CHAPTER-7
SUMMARY, FINDINGS AND SUGGESTIONS

7.1 Introduction

7.2 Summary

7.3 Experiences of the Investigator during Administration of test

7.4 Major findings

7.5 Educational Implication

7.6 Suggestions for further research
7.1 Introduction:

This chapter gives the entire study in a capsule form. It mainly addresses to the findings of each objective, experiences gained by the investigator during the administration of the test and suggestions based on the findings. The chapter ends with the suggestions for further research in this area.

7.2 Summary:

Observing the changing scenario of education pattern, researcher felt the need of a standardized tool that could measure numerical ability of pupils. As no recently developed tool was available for English medium students of std.VIII and std.IX, the researcher undertook this task.

The foremost step for construction was reviewing literature, which could throw light upon the various components of numerical ability and type of items to be constructed. After getting a clear understanding about numerical ability and its nature, researcher defined the operational definition of numerical ability for this tool. Five components of numerical ability were taken into consideration for this test.

They are:

- Numerical facility
- Arithmetic concept
- Number series and number matrices
- Relative magnitude
Arithmetic reasoning

Next step was to construct item pool based on the above-mentioned components. After the construction, item pool along with instructions was sent to the experts of research in the field of education and mathematics. Items were reworded and their distractors were modified as per the suggestions of experts.

The test of 233 items was administered on a small group as a prepilot study. Pre pilot study aimed to find out the defected items in item pool, ambiguity present in the instructions and maximum and minimum time required by the testee to complete the test. From the input of the prepilot run the test was filtered. Now the filtered version of the test comprising of 175 was administered to a larger sample of 107 students as first tryout of pilot study. One school from urban area and one school from rural area of Ahmedabad were selected for first pilot study. The time limit was kept fixed and minute observations by the researcher were noted. Revised version of the test was prepared for the second tryout of pilot study having 114 items. Item analysis was done and difficulty value and discriminating index of each item was computed. Items were carefully selected for the final version of the test. Eight items for each component were selected and thus the final version of the test consisted of 40 items. Time limit was decided of 40 minutes.
The last step before administrating the test on the sample was to determine the reliability and validity of the test. Reliability of this test was determined by three ways viz: test-retest, split half and KR20 formula. The values are 0.79, 0.84, and 0.80 respectively. The criterion related validity of the test was determined by correlating the numerical ability test scores with their class mathematics achievement test and K.G.Desai’s verbal-nonverbal intelligence test. The values obtained are respectively 0.60 and 0.69. To determine the content validity of the test, a panel of judges evaluated the operational definition of numerical ability and they reviewed constructed sitems for each component. This ensured the content validity of the test.

Population for this study was students studying in std. VIII & std. IX of English Medium schools following Gujarat State Education Board, situated within Gujarat State. In the present study, investigator has used probability sampling method and technique used for the sampling is stratified random cluster sampling technique.

As the objective of the final run of administration was to establish the norms of the numerical ability test (NAT), targeted population i.e. Gujarat State had to be considered and representative sample had to be drawn. The investigator divided Gujarat state into four zones and total 3287 pupils of various schools from urban and rural were selected as sample.

The test was administered on the sample and scored as one mark for correct answer and zero mark for wrong answer. The collected score was
classified and analyzed further. The descriptive statistics were calculated for different cells. Detailed ANOVA was computed and it was found that std., gender, area and interaction between std. and gender had significant influence on numerical ability test scores. So it was necessary to establish separate norms for std., gender and area. Thus, norms table was prepared by computing percentile rank and T-score for the required variables.

7.3 Experiences of the Investigator during Administration of test:

The investigator passed through many sweet and sour experiences during this study.

- School authorities were very co-operative. They helped the investigator in arranging the periods, sitting arrangements and in supervision where as some schools refused to give the permission.
- It was very difficult for investigator to find out English medium schools in rural areas. So at some places random selection was not possible.
- Girl’s education is still neglected to a great extent especially in rural areas. In schools that were visited by investigator the gender ratio was hardly found equal in rural areas.
- The investigator noted a very eye opening observation. Students and school teachers were not aware about testing procedure. Teachers at some places were not serious in instructing the students.
o On the other hand students found little difficulty in grasping and following the instructions given in the starting of the test. They were mainly confused about how to answer the particular test item i.e. the answer has to be encircled or underlined. Even though after instructing them for nothing to write in the test booklet many students marked the answers in the test booklet. These booklets were discarded.

o It was very evident that few urban area school students were well versed with the testing procedure as school used to conduct such type of programs. These students achieved good scores also.

o Students enjoyed giving the test. They were very curious about the purpose of test and their results. Investigator used to send the achieved score of the students wherever principals had asked.

7.4 Major Findings:

The major findings of this study are as follows:

➢ Std. did influence numerical ability test scores. Students of std.IX were superior to students of std.VIII in numerical ability.

➢ Gender did influence numerical ability test scores. Boys were superior to girls in numerical ability.

➢ Area did influence numerical ability test scores. Urban area students were superior to rural area students in numerical ability.
Interaction between std. and gender did influence numerical ability test scores.

Interaction between gender and area did not influence numerical ability test scores.

Interaction between std. and area did not influence numerical ability test scores.

Interaction between std., gender and area did not influence numerical ability test scores.

7.5 Educational Implication:

Standardized aptitude test is not used for the purpose of measuring the student’s academic success. Instead, they are included for the primary purpose of providing a more complete interpretation of the achievement test scores and hence a more complete evaluation of the student’s academic success.

The constructed ability test by the investigator can be used for various purposes:

- Evaluation:

  Classroom use of test score provides evaluation of academic success in terms of mental ability. Teachers are able to compare the level of mental ability of students with their level of academic success. This leads towards the first step of student’s career counseling in school system.
It also provides a base for evaluating and determining quality of educational program. If summary of achievement score and numerical ability score is prepared, it provides a firm foundation for the intelligent analysis of various aspects of mathematics teaching. This result directs us for planning and improvement in mathematics teaching in terms of textbook making, teaching methodologies, school evaluation system etc.

- **Diagnosis:**

  - Administration of numerical ability test makes easy in the identification of groups like over achievers and under achievers, which helps us in diagnosis work.

  - The diagnosis of student’s deficiencies in mathematics achievement is one of the most difficult task for teachers. Administering numerical ability test to a group uncovers the weaknesses in the learning of basic skills or basic concepts. As per the need arises, remedial program can be planned and executed. As this test has homogenous segments of items under each component, diagnostic area can be caught more accurately.
• Vocational Guidance:

➢ Standardized aptitude test can contribute to more intelligent vocational decisions. In deciding which subject or curriculum to pursue, the students can be aided by knowledge of their strengths and weaknesses. As per the policy of Gujarat State Secondary Education Board students have to select group of subjects from Std.XI. It will definitely be beneficial if we start preparing and guiding students from high school level itself.

• Supplementary uses of test:

➢ Administration of numerical ability test prepares students for how to attempt psychological test, as they are little different from traditional examination system.

➢ As entrance exams play a vital role in selecting candidates for professional courses, administration of this test provides them drill work.

➢ In conducting research in education, need arises of various types of psychological tests. This test maybe helpful for it.

7.6 Suggestions for further research:

• This test has been standardized for std.VIII and std.IX students. Same type of test can be constructed and standardized for std.X as well as for higher secondary students.
• Not just a single test, but also a test battery involving more than one mental ability can be constructed and standardized.

• Vertical research about the development of numerical ability of students can be conducted.

• Comparative study of over achievers and under achievers can be conducted.

• Development and tryout of a program to enhance numerical ability of students can be undertaken.