Chapter – 1

1.1 Introduction

1.2 Statement of the problem

1.3 Importance of the study

1.4 Objectives of the study

1.5 Hypotheses

1.6 Delimitations of the study

1.7 Explanation of the terms

1.8 Chapterization
1.1 Introduction:

Measurement pervades all aspects of our lives-right from birth of a person, measurement in terms of date, time, length, weight etc are measured. Educators, psychologists and other behavioural scientists make extensive use of measurement because they focus on abilities, achievements, aptitudes, interests, attitudes values and personality traits. These measurements are useful for the purpose of planning, evaluation, instructions, placements etc., which match their abilities and interests. Wide variations are seen in different individuals with respect to various traits like intelligence, creativity, mathematical ability, language ability, flexibility etc.

Psychological measurements have several applications like descriptive uses and decision-making uses. The descriptive uses of psychological measurements may take place during a counseling process, where the individual is provided description of his abilities, interests or personality traits. The individual can therefore use this data for planning, selecting, improving a study program. In contrast to descriptive uses of a test, test are also used as an aid in making specific practical decisions. Selection, placement, proficiency, diagnosis, evaluation etc. can be listed as decision making uses of a test.

However, psychological measurements play a pivotal role in revealing innate potentialities, skills and behavioral traits present in an
individual or a group of individuals and help to channelize or direct these abilities in a productive way.

Since world war – II, testing for educational and personal use have multiplied. Concept of large scale testing program has spread almost all over India. With the explosion of knowledge and population, entrance exams are replacing the importance of scholastic achievement score. In all major fields like engineering, medical, defense, banking etc. selection of a candidate is done on the basis of scores obtained in entrance exams. Numerical ability is a part and parcel of entrance exams along with other abilities. So in this competitive world, numerical ability is more a necessity than mere ability. According to Gerberich, Greene and Jorgensen\(^1\) (1962) "Failure in developing numerical ability is like to neglect an educational responsibilities". Looking to these essentialities of numerical ability, researcher felt the necessity of constructing and standardizing a tool for students studying in English medium, which can measure numerical ability. Thus the present study is entitled as follows:

1.2 Statement of the problem:

"Construction and standardization of numerical ability test"

1.3 Importance of the study:

Numerical ability predicts about how well do you understand ideas expressed in numbers as well as about how clearly can you think and reason with numbers\(^2\).
Numerical ability is one element of all round ability to master academic work. In every walk of life numerical ability has its importance. Numerical ability is especially important in high school subjects like mathematics, physics and chemistry. Numerical ability plays a vital role in day-to-day life experiences.

Students who do well in this test are likely to do well in arithmetic and measuring so common in business offices, factories, service shops and stores. Numerical ability is also helpful in technical careers not requiring a college degree. Numerical ability is useful in such jobs as lab. assistants, bookkeeper, clerk etc.. Many of the jobs in skilled trade in manufacturing or construction work require considerable numerical ability.

Scores of numerical ability suggests planning for higher education. Moreover it is very important to measure numerical ability, as it is the best predictor of mathematics. According to the new pattern of Gujarat State Education Board, students have to select the subject group from Std.XI itself, which further directs to the selection of professional courses. Due to this it is very necessary to measure numerical ability and provide them guidance at secondary level. For this purpose it was very essential to have a tool, which would provide the measure of this ability. This tool can also be helpful in developing skills like logical thinking, critical thinking etc.. It also helps in increasing the speed of calculations and accuracy.
Much spadework has been done in the field of intelligence but in today's skill based society measuring, guiding and developing one's ability is more important than measuring overall intelligence. This study is an effort to address today's need.

1.4 **Objectives of the study:**

An objective of a research directs and organizes the path of research. So researcher decided to work on the following objectives.

1. To construct numerical ability test for the students of Std. VIII and Std. IX studying in English medium schools.

2. To standardize the constructed numerical ability test.

3. To study the effect of std. VIII and std. IX on mean score of numerical ability test.

4. To study gender effect on mean score of numerical ability test.

5. To study areawise (urban, rural) effect on mean score of numerical ability test.

6. To study the interaction effect of std. and gender on the mean scores of numerical ability test.

7. To study the interaction effect of std. and area on the mean scores of numerical ability test.

8. To study the interaction effect of area and gender on the mean scores of numerical ability test.
To study the interaction effect of std., gender and area on mean score of numerical ability test.

To establish norms of numerical ability test.

1.5 **Hypotheses:**

Hypotheses are statements that can be tested statistically. Hypotheses usually make predictions about future events, existing differences among groups or existing relationship among variables. Researcher constructed following hypotheses for this study:

Ho 1: There is no significant influence of std. on mean score of numerical ability test.

Ho 2: There is no significant influence of gender on mean score of numerical ability test.

Ho 3: There is no significant influence of area on mean score of numerical ability test.

Ho 4: There is no significant influence of interaction of std. and gender on mean score of numerical ability test.

Ho 5: There is no significant influence of interaction of gender and area on mean score of numerical ability test.

Ho 6: There is no significant influence of interaction of std. and area on mean score of numerical ability test.

Ho 7: There is no significant influence of interaction of std., gender, and area on mean score of numerical ability test.
1.6 **Delimitations of the study:**

Delimitations are the boundaries purposely put on the study, usually to narrow it for researchability. This study was confined to following boundaries.

1. Present study was limited for students studying in std. VIII and std. IX.

2. Only English medium schools affiliated to Gujarat State Education Board were taken under study.

1.7 **Explanation of the terms:**

- **Standardization:**
  - “The establishment of fixed procedures for administering and scoring a test”\(^{(3)}\)
  - “The establishment of norms of a test.”\(^{(4)}\)
  - “An objective type test accompanied by tables of norms important for score interpretation, with the norms having been obtained by giving the test to validly representative group of persons of the types for which the test is designed, the process of obtaining such norms is called the test standardization.”\(^{(5)}\)

- **Standardized Test:**

  “A test for which content has been selected and checked empirically for which norms have been established, for which
uniform methods of administering and scoring have been developed, which may be scored with a relatively high degree of objectivity.\(^{(6)}\)

- **Numerical Ability Test:**
  
  "A test concerned primarily with abilities involved in the use of numbers"\(^{(7)}\)

  "A test of special ability in dealing with numbers and their interrelationships."\(^{(8)}\)

- **Operational definition of numerical ability test:**
  
  A test comprised of items based on components like numerical facility, arithmetic concepts, number series and matrices, relative magnitude and arithmetic reasoning is called numerical ability test.

1.8 **Chapterization:**

A brief outline of chapterization in this thesis is as under:

Conceptual understanding of numerical ability, organization of mental abilities, various approaches to aptitude testing is described in chapter – 2.

Chapter – 3 is an attempt to state the importance of review of related literature, gives a brief sketch of researches done, similar to this study in India and abroad and rationale of the present study.
Chapter – 4 describes the planning and procedure of this study. It reflects the idea of population, sample for the final run of the test and statistical techniques used for data analysis.

A detailed description about tailoring the test, which includes information of components, item pool, information regarding try outs, administration of the test for final run, fixation of norms and reliability and validity of this test is given in chapter – 5.

Analysis of the data and its interpretation is discussed in Chapter – 6.

Chapter – 7 deals with brief account of present work, major finding and suggestions for further study.
Chapter Reference


(4) Ibid.


(7) Ibid Page No.-562

(8) Ibid