CHAPTER - V

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5.1 INTRODUCTION

In this chapter, results are discussed with reference to each of the hypotheses stated in chapter III. The summary of findings is given and the conclusion drawn based on the results is presented. The implications of the present study are also briefed with some suggestions for further study that may be undertaken in future.

5.2 STATEMENT OF THE PROBLEM

GENDER DIFFERENCES IN MATHEMATICAL ABILITY AMONG HIGH SCHOOL STUDENTS IN SALEM.

5.3 SUMMARY OF FINDINGS

1) There is interaction between sex and mathematical ability.

2) There is interaction between sex and medium of instruction on the cognitive ability.

3) There is interaction between sex and management on affective objectives. There is no interaction between sex and objective objectives based on the sub samples (a) types of schools (b) locality (c) medium of instruction (d) birth order.
4) There is no interaction between sex and psychomotor skills based on the sub samples
   a) Types of schools   b) Locality   c) Medium of Instruction
d) Management of schools   e) Birth Order

5) There is no interaction between sex and mathematical ability based on the sub samples
   a) Types of schools   b) Locality   c) Medium of Instruction
d) Management of schools   e) Birth Order

6) Boys and Girls differ in their Mathematical ability.

7) Boys and girls of middle order and last born differ from the other filial order groups in mathematical ability. Boys and girls do not differ in mathematical ability based on the sub samples types of schools, locality, medium of instruction and management of schools. Boys and girls of VI and IX standards differ in their mathematical ability.

8) Single children of VI standard boys and girls differ in mathematical ability. VI standard boys and girls do not differ in mathematical ability based on the sub samples (a) Types of schools (b) Locality c) Medium of Instruction and (d) Management of schools

   First born, middle and last born students of VI standard differ in mathematical ability.

9) Single children of IX standard of either sex do not differ in their mathematical ability. IX standard boys and girls do not differ in their
mathematical ability based on types of schools, locality medium of instruction and management of schools.

10) Boys and Girls differ in their Mathematical ability in the affective objectives. Boys and Girls do not differ in their Mathematical ability in the cognitive and psychomotor outcomes.

11) Boys and Girls differ in knowledge objective, and in the content areas arithmetic and geometry. Boys and Girls do not differ in the cognitive constructs academic achievement, Spatial visualization ability, logical reasoning ability and in the objectives understanding and application and also in the content area algebra.

12) Boys and girls differ in the sub components of affective objectives.

13) Boys and girls differ in the drawing skills. Boys and girls do not differ in the modeling skill.


15) Boys and Girls of VI Standard differences the sub components of affective objectives, attitude towards mathematical and value for mathematics.

16) Boys and Girls of VI Standard do not differ in the sub components of Psychomotor skills namely drawing skills and modeling skill.
17) Boys and girls of IX Standard differ in their Mathematical ability in the Cognitive, affective and Psychomotor outcomes.

18) Boys and Girls of IX standard differ in their logical reasoning ability. Boys and girls of IX standard do not differ in the sub components of Cognitive constructs academic achievement, Spatial Visualisation, Knowledge, Understanding, Application, Arithmetic, Algebra and Geometry

19) Boys and Girls of IX Standard differ in their attitude towards Mathematics and their value for Mathematics.

20) Boys and Girls of IX Standard differ in their drawing skills. Boys and Girls of IX Standard do not differ in their modeling skills.

21) VI standard boys and girls from rural and urban locality differ in cognitive constructs. VI standard boys and girls do not differ in cognitive constructs based on the sub samples
   a) Types of schools
   b) Medium of Instruction
   c) Management of schools
   d) Birth Order

22) Boys and girls of VI standard from different management schools differ in the affective objectives. VI standard boys and girls do not differ in affective objectives based on the sub samples
   a) Types of schools
   b) Locality
   c) Medium of Instruction
   d) Birth Order
23) VI standard boys and girls differ in their psychomotor skills based on the sub samples
   a) Types of schools    b) Medium of Instruction and   c) management
VI standard boys and girls do not differ in their psychomotor skills based on the sub samples
   a) Birth Order       b) Locality

24) Boys and girls of IX standard coming from different types of schools and different locality differ in their cognitive construct. IX standard boys and girls do not differ in cognitive constructs based on the sub samples
   a) Medium of Instruction       b) management       c) Birth Order

25) IX standard boys and girls of different management schools differ in their affective objectives. IX standard boys and girls do not differ in affective objectives based on the sub samples
   a) Locality       b) Medium of Instruction       c) type of schools and d) Birth Order

26) IX standard boys and girls of different medium of instruction differ in their psychomotor skills. Boys and girls of IX standard do not differ in psychomotor skills based on the sub samples.
   a) Types of schools  b) Locality  c) management and d) Birth Order

27) There is significant positive relation between the cognitive ability and its components and the mathematical ability of the students.
There is insignificant positive relation between affective ability and its components and mathematical ability.

There is negligible/no relation between psychomotor abilities and its components and mathematical ability.

28) There is significant positive relation between the cognitive ability and mathematical ability, the academic achievement and mathematical ability, the spatial visualization and mathematical ability, the attitude towards mathematics and mathematical ability and the affective objectives and mathematical ability.

There is insignificant negative relation between psychomotor skills and mathematical ability of VI standard students.

There is no relation between drawing skills and mathematical ability and modeling skills and mathematical ability of VI standard students.

29) There is relation between mathematical ability of IX standard students in the three domains.

30) There is association between attributional style and mathematical ability.

31) There is no association between attributional style and cognitive ability.

32) There is association between attributional style and affective objectives.
33) There is no association between attributional style and psychomotor skills.

34) There is association between sex and attributional style.

35) There is association between sex and the attributional style of VI standard students.

36) There is association between sex and the attributional style of IX standard students.

37) The discriminative variables are found as Spatial, logical reasoning, academic achievement, value and modeling.

38) Among the variables chosen the discriminating variables are identified as spatial visualization, logical reasoning, academic achievement, modeling skill, locality and sex.

39) From structure matrix the discriminating variables of mathematical ability were identified as academic achievement, value for mathematics, birth order, modeling, sex, spatial visualization, drawing skill, locality, management, types of schools, medium of instruction, attitudes towards mathematics, logical reasoning and attributional styles.

40) The variance in mathematical ability is explained more by affective variables followed by cognitive constructs and psychomotor skills.

41) After 4 iterations, the factors value for mathematics, attitude towards mathematics and academic achievement were identified as
three factors numbered as 1, 2 and 3 influencing the mathematical ability.

42) The mathematical ability is dependent on the academic achievement, logical reasoning ability, spatial visualisation ability, attitude towards mathematics and value for mathematics.

5.4 CONCLUSIONS

1. It is found that the factor sex has no significant effect on the total mathematical ability. But the factor ability in cognitive constructs, affective objectives and psychomotor skills have significant effect on the mathematical ability.

2. It is concluded that there is interaction of sex and medium of instruction on the cognitive constructs.

3. It is evident that in affective objectives there is interaction between sex and management of schools. Also the factors locality, sex, management of schools and types of schools influence the affective objectives of boys and girls.

4. The study has revealed that there is no interaction between sex and psychomotor skills. But the factors types of schools, management of schools and medium of instruction influence the psychomotor skills of the students.
5. The present study has shown that there is no interaction between sex and mathematical ability. However the factors sex and management do influence the mathematical ability of the students.

6. It is found that boys and girls differ in their mathematical ability. The mathematical ability of girls is more than that of boys.
   a. Boys and girls of middle born order and last born differ in their mathematical ability.
   b. VI Standard boys and girls differ in their mathematical ability. VI standard girls have mathematical ability than their counter parts.
   c. IX Standard boys and girls differ in their mathematical ability. IX standard girls have mathematical ability than their counter parts.

7) It is concluded that boys and girls differ in the knowledge objective and in the content area geometry. The difference is in favour of girls.

8) It is evident that boys and girls differ in their mathematical ability in their affective objectives. The affective objectives scores of girls is more than the affective objective scores of boys.

9) Boys and girls differ in the affective objective scores in the sub components attitude towards mathematics and value for mathematics; In both these components the mean scores of girls is more than that of boys.
10) It is evident that boys and girls differ in the sub components of psychomotor skills Drawing. Here also the difference is in favour of girls.

11) It is found that a) Boys and girls of VI standard differ in their mathematical ability in the affective objectives.

12) The study has revealed that (a) Boys and girls of IX standard differ in their mathematical ability in the Cognitive, affective and psychomotor domains. In all the three cases; the differences are in favour of girls. (b). Boys and girls of IX standard differ in their logical reasoning ability. (c). Boys and girls of IX standard differ in their attitude towards mathematics and their value for mathematics. (d) Boys and girls of IX standard differ in their drawing skill.

13) From the study it is evident that VI standard boys and girls from different locality, different management schools, different types of schools differ their cognitive constructs, affective objectives and psychomotor skills respectively.

14) The study has found that boys and girls of IX standard coming from the different types of schools and different locality differ in their cognitive constructs. Boys and girls of different management schools differ in their affective objectives. In psychomotor skills boys and girls from different medium of instruction differ from each other.
15) (a) There is relation between cognitive construct and mathematical ability, also there is relation between affective objectives and mathematical ability. There is no relation between psychomotor skills and mathematical ability. (b) There is significant positive relationship between cognitive ability and mathematical ability, academic achievement and mathematical ability of IV standard students. (c) There is no relation between affective objectives and mathematical ability, modeling skill and mathematical ability of VI standard students. (d) There is relation between mathematical ability of IX standard students in all the three domains.

16) It is evident that (a) There is a association between attributional style and mathematical ability. (b) There is association between attributional style and affective objectives as well as psychomotor skills. (c) It is concluded that 50% of students from high and average achievers attribute to their success hard work (d) Nearly 50% of female students attribute their success to hard work while 40% of the boys attribute their success to ability.

17) It is concluded that the total mathematical ability is dependent on the academic achievement logical reasoning ability, spatial ability, attitudes towards mathematics and value for mathematics.

18) The variance in mathematical ability is explained more by affective variables followed by cognitive ability and psychomotor skills respectively.
19) It is studied that (a) The discriminating variables are found us spatial visualization ability, logical reasoning ability, academic achievement, value for mathematics and modeling skills (b) Academic achievement, value for mathematics, modeling skills, spatial visualization, value for mathematics, drawing skills, attitude towards mathematics and logical reasoning ability exhibit absolute correlation between each variable and any discriminant function. Among the personal variables birth order, sex, management schools, types of schools and medium of instruction discriminate the learners. (c) The factors value for mathematics, attitude towards mathematics and academic achievement were identified as three factors influencing mathematical ability.

20) It is concluded that (a) The mathematical ability of students of
(a) Central board
(b) Urban locality
(c) Private schools
(d) English medium
(e) Last born
(f) VI standard students and
(g) Girls
were found to be more when compared to their counterparts.

21) It is concluded that (a) The mathematical ability of students of
(a) State board
(b) Urban locality
(c) Private schools
(d) English medium
(e) Single children
(f) VI standard students and
(g) Girls

were found to be more when compared to their counterparts.

22) It is concluded that (a) The cognitive ability of students of
   (a) Central board
   (b) Rural locality
   (c) Private schools
   (d) Tamil medium
   (e) VI standard students and
   (f) Girls

were found to be more when compared to their counterparts.

23) It is concluded that (a) The psychomotor skills of students of
   (a) Matric board
   (b) Urban locality
   (c) Private schools
   (d) English medium
   (e) IX standard students and
   (f) Girls

were found to be more when compared to their counterparts.
24) The cognitive ability of girls were found to be more than boys in all the components of cognitive constructs and in all the three branches of mathematics.

25) In the cognitive ability in the components spatial visualization and logical reasoning girls and VI standard students were better than their counterparts.

26) The affective ability and academic achievement scores of VI standard students and girls were found to be more.

27) In the components of psychomotor abilities in drawing skills and modeling skills the scores of girls were more.

28) The mathematical ability of VI standard students was more in all the subcomponents.

5.4 DISCUSSIONS

i) The present study has revealed that, "girls have more mathematical ability than boys". This result does not conform to the study done by Khatiyar (1979) in which he has stated that, "Boys and girls do not differ in their mathematical ability".

ii) The current study has shown that "in spatial visualization ability the scores of girls were more than that of boys". This finding conforms with the study of Fennema and Tartre (1985) who
reported that “There was difference between boys and girls in respect of spatial visualization skills, but it was small.

iii) From the study it is evident that, “girls outperform boys in arithmetic, algebra and geometry”. This findings conforms to the findings of Nagavalli.T (1996) which reported that the “performances of X standard girls in algebra, arithmetic and geometry was better than that of boys”.

iv) The present study has shown that “the mathematical ability of VI standard girls is better than the boys”. This result conforms to the findings of Rao.T.G (1993) who said “In grade VI, girls scored higher than boys”.

v) The study has found that “the affective objective namely attitude towards mathematics and mathematics achievement of girls were more than boys”. This result conforms to the findings of Rajendran, (1998) who has reported “There is difference in attitude towards mathematics between V standard boys and girls. On the other hand, it is evident that more VIII standard girls have more positive attitude towards mathematics than boys”.

vi) It is reported in this study that “more number of girls attribute their failure / success to hard work while more boys attribute their failure / success to ability”. This results conforms with the studies done by Reyes (1984) and Fennema (1990) which reported that “Women tend to attribute success to effort and men to their ability”
5.5 IMPLICATIONS OF THE STUDY

The study has identified several educational implications.

(i) Central board schools, urban locality, private schools, English medium class, last born children, students in the age group 10+, and girls have better mathematical ability. This result shows the central board syllabus, the urban background, the facilities of private schools and international language as a medium of instruction influence the mathematical ability.

(ii) The urban locality, the English has the medium of instruction, the private schools, and management seem to be the influential factors in the development of cognitive, affective, psychomotor skills. This emphasises the lion’s share of the private schools in imparting quality education to the students. The government and corporation schools in the rural areas and schools with Tamil has medium of instruction should put forth maximum effort to compete with their counter parts.

(iii) In the cognitive construct “Geometry” and in the objective “knowledge” the scores of the students were more. This shows the mastery level of the students is very low and they have not yet mastered even the fundamental ideas in arithmetic and algebra. Schools should pay more attention to mastery in arithmetic and algebra because these are the two branches to which students are focused to right from the earlier years. If the lower levels of learning “understanding and application” are not
mastered in these two branches, then mathematical ability cannot be developed, which in turn will be hindrance to the development of the learners. Hence much focus has to be given by the authorities (Teachers) to develop computational skills in arithmetic and algebra among the students.

(iv) The mathematical abilities of boys are less than that of the girls. This may be because the boys have more distraction than the girls (or) The boys may think that to develop mathematical ability one should be bestowed with ability by nature. But mathematical ability can easily be developed if one is hardworking.

(v) The mathematical ability of VI standard students is more than that of IX standard students. This result shows the indifference or negligence of the IX standard students (especially boys of corporation and government schools) who did not take pains to solve the problems given to them. This type of behaviour should be corrected immediately. With seriousness and concentration the students should do any work assigned to them.

(vi) The factors that discriminate learners were identified as academic achievement, value for mathematics, locality, modeling, sex, spatial visualization ability and logical reasoning ability. This result suggests that the locality of the students has an influence on their mathematical ability. Hence the authorities should provide more amenities, learning facilities to the rural students so
that they will develop on par with the urban students. This is stressed by our president Dr. A. P. J. Abdul Kalam, in his concept 'PURA' - 'Providing Urban amenities in the Rural Areas'. Students should be trained to visualize abstract concepts even at their young age, which would facilitate their mathematical learning. They should also be trained to reason out in logical manner. Any concept / idea should be accepted only through logical reasoning. The concepts are to be proved by them or to be presented by them only on the basis of logical reasoning. Logical reasoning ability also induces the mathematical ability. Our system of curriculum transaction in educational institution should be modified. So that students could visualize and reason out on their own. The habit of visualization and reasoning will widen their sphere of knowledge.

(vii) Most of the students in the average and higher ability groups attribute their success to hard work and ability. Only low achievers attribute their success to luck and elders. This shows that the success in mathematics is only due to hard work and ability. The guidance of elders is absolutely needed by the slow learners and it is of much help to them to improve their ability. The high achievers attribute their success only to the ability and hard work which shows their individuality, originality and self-confidence.
5.6 SUGGESTIONS FOR FURTHER STUDY

1. Replication of the study may be taken up at other levels (Primary, higher secondary, college etc.)

2. The study may be taken up as a longitudinal study (from V standard to X standard)

3. More independent and dependent variables could be added to study the effect of these variables on the mathematical ability of boys and girls.

4. An experimental study may be taken up to identify the factors that lead to gender differences in mathematical ability among school students.