hinders social and educational awareness. The percentage of literacy in India is 40. In fact, genuine percentage of literacy is only 30 if the country-men who know only how to sign are excluded from the list. How can we eradicate this mass illiteracy from the whole of nation? This is feasible only through learning mathematics and its ability is the only key to social enlightenment and national growth and development.

Caste may have effect on mathematical concept and mathematical achievement. It is hypothesized that N.B.C. pupils are better in mathematical concept and mathematical achievement than B.C. pupils.

1.1.5 Family Size
The family provides the early mathematics learning experiences of the child. An understanding of the probable values, ideals and attitudes prevalent in the home while the child was younger than school age may be indicative of what the child may have learned.

Almost all children are dependent upon their parents to learning mathematics. Families which do many things together,
where everyone participates in the varied home activities, produce well adjusted and happy children. Children reared in such homes tend to catch the spirit of the home and develop good dispositions and favourable outlooks upon the life. On the other hand, parents who display habits of selfishness and who are unable to accept their children as unique personalities may well hinder their personal and social adjustment and consequently their outlook and disposition.

Uptil now a very few researches have been undertaken to explore the effects of the pupil's family size on his mathematical ability. The investigator intend to examine the effects of the family size on the pupil's mathematical concept and mathematical achievement.

Pupil's family size may have effect on mathematical concept and mathematical achievement. It is hypothesized that pupils comes from small family are superior in mathematical concept and mathematical achievement than pupils comes from large family.

1.1.6 Birth Order

Almost all children are dependent upon their parents to learning mathematics. Some parents provide more love to younger children than the other children provide more facilities in learning mathematics. Some parents do not provide full facilities to the first borned children in learning mathematics. Because, some parents give the responsibility to first borned children to look after younger children and, first borned children have to help in household activity, henceforth, the effect of the pupil's birth order on mathematics learning.
The investigator intends to examine the effect of the pupil's birth order on the mathematical concept and mathematical achievement. It is hypothesized that pupils having 2nd birth order are better in mathematical concept and mathematical achievement than pupils having 1st birth order.

It is perhaps a common experience of all that the pupils of different grades differ in their mathematical concept and mathematical achievement. It must be said that general and sporadic researches in the past had been done to assess mathematical concept, mathematical achievement, intelligence, anxiety, n-Ach. et. as psychological correlates as well as caste family size, birth order, etc. as demographic correlates viewing all these psychological and demographic correlates as independent variables to mathematical concept and mathematical achievement.

In order to have some idea of predictors of mathematical concept and mathematical achievement, the present researcher has selected the following problem for research.

1.2 Statement of the Problem.

The problem of present investigation is as under: "A comparative study of the mathematical concept and mathematical achievement of the pupils of grade VIII in the context of caste, intelligence, anxiety, n-Ach and certain demographic variables."
1.3 Defining the terms

It would be felt quite essential to clarify the meanings and concepts of certain significant terms in the research problem with reference to the present study. These terms are 'concept', 'Achievement', 'Grade', 'Pupil', 'Intelligence', 'Anxiety', 'N-Ach' '(Need for Achievement)', and Demographic variable'.

1.3.1 Concept

An idea that is not the direct result of sensory inputs but is produced by the manipulation of various sensory impressions.  

1.3.2 Achievement

In educational psychology, the term is applied to a specified level of proficiency in academic work in general or in a specific skill such as reading or arithmetic.  

1.3.3 Grade

Grade means a standard of the school system to which pupils belong for the instructional purpose.

1.3.4 Pupil

Pupil means one who attends a school of an elementary or secondary or high level of education.
1.3.5 Intelligence

Intelligence is (1) ability to make successful and rapid adaptation to new situations and to learn from experience (2) capacity to integrate experience (3) as commonly used in measurement and testing a degree of ability represented by performance on a group of tests selected because they have proved their practical value in the prediction of success in academic work and in some vocations.6

Intelligence is a widely used term for general mental abilities but also one of the most disputed concepts in psychology and education and therefore defined in a variety of ways which one can broadly classify into biological psychological and operational categories. The first 2 are embraced in Helm's definition. Intelligence activity consists of grasping the essentials in a given situation and responding appropriately to them.7.

1.3.6 Anxiety

Anxiety is termed as complex emotional experience often unconscious in origin, with fear or dread as its most notable characteristic. Symptom in various nervous and mental disorders where the term anxiety state may be used can be defined operationally as the automatic response pattern characteristic of an individual organism after a noxious stimulus.8
Anxiety

Origins of the concept: Like its Latin original anxietas, anxiety commonly connotes an experience of varying blends of uncertainty, agitation, and dread.\(^9\)

1.3.7 N-Ach. (Need for Achievement)

N-Ach (Need to achieve) means a motive to achieve in which the pupil wants to know and understand to obtain status through schooling, and to be approved by others. The term 'need for achievement' or 'n-Ach' for short arises from the work of Maclelland.\(^10\)

1.3.8 Demographic Variable

Demographic variable means influence/sacting on education because of population growth and change.\(^11\)

Demographic variable relates to demography which means the science or organized study of populations, concerned particularly with the rate of population change distribution and the causes of such change, and moral, intellectual, physical psychological as well as economic factors affecting births, marriages and morality.

1.4 Objectives of the Study.

The present study was undertaken keeping the following objectives in mind.
1. To assess the intelligence, anxiety and N-Ach. of the pupils of grade VIII.
2. To prepare the test which would measure mathematical concepts of the pupils grade VIII.
3. To ascertain their level of concept formation in mathematics.
4. To assess their demographic variables.
5. To assess their achievement in mathematics.
6. To assess the effect of intelligence, anxiety, N-Ach, Caste and certain demographic variables on their mathematical concepts and mathematical achievement.
7. To assess the effect of interaction between independent variables on their mathematical concepts and mathematical achievement.

1.5 Limitations of the study

The limitations of the present study were as under:
1. Pupils of Std. VIII of the forty-two schools of Mohsana district participated in the present study.
2. For achievement in mathematics. The school examination results were taken into account.
3. The interpretations were held to be valid and reliable to the extent of the reliability and validity of the tools employed in measuring or assessing. The intelligence, Anxiety, N-Ach. and other mathematical attributes contained in the investigation.
4. It is limited to those B.C. pupils who belong to scheduled castes and scheduled Tribes that are viewed both socially and educationally backward as per Gujarat Government Resolution of 1960. The B.C. pupils who belong to Migratory Tribes and Denotified Tribes which are considered only economically backward and the pupils who belong to the Baxi punch castes are not treated as B.C. pupils in this study.

5. It involves only Gujarati Medium Secondary School Pupils of grade VIII.

6. The study is also delimited in the sense that only family size and pupils birth-order are treated as certain demographic variables.

1.6 Scheme of Chapterization

The entire research report is divided into six chapters. Here is presented a bird's eye view of all the chapters:

The first chapter is devoted to the importance of the study. The chapter gives definitions of key words appearing in the study specific objectives of the study are enlisted and the limitations of the study are recognized. Thus, the first chapter strives to serve as a pre-view of the research study.

The second chapter contains the details about the concepts of variables. The outstanding theories of variables.
The third chapter gives the summary of the related researches done in the past.

The fourth chapter gives in detail the plan of the research and its procedure.

The fifth chapter comprises of the data analysis and their interpretations and conclusions.

The sixth chapter gives the summary from of the observations, conclusions and the suggestions.

The body of the research report contains a number of tables and figures and copious references wherever felt necessary. A list of exhaustive bibliography is furnished at the close of the report. In addition to these appendices consisting of 1 to 10 are also attached at the end.
References:


3. As quoted in his article "Achievement motivation Development" by David C.McClelland in the Special Issue on 'Achievement Motivation', Nootan Shikshan, Cumulative Issue No.424, Nov. 1970, the 3rd Title Page.


5. Ibid P. 6.


8. Ibid. P. 23.


11. Ibid., P. 100