CHAPTER VI

FINDINGS, INTERPRETATIONS AND SUGGESTIONS
## CHAPTER VI

FINDINGS, INTERPRETATIONS AND SUGGESTIONS

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CHAPTER VI
FINDINGS, INTERPRETATIONS AND SUGGESTIONS

6.1 FINDINGS:

ACHIEVEMENT IN MATHEMATICS AND LEVEL OF MENTAL AND EMOTIONAL CHARACTERISTICS

SECONDARY CLASS STUDENTS:

Students of secondary classes are poor in achievement in mathematics – in general and also as per Bloom’s stages of learning. Moreover, they are average in their intelligence, numerical ability and interest in mathematics, very low in verbal reasoning, low in self-esteem and achievement motivation. They are field dependent in cognitive style and also their school anxiety varies from low to high.

STANDARD IX - STUDENTS:

Students of standard IX are poor in achievement in mathematics – in general, in the units: application, statistics, geometry, construction and graphs and also as per Bloom’s stages of learning. However they are good in the units: number system, set language, algebra and computer programming. In mensuration their achievement varies from poor to good.

Moreover, they are average in their intelligence, numerical ability and interest in mathematics, very low in verbal reasoning, low in self-esteem and achievement motivation but high in school anxiety. They are field dependent in cognitive style.

STANDARD X - STUDENTS:

The students of standard X are poor in achievement in mathematics – in general, in the units: statistics, logarithm, theoretical geometry and as per Bloom’s stages of learning: understanding and application. However they are good in the units: number system, mensuration, set theory, algebra, matrices, trigonometry, analytical geometry, graphs and computer programming. But in their achievement in geometry and in Bloom’s stages of learning: knowledge level, they vary from poor to good.

Moreover, they are average in their intelligence, numerical ability and interest in mathematics, low in verbal reasoning, achievement motivation and school anxiety. Their self-esteem varies from low to high and they are field dependent in cognitive style.
Figure 6.1

ACHIEVEMENT IN MATHEMATICS

Mathematics – in general

Knowledge

Understanding

Application

Secondary classes

Standard IX

Standard X

Poor

Poor

Poor

Poor

Poor

Poor

Poor

Poor

Poor

Poor

Poor

Poor

Poor

Poor

Poor

Poor

Poor

Poor

Poor

Poor

Poor

Poor
CLASSROOM ENVIRONMENT AND ACHIEVEMENT IN MATHEMATICS

Significant difference is found between the students of (i.) Secondary classes (ii.) Standard IX and (iii.) Standard X studied in progressive and non-progressive classrooms in terms of achievement in mathematics - in general, in all the units of mathematics and as per Bloom’s stages of learning.

Students of (i.) Secondary classes (ii.) Standard IX and (iii.) Standard X studied in progressive classrooms show better achievement than the students studied in non-progressive classrooms in terms of achievement in mathematics - in general, in all the units of mathematics and as per Bloom’s stages of learning.

TEACHER’S ATTITUDE TOWARDS change and ACHIEVEMENT IN MATHEMATICS

Significant difference is found between the students of (i.) Secondary classes (ii.) Standard IX and (iii.) Standard X of innovative and non-innovative teachers in terms of achievement in mathematics - in general, in all the units of mathematics and as per Bloom’s stages of learning.

Students of (i.) Secondary classes (ii.) Standard IX and (iii.) Standard X of innovative teachers show better achievement than the students of non-innovative teachers in terms of achievement in mathematics - in general, in all the units of mathematics and as per Bloom’s stages of learning.

BACKGROUND CHARACTERISTICS AND ACHIEVEMENT IN MATHEMATICS

GENDER:

Significant difference is found between boys and girls of (i.) Secondary classes (ii.) Standard IX and (iii.) Standard X in terms of achievement in mathematics - in general, in all the units of mathematics and as per Bloom’s stages of learning.

Girls of (i.) Secondary classes (ii.) Standard IX and (iii.) Standard X show better achievement than Boys in terms of achievement in mathematics - in general, in all the units of mathematics and as per Bloom’s stages of learning.

LOCALITY OF SCHOOL:

Significant difference is found between the students of (i.) Secondary classes (ii.) Standard IX and (iii.) Standard X studied in rural schools and urban schools in terms of achievement in mathematics - in general, in all the units of mathematics and as per Bloom’s stages of learning.
Figure 6.2
ACHIEVEMENT IN THE MATHEMATICS NUMBER SYSTEM

- SET LANGUAGE
- ALGEBRA
- MENSURATION
- TRIGONOMETRY
- ANALYTICAL GEOMETRY
- CONSTRUCTION
- THEORETICAL GEOMETRY
- APPLICATION
- MATRICES
- LOGARITHM
- STATISTICS
- GEOMETRY
- GRAPHS
- COMPUTER PROGRAMMING

STANDARD IX

- Good
- Good
- Good
- Poor
- Poor
- Poor
- Poor
- Good

STANDARD X

- Good
- Good
- Good
- Good
- Good
- Poor
- Poor
- Poor
- Poor
- Poor
- Poor
- Poor
- Poor
- Good
- Good
- Good
Students of (i.) Secondary classes (ii.) Standard IX and (iii.) Standard X studied in urban schools show better achievement than rural schools in terms of achievement in mathematics—in general, in all the units of mathematics and as per Bloom’s stages of learning.

**TYPE OF SCHOOLS:**

Significant difference is found between the students of (i.) Secondary classes (ii.) Standard IX and (iii.) Standard X studied in government schools and management schools in terms of achievement in mathematics—in general, in all the units of mathematics and as per Bloom’s stages of learning.

The students of (i.) Secondary classes (ii.) Standard IX and (iii.) Standard X studied in management schools show better achievement than government schools in terms of achievement in mathematics—in general, in all the units of mathematics and as per Bloom’s stages of learning.

**SOCIAL STATUS:**

Significant difference is found among BC, MBC, OC and SC/ST students of (i.) Secondary classes (ii.) Standard IX and (iii.) Standard X in terms of achievement in mathematics—in general, in all the units of mathematics and as per Bloom’s stages of learning except in the units: geometry and graphs in the case of Standard X students.

BC students of Secondary classes and Standard X show better achievement than other communities in terms of achievement in mathematics—in general, in all the units of mathematics except geometry and computer programming and as per Bloom’s stages of learning whereas OC students of Standard X show better achievement than other communities in the units: geometry and computer programming.

MBC students of Standard IX show better achievement than other communities in terms of achievement in mathematics—in general, as per Bloom’s stages of learning and in the units: number system, application, statistics, construction and graphs and BC students show better achievement than other communities in the units: set language, algebra, and mensuration and OC students show better achievement than other communities in the units: geometry and computer programming.
Figure 6.3
IMPACT OF MENTAL AND EMOTIONAL CHARACTERISTICS

Mental characteristics

- Intelligence
  - Average
  - Average

- Numerical ability
  - Average
  - Average

- Verbal reasoning
  - Very low
  - Low

Cognitive style
  - Field dependent
  - Field dependent

Emotional characteristics

Secondary classes
- Average
- Average
- Average
- Low to high

School anxiety
- High
- Low
- Low

Self-esteem
- Low
- Low
- Low

Achievement motivation
- Low
RELIGION:

Significant difference is found among Hindu, Christian and Muslim students of (i.) Secondary classes (ii.) Standard IX and (iii.) Standard X in terms of achievement in mathematics - in general, in all the units of mathematics and in terms of Bloom's stages of learning mathematics except in the unit construction of standard IX and logarithm of standard X.

Christian students of Secondary classes and Standard X show better achievement than other religions in terms of achievement in mathematics - in general, as per Bloom's stages of learning and in all the units of mathematics whereas in the units logarithm and trigonometry both the Christian and Muslim students are better than the Hindu students.

Muslim students of Standard IX show better achievement than the students of other religions in terms of achievement in mathematics - in general, as per Bloom's stages of learning and in the units: number system, algebra, mensuration, statistics, geometry and construction whereas Christian students show better achievement than other religions in the units: set language, application, graphs and computer programming.

NATURE OF SCHOOLS:

Significant difference is found among the students of (i.) Secondary classes (ii.) Standard IX and (iii.) Standard X studied in Boys' schools, Girls' schools and Co-ed schools in terms of achievement in mathematics - in general, in all the units of mathematics and as per Bloom's stages of learning.

The students of (i.) Secondary classes (ii.) Standard IX and (iii.) Standard X studied in girls' schools show better achievement than other schools in terms of achievement in mathematics-in general, in terms of Bloom's stages of learning mathematics and in all the units of mathematics except the unit trigonometry of standard X.

In the unit trigonometry of standard X, the students studied in Co-ed schools show better achievement than the students of other schools did.

PARENTAL EDUCATIONAL STATUS:

Significant difference is found among the students of (i.) Secondary classes (ii.) Standard IX and (iii.) Standard X whose parental educational status is low, moderate and high in terms of achievement in mathematics - in general, in all the units of mathematics and as per Bloom’s stages of learning.
### Figure 6.4

Background characteristics and achievement in mathematics of secondary classes - Leading Factors

<table>
<thead>
<tr>
<th>Secondary Classes</th>
<th>Classroom climate</th>
<th>Teachers' attitude</th>
<th>Gender</th>
<th>Social status</th>
<th>Religion</th>
<th>Locality of school</th>
<th>Type of school</th>
<th>Nature of school</th>
<th>Parental education</th>
<th>Birth order</th>
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<tr>
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<td>Girls</td>
<td>BC</td>
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<td>Urban</td>
<td>Management</td>
<td>Girls' school</td>
<td>Highly</td>
<td>Last born</td>
</tr>
<tr>
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<td>Innovative</td>
<td>Girls</td>
<td>BC</td>
<td>Christian</td>
<td>Urban</td>
<td>Management</td>
<td>Girls' school</td>
<td>Highly</td>
<td>Last born</td>
</tr>
<tr>
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<td>Innovative</td>
<td>Girls</td>
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<td>Girls' school</td>
<td>Highly</td>
<td>Last born</td>
</tr>
</tbody>
</table>
Students of (i.) Secondary classes (ii.) Standard IX and (iii.) Standard X whose parental educational status is high show better achievement than others in terms of achievement in mathematics - in general, in all the units of mathematics and as per Bloom’s stages of learning.

ORDER OF BIRTH:

Significant difference is found among first born, middle born and last born of (i.) Secondary classes (ii.) Standard IX and (iii.) Standard X in terms of achievement in mathematics - in general, as per Bloom’s stages of learning and in all the units of mathematics except mensuration, set theory, algebra and graphs of standard X.

Last born of Secondary classes and Standard IX show better achievement than others in terms of achievement in mathematics - in general, in all the units of mathematics and as per Bloom’s stages of learning.

First born of Standard X show better achievement than others in terms of achievement in mathematics - in general, as per Bloom’s stages of learning: knowledge and application and in the units: number system, mensuration, algebra, matrices, analytical geometry, theoretical geometry and computer programming whereas last born of Standard X show better achievement than others as per Bloom’s stages of learning: understanding and in the units: set theory, statistics, trigonometry, geometry and graphs. In the unit logarithm, both first born and last born show better achievement than middle born.

MENTAL CHARACTERISTICS AND ACHIEVEMENT IN MATHEMATICS

The mental characteristics (i.) Intelligence (ii.) Numerical ability (iii.) Verbal reasoning and (iv.) Cognitive style have significant impact over the students of (i.) Secondary classes (ii.) Standard IX and (iii.) Standard X in terms of achievement in mathematics – in general, in all the units of mathematics and as per Bloom’s stages of learning.

Students of (i.) Secondary classes (ii.) Standard IX and (iii.) Standard X who are above average in Intelligence, Numerical ability and Verbal reasoning show better achievement than others in terms of achievement in mathematics – in general, in all the units of mathematics and as per Bloom’s stages of learning.

Students of (i.) Secondary classes (ii.) Standard IX and (iii.) Standard X whose cognitive style is field independent show better achievement than others in
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<th>Type of school</th>
<th>Nature of school</th>
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</table>
terms of achievement in mathematics – in general, in all the units of mathematics and as per Bloom’s stages of learning.

EMOTIONAL CHARACTERISTICS AND ACHIEVEMENT IN MATHEMATICS

The following emotional characteristics (i.) Interest in mathematics (ii.) School anxiety (iii.) Self-esteem and (iv.) Achievement motivation have significant impact over (i.) Secondary classes (ii.) Standard IX and (iii.) Standard X in terms of achievement in mathematics – in general and as per Bloom’s stages of learning.

Students of (i.) Secondary classes (ii.) Standard IX and (iii.) Standard X who are above average in Interest in mathematics and Achievement motivation show better achievement than others in terms of achievement in mathematics – in general, in all the units of mathematics and as per Bloom’s stages of learning.

Students of (i.) Secondary classes (ii.) Standard IX and (iii.) Standard X who are of low in School anxiety and high in Self-esteem show better achievement than others in terms of achievement in mathematics – in general, in all the units of mathematics and as per Bloom’s stages of learning.

6.2 INTERPRETATION: -

The result of the S.S.L.C examination published in the month of June 2000, gives in the impression that the students performance is somewhat encouraging in various subjects in general and mathematics in particular. (70% of students have passed in the S.S.L.C. examination in which only 0.35% of the students have secured centum in mathematics).

When the study was started in 1998, the investigator assumed from the facts available that the performance of the students of secondary classes i.e., standard IX & X (S.S.L.C) was not encouraging. This assumption is found to be in contradiction with the achievement shown by the students of secondary classes in 2000. Clearly, the present study shows that the achievement of the students of secondary classes in mathematics is poor. It is also revealed that the achievement in mathematics measured in terms of Bloom’s stages of Learning- knowledge, understanding and application is only poor in the case of secondary class students by the present investigation. From this, it may be interpreted that the marks obtained by the students of tenth standard i.e., in the March 2000 S.S.L.C. Examination may not
Table 6.6
Leading Factors on achievement in mathematics of standard X

<table>
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<th>Standard X</th>
<th>Classroom climate</th>
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be a real measure of their actual achievement. The investigator being a teacher of mathematics does not aim at analyzing the validity of the test items that are being used in the public examination question papers. However, a word about the items that are found in such government examinations is not out of place. Many of the studies completed on university and government examinations show that the test items are repetitive and not valid enough to assess the real achievement in the subject as well as in different areas of the subject. That is why, the investigator prepared and validated achievement tests separately for standard IX and X on the basis of objectives of teaching mathematics with due weightage to various units found in the syllabus. Therefore, the investigator feels that the level of achievement of standard IX and X students in mathematics recorded in the present study is a more accurate estimate of the status of learning and teaching of mathematics at the secondary level.

The investigator has chosen certain variables related to the cognitive and affective domains for arriving at an appropriate conclusion with regard to the reason for the recorded present level of achievement in mathematics. A mere glance at the global finding related to the variables reveal the fact that the cognitive characteristics - intelligence, numerical ability and verbal reasoning are not found to be prominent in the target group. Likewise, in the affective characteristics such as self-esteem, achievement motivation and interest in mathematics also they are not prominent. Therefore it may be concluded that the poor achievement in mathematics - in general and also in terms of Bloom’s stages of learning may be due to lack of prominence in the chosen mental and emotional characteristics of the individuals.

When one looks into achievement in mathematics of standard IX, it may be seen that they are not only poor in total performance but also in many of the areas of mathematics and also in knowledge, understanding and application levels of learning. As in general population they are week in cognitive abilities in addition to their high school anxiety and field dependent cognitive style. It may not be erroneous to say that the emotional factor high school anxiety and the cognitive style - field dependence may be a handicap for the students of this category, to fare well in mathematics.

Though the students of standard X seem to be somewhat better than their counterparts in standard IX in the areas of geometry, graphs and computer programming and also in knowledge level of learning their cognitive and emotional
characteristics are somewhat similar to the students of standard IX. The only visible advantage of the students of standard X is found to be their low school anxiety. Therefore it may be stated that low school anxiety is likely to foster higher level achievement in mathematics.

It is also learned from the findings of the present study that variety and freedom play a significant role in enhancing the achievement of the students of secondary classes (both standard IX and X) in mathematics. It is more so in the case of different areas of mathematics and also at knowledge, understanding and application levels of learning. Such an inference is found possible from the finding that students studying in progressive classrooms fare better than those studying in non-progressive classrooms.

The findings of the present study seem to support the assumption that the teachers who are capable of breaking away from the traditional methods are the boosters of the students' performance in various subjects. It has been shown that the students of innovative teachers are prepared better than the students' of non-innovative teachers in mathematics, in all the areas of mathematics and also at the knowledge, understanding and application levels of learning mathematics. It drives home the fact that innovation is a rare phenomenon in the secondary schools in Tinnevelly Educational District and as a result, the general achievement of the students of secondary classes in mathematics, in different areas of mathematics and at different levels of learning mathematics is recorded poor.

In the present academic scenario, the females found to dominate over their counterparts in all disciplines at all levels ranging from secondary to higher education. In the recently published S.S.L.C result also it is found explicit. The report says 66.9% of boys and 73% of girls have passed in the public examination during the year 1999-2000. True to this, the present study also shows that the girls are far superior to boys in mathematics – in general, in all the areas of mathematics and also that knowledge, understanding and application levels of learning mathematics. The one and only explanation offered by all for this state of affairs is that girls are more dedicated, more hard working and more obedient than their counterparts. The same may be true in the case of the students of secondary classes chosen for the present study. However, the present investigation lends itself to further explanation for this phenomenal superemacy of girls over boys in the light of the findings related
to the variables treated for achievement in mathematics. In the present study, the girls are significantly better than boys in all cognitive characteristics except cognitive style and also in all emotional characteristics. Though the boys are more fields independent than their counterparts, their performance in mathematics is less. Moreover, when field independent boys are compared with field independent girls the level of achievement in mathematics is found to be less in the case of the former. Therefore, it may be interpreted that the field independence which is prominent in boys is also of no help to raise the level of achievement of standard IX and X boys in mathematics.

Mathematics is a subject which calls for mental work and concentration for better understanding and execution. The achievement of the students in rural schools and urban schools in mathematics generally does not vary much. Infact many of the teachers are of the opinion that performance of the rural school students is far better than the students in urban schools. Many of the research findings related to achievement in mathematics is also not consistent in terms of locality (Misra. M., 1986; Chakrabarti, S., 1988; Lalithamma, K.N., 1975; and Khalild, Mohd Nasir, 1997). The present study brings out the fact that urban students are significantly better than the rural students in achievement in mathematics in general in all the areas of mathematics and also in terms of Knowledge, understanding and application levels of learning. The research findings related to the influence of the mental and emotional factors over the level of achievement in mathematics provide interpretation for this outcome of the study. It has been noted in the present study that the students who fare well in intelligence, numerical ability urban reasoning are good in their achievement in mathematics also. It is shown that the secondary class students in urban schools are better than their counter parts in all these three aspects, Therefore one may arrive at the conclusion that because of better intelligence, numerical ability and verbal reasoning, the students of urban schools are better than the students of rural schools in their achievement in mathematics. Likewise, the outcome of the present investigation related to locality may also be attributed to the emotional characteristics possessed by rural and urban secondary class students. It is found in the present study that the emotional characteristics: interest in mathematics, achievement motivation, self-esteem and school anxiety are capable of influencing the secondary class pupils’ achievement in mathematics. It is also revealed that the urban students are better than the rural students in their interest in mathematics, self-esteem
and achievement motivation, however they are found to be less prominent in school anxiety than the rural students. From this, it may be understood that the urban students are better than the rural students in their achievement in mathematics - in general, in all the areas of mathematics and in terms of knowledge understanding and application levels of learning, because of their better position in interest in mathematics, self-esteem and achievement motivation and less in prominence in their school anxiety.

The officials and Public hold the opinion the management schools are functioning better than the Government Schools. Many of the studies (Hirunval, A., 1980; and Sabapathy, T., 1986) have shown that management schools are better than the Government Schools in producing percentages of passes in different subjects and also securing district and state level ranks in various subjects at the secondary and higher secondary levels. In the recently published results of the S.S.L.C examination 98% of rank holders are from management schools and remaining from Government Schools. It is often attributed to the teaching, discipline and available infrastructure facilities. However, the investigator feels, over and above these factors, some individual oriented characteristics may be responsible for such a difference. Therefore, while studying the mental characteristics of the secondary class students of management schools and Government Schools in relation to achievement mathematics, it is found that the students of management schools are superior to the Government School students in their intelligence, numerical ability and verbal reason, which are found to have significant influence over the level of achievement of students in mathematics. In the same way the students of management schools are found to be better than the Government School students in their emotional characteristics: Interest in mathematics, self-esteem and achievement motivation which are capable of positively influencing achievement in mathematics. In the negative factor - school anxiety the Government School students are higher than the students of management schools, thereby bringing down their level of achievement in mathematics. Therefore, it may be stated that because of the deficiency in some of the mental and emotional characteristics the Government school students are incapacitated to score better in mathematics.

A few studies have attempted to verify whether the social status which is identified in terms of community categorized by the Government of Tamil Nadu...
and the Government of India as people of Forward Community (O.C), backward community, most backward community, Schedule Caste and Schedule Tribes is capable of developing certain typical characteristics based on the nature of the community which in turn may affect the intellectual activity of the people. However, many of the studies have shown no significant difference in psycho-social characteristics due to the difference in their community for social status.

According to the present study community seems to play a significant role in achievement of the secondary class students in mathematics. It is recorded that the pupils of backward community fare better than the pupils of other communities in their overall achievement in mathematics and in their knowledge, under & applications levels of learning. An explanation is possible for this superiority of the B.C. students from the sociological point of view as the majority of the people of this community come under middle class and as such depend largely on education and employment for securing a better means of living. Therefore they are prone to concentrate more on education and educational activities and thereby achieve better in academic works. Moreover, the investigator is capable of providing another explanation from the point of view of psychology based on the mental & emotional characteristics used as the variables of achievement in mathematics. The present study shows that the pupils of the backward community are better than their counter parts in Intelligence numerical ability and field independence which are of greater influence over achievement in mathematics. Likewise, the superiority of the B.C students is seen in achievement motivation & self-esteem which are capable of influencing one’s achievement in mathematics significantly. Moreover, their low school anxiety is also found to be a contributive factor for their better achievement in mathematics. Hence, it may be stated that the pupils of the B.C community are better than their counter parts in achievement in mathematics due to the presence of conducive mental & emotional characteristics.

Many of the studies (Ojha, H., 1983), which treat religion as one of the variables, have put-forth findings, which are inconsistent in nature. In the present study it is found that Christian students of secondary classes have supremacy of others in achievement in mathematics and the levels of learning mathematics - Knowledge, understanding and application. When the standard IX and X samples were studied separately, it is found that in the case of std X, Christian students recorded highest and
in the case of std IX, Muslim students have marked the highest. In general, it may be stated the students belonging to minority communities are capable of scoring better than the students of other major religions in mathematics. For this, an explanation may be given on the basis of the psychological variables studied. In the mental characteristics Intelligence, numerical ability, verbal reasoning and Cognitive Style: and emotional characteristics: interest in mathematics, achievement motivation school anxiety and self-esteem which are of significant influence over achievement in mathematics, Christians reign supreme, thereby recording the highest performance in mathematics. Next to them comes the pupil of Islam in the characteristics: numerical ability, verbal reasoning, cognitive style-field independence interest in mathematics and conducive school anxiety. Thus, it is clear because of these mental & emotional characteristics Christian students are able to do so well in mathematics followed by students of Islam.

Tamilnadu is noted for its unique culture and one such aspect of culture is lack of encouragement for girls to pursue education beyond the middle school stage. Inspite of such a barrier, it is found nowadays that the girls exceed boys not only in number but also in achievement in almost all the areas of learning. It shows that girls have come out of the cultural drag and started taking up responsibilities in par with their counter parts. The findings of the present study also reveals the fact that students of girls' schools are better than the boys' schools or the coeducational schools. It is recorded in the present study that the students of girls' schools are better than the students of boys' schools or coeducational schools in the following mental characteristics: intelligence, numerical ability, verbal reasoning and cognitive style and emotional characteristics, interest in mathematics, achievement motivation, conducive school anxiety and self-esteem which are capable of influencing significantly achievement in mathematics - in general & in terms of knowledge, under and application levels of learning. Therefore, it may be concluded that due to the advantage of students of girls' schools in the conducive mental & emotional characteristics they are able to register a better performance in mathematics.

Many of the studies (Bowers, Mack Samuel, 1994; Ahluwalia, I., 1985; Joskolka, Darrel Lee., 1995) which relate educational environment available at home with the curricular and cocurricular participation and achievement of students
of different stages of learning have shown that parental education which decides the
educational environment at home is has significant factor influencing the students;
participation and achievement in educational programmes. Now the present study is
in a position to explain how the parental education fosters essential mental and
emotional characteristics needed for one's better performance in the field of education
in general and mathematics - in particular. It is shown in the present study that the
pupils of highly educated parents are highly prominent in the following mental
characteristics: intelligence, numerical ability, verbal reasoning and cognitive style
and emotional characteristics: interest in mathematics, achievement motivation,
conducive school anxiety and self-esteem which are found to significantly influence
achievement in mathematics. Therefore it may be concluded that better parental
education fosters better mental and emotional characteristics in pupils which in turn
cause better achievement in mathematics.

Sociologically, the order of birth has its importance in the socialization
of individuals due to the differences in child rearing when there is successive birth of
children in the family. Therefore, it is assumed that achievement in mathematics, one
of the phases of education may also be influenced by order of birth which could
design the mode of child of rearing I the family. Some of the studies (Ahluwalia, I.,
1985; Ena Vazquez Nuttall, Ronald L. Nuttall, Denise Polit and Joan B. Hunter.,
1976) which used order of birth as one of the variables have come out with the finding
that the first born are superior to the other siblings and whereas some others show
last-born are better than the other siblings. The present study shows the last born are
superior to others in achievement in mathematics - in general and also in Knowledge,
under and application levels of learning, closely followed by the first born. It is
observed that such a higher level performance in mathematics is due to the advantage
of the following mental characteristics: numerical ability, verbal reasoning and
cognitive style - field independence and emotional characteristics: interest in
mathematics, achievement motivation and conducive school anxiety of the last born
which are significant influence over achievement in mathematics. Likewise, the first
born are capable of showing the next best performance in mathematics due to the
influence of the following mental characteristics: intelligence, numerical ability,
verbal reasoning and cognitive style - field independence and emotional
characteristics: interest in mathematics, achievement motivation and self - esteem.
Hence it may be concluded that the influence of order of birth over achievement in mathematics is mainly due to the conducive mental and emotional characteristics developed by the students of this category.

6.3 RECOMMENDATIONS:

1. Mathematics is a subject capable of sharpening thinking and discipline the mind. Therefore, it provides the general competence to the learner to apply his mind while learning different subjects and sustain the spirit of thinking deliberately for a longer duration. So it is considered as a basic subject for developing essential skills to master subjects of different nature. In such a basic essential subject, it is found that the pupils of secondary classes of the schools in Tinnevelly Educational District are recorded poor. It shows the presence of a gloomy scenario in the educational field that too when the students are in the crucial stage of learning. To overcome this situation it may be recommended that necessary steps have to be taken immediately to bring about better change in the field of teaching mathematics. For this, it is recommended that the following measures are to be taken up:

a. To bring about change in the method of teaching mathematics, each and mathematics teachers should be inducted in a course or series of courses on methodology of teaching mathematics, designed and offered by experts in the field of mathematics.

b. Enough encouragement should be given to teachers of mathematics in the form of awards and appreciation’s for producing better results in the schools.

c. Every mathematics teacher may be made more innovative by enabling him to take up projects for which necessary training and guidance may be provided to each and every one of them.

d. In each educational district, a unit of experts may be formed with a specific plan of meeting and assisting the practicing mathematics teachers in each and every school.

2. The text books that are published for teaching mathematics following the state Board syllabus may be made more readable and interesting. i.e. the experts who are incharge of preparing the text books of mathematics should see to it that the examples, Illustrations, language and the subject matter are easily
understandable to the students of the particular stage. i.e., the textbook should be designed in such way that the students can read and work out sums and exercises on their own without depending much on the teachers.

3. A Mathematical laboratory may be formed in every school. This may be the place for the frequent visit of the children to answer mathematical riddles. Moreover, by using certain models and appliances the students can practice what they have learnt in their classes. Thereby they can understand the application of mathematical Knowledge.

4. Mathematics is considered as a dull subject by many because of their ignorance in application. Therefore to foster interest, and instill confidence in students while learning mathematics the pupils may often be taken to places which may provide certain typical Knowledge or theory or skill of mathematics. For example, when they are taken to banks and allow to observe the activities of the clerks, they can learn commercial mathematics.

5. A change in the evaluation of the performance of the students in mathematics is recommended. In lower classes, instead of making use of certain specific sums to be worked out in the examination hall, as a means of evaluation of learning mathematics it is recommended that series of situations may be designed in the classroom itself periodically and with the help of mathematical instruments the students can apply their knowledge and solve the problems in a practical way. This periodical practical assessment will help them escape from the test anxiety and rather enable them to develop interest and curiosity for learning mathematics.

6.4 SUGGESTION FOR FURTHER STUDY:

1. A CRITICAL STUDY ON ACHIEVEMENT IN MATHEMATICS OF HIGHER SECONDARY SCHOOL STUDENTS.

2. AN INVESTIGATION INTO THE TRAINING PROGRAMMES AVAILABLE FOR TRAINING TEACHERS OF MATHEMATICS.

3. A SURVEY OF METHODS ADOPTED BY TEACHERS OF SECONDARY CLASSES FOR TEACHING MATHEMATICS.

4. IMPACT OF SOCIOLOGICAL CHARACTERISTICS ON ACHIEVEMENT IN MATHEMATICS PRIMARY AND MIDDLE SCHOOL STAGES.

5. IMPACT OF PARENTAL INVOLVEMENT AND PER ASSISTANCE OVER ACHIEVEMENT IN MATHEMATICS.