



# Implementation of Mechanical Reasoning test and Numerical Ability test on the students of Senior Secondary Schools of Ahmedabad District.

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## **Abstract:**

*We exist in a universe where employment and requirements are formed and dissolved in real time as a result of unknown developments, shifting demography, technological changes, and provident internationalization. We know that, as a result of the explosion of knowledge, experts' current skills and understanding may become obsolete in four to five years, if not sooner. As a result, education alone is insufficient for someone to prepare for a stage in a changing (constantly changing) world. It's crucial to understand character. This awareness aids students in identifying their gift and character gratification. For talented scholars, however, this is not an easy task. Character can be discovered in a variety of ways, including accomplishment assessments, various competitions, objective assessment, interpretation, and so on. A good time to conduct such an assessment is when students are in secondary or higher secondary school. Differential aptitude test batteries, on the other hand, are an excellent instrument for this purpose.*

**Keywords:** *Differential Aptitude Test, Mechanical Reasoning test, Numerical ability.*

## **Introduction:**

In light of the Indian Education System's framework and societal trends, the researcher decided to conduct a series of aptitude tests on a regular basis. Clerical, Language, Mechanical, Numerical, Abstract, Verbal, and Space are the aptitudes in question. a collection of various aptitude tests (DAT). As a result, the researcher chose to use a Differential Aptitude Test with Senior Secondary School Students. Differential aptitude tests are a set of standardised tests that are widely used for career and educational counselling, particularly in senior secondary schools; among the aptitudes assessed by its constituent tests are verbal reasoning ability, mechanical reasoning, clerical speed and accuracy, spelling, and perception of spatial relations. These exams are the most recent in the line of career aptitude tests. General exams have been demonstrated to be ineffective in screening candidates for all types of jobs. According to this idea, each person has varying levels of interest and intelligence in various subjects of study. Some people have a stronger command of the English language yet struggle with numbers. These tests can then be used to assist a person in the following ways:

1. Based on your talents and weaknesses, choose between educational and employment alternatives.
2. Assist a person in understanding why they perform well or poorly in certain disciplines.
3. Can propose fresh job paths that haven't been examined before.
4. A shift in educational and career ambitions.

**Objectives of the Study:**

Researcher stated the following objective:

1. To study different aptitudes of senior secondary school students in relation to area.
2. To study different aptitudes of senior secondary school students in relation to gender.

**Hypothesis of the study:**

Researcher stated the following hypothesis as under:

**Ho1.** There may be significant difference between mean score of aptitude test of rural area senior secondary school students and urban area senior secondary school students in Mechanical reasoning test.

**Ho2.** There may be significant difference between mean score of aptitude test of rural area senior secondary school students and urban area senior secondary school students in Numerical ability test.

**Ho3.** There may be significant difference between mean score of aptitude test of girls of rural area senior secondary school and urban area senior secondary school students in Mechanical reasoning test.

**Ho4.** There may be significant difference between mean score of aptitude test of girls of rural area senior secondary school and urban area senior secondary school students in Numerical ability test.

**Ho5.** There may be significant difference between mean score of aptitude test of boys of rural area senior secondary school and urban area senior secondary school students in Mechanical reasoning test.

**Ho6.** There may be significant difference between mean score of aptitude test of boys of rural area senior secondary school and urban area senior secondary school students in Numerical ability test

**Limitations of study:**

1. Study is limited to Ahmedabad district only.
2. The study is limited to Gujarati medium schools only for GSHSEB schools.
3. In the differential aptitude test only two types of aptitudes were selected from the noticed aptitudes which are more than 20.
4. The test is restricted to only senior secondary students of class 11<sup>th</sup> and 12<sup>th</sup>.

**Variables under the study:**

The variables under the study were:

- Independent variable including area and gender.
- Dependent variable consisting the aptitude scores and differential abilities including two test i.e. Mechanical Reasoning Test and Numerical Ability test.
- Controlled variable was the medium of school i.e. Gujarati.

**Population of the study:**

Every student studying in standard 11<sup>th</sup> and 12<sup>th</sup> of Gujarati medium senior secondary schools of Ahmedabad district were involved in population which was relatively 89988 in number.

**Sample of the Study:**

In this study, we decided to use the probability sampling technique, and then we combined that with the random sampling method. The district of Ahmedabad was split up into four distinct areas: the north, southeast, east, and west. For the aim of drawing up the samples, four school from each of the zones were selected. With

the help of the sampling method, a total of 3088 samples were drawn out from a total of six various educational institutions.

### Research methodology:

Since the goals and scope of the organisation were related with the efforts to determine the position of the phenomena within consideration, the current investigation took use of the Descriptive Questionnaire Survey as the research approach.

### Research tools:

The data collection for the this investigation was carried up with the use of which was before instruments. There were a total of 6 exams carried out, which included the secretarial speed and accuracy test as well as the language use ability test. A scoring key was utilised in order to grade the responses that have been provided by the students. The scores of a pupils were interpreted with help of the answer sheet. Students got a score of "1" for every correct answer, while they got a score of "0" for every wrong response. Students got a score of '0' even if they did not attempt any of the problems.

### Data Collection:

The data was gathered over the course of the school year 2021–2022. The data gathering strategy was put out in terms of the school year's days of work, with the notion that inspections of schools, leaves, and other circumstances would not interfere with the data collection timetable. The study did not include the administration of tests at regular intervals during the time. To reduce the impact of mental tiredness, a loss of interest, a decline in sincerity, and the amount of time spent studying, the test sequence was modified on a regular basis. To make data interpretation easier, completed responses were grouped together according to the exam. The test booklets were verified on a periodic basis to ensure there were no duplicates in which students had marked a response or written something that was not allowed.

### Major Findings:

After doing an analysis of data that was obtained, the following important discoveries was discovered according to the hypothesis stated:

**Ho1.** There may be significant difference between mean score of aptitude test of rural area senior secondary school students and urban area senior secondary school students in Mechanical reasoning test.

$t$  – value against 3086 degree of freedom at 0.05 level of significance level = 1.960. Thus  $t$  – value calculated  $>$   $t$  – value in table at 0.05 level of significance. So the null hypothesis is rejected at 0.05 level of significance. Significant difference between the mean scores of the Urban area senior secondary students and Rural area senior secondary students was found. The mean score of urban area senior secondary students are 16.050 which is higher than the mean scores of rural area senior secondary students which is 14.725. Thus urban area senior secondary students have slightly higher aptitude skills than the rural area senior secondary students.

**Ho2.** There may be significant difference between mean score of aptitude test of rural area senior secondary school students and urban area senior secondary school students in Numerical ability test.

$t$  – value against 3086 degree of freedom at 0.05 level of significance level = 1.960. Thus  $t$  – value calculated  $>$   $t$  – value in table at 0.05 level of significance. So the null is rejected at 0.05 level of significance. Significant difference between the mean scores of the Urban area senior secondary students and Rural area senior secondary students was found. The mean score of urban area senior secondary students are 16.825 which is slightly than the mean scores of rural area senior secondary

students which is 16.173. Thus urban area senior secondary students have slightly higher aptitude skills than the rural area senior secondary students

**Ho3.** There may be significant difference between mean score of aptitude test of girls of rural area senior secondary school and urban area senior secondary school students in Mechanical reasoning test.

$t$  – value against 1535 degree of freedom at 0.05 level of significance level = 1.961. Thus  $t$  – value calculated >  $t$  – value in table at 0.05 level of significance. So the null hypothesis is rejected at 0.05 level of significance. Significant difference between the mean scores of the girls of rural area senior secondary school and girls of urban area senior secondary school was found. The mean score of girls of urban area senior secondary school are 16.150 which is higher than the mean scores of girls of rural area senior secondary school which is 14.677. Thus girls of urban area senior secondary school have higher aptitude skills than the girls of rural area senior secondary school.

**Ho4.** There may be significant difference between mean score of aptitude test of girls of rural area senior secondary school and urban area senior secondary school students in Numerical ability test.

$t$  – value against 1535 degree of freedom at 0.05 level of significance level = 1.961. Thus  $t$  – value calculated >  $t$  – value in table at 0.05 level of significance. So the null hypothesis is rejected at 0.05 level of significance. Significant difference between the mean scores of the girls of rural area senior secondary school and girls of urban area senior secondary school was found. The mean score of girls of urban area senior secondary school are 17.054 which is higher than the mean scores of girls of rural area senior secondary school which is 16.094. Thus girls of urban area senior secondary school have higher aptitude skills than the girls of rural area senior secondary school.

**Ho5.** There may be significant difference between mean score of aptitude test of boys of rural area senior secondary school and urban area senior secondary school students in Mechanical reasoning test.

$t$  – value against 1549 degree of freedom at 0.05 level of significance level = 1.961. Thus  $t$  – value calculated >  $t$  – value in table at 0.05 level of significance. So the null hypothesis is rejected at 0.05 level of significance. Significant difference between the mean scores of the boys of rural area senior secondary school and boys of urban area senior secondary school was found. The mean score of boys of urban area senior secondary school are 15.950 which is higher than the mean scores of boys of rural area senior secondary school which is 14.806. Thus boys of urban area senior secondary school have higher aptitude skills than the boys of rural area senior secondary school.

**Ho6.** There may be significant difference between mean score of aptitude test of boys of rural area senior secondary school and urban area senior secondary school students in Numerical ability test.

$t$  – value against 1549 degree of freedom at 0.05 level of significance level = 1.961. Thus  $t$  – value calculated >  $t$  – value in table at 0.05 level of significance. So the null hypothesis is rejected at 0.05 level of significance. Significant difference between the mean scores of the boys of rural area senior secondary school and boys of urban area senior secondary school was found. The mean score of boys of rural area senior secondary school are 16.018 which is higher than the mean scores of boys of urban area senior secondary school which is 11.020. Thus boys of rural area senior secondary school have higher aptitude skills than the boys of urban area senior secondary school.

### **Educational Implications:**

A few recommendations that may be helpful are based on the findings of the work done, related literature, and observations made by the researcher during the work period:



### 1. For Students:

The current study included 3088 students from Gujarat who were enrolled in educational institutions. It has produced a beneficial result that can be utilised on senior high school students with reasonable accuracy to determine their Differential Abilities, which will help them choose a suitable career path. The pupils' Differential Abilities can be determined using the results.

The conclusions of this study will aid in recognising, attempting to identify, and fostering each student's particular skills. This will be accomplished through raising awareness among educators and parents about the importance of each student's total development in both academic and non-academic areas. The findings of this study would then aid in recognising, identifying, and fostering each student's distinct strengths. (In compliance with the NEP 2020 principles)

### 2. For Teachers:

The vast majority of pupils have a modest level of secretarial speed and precision, as well as language use skill, according to the findings of this study. The levels of overall Divergent capabilities, as well as each component of Divergent abilities, were found to be moderate among the senior secondary students that took part in the study. This disorder was discovered to pose a significant threat to civilization's growth. Teachers should indeed be invited to take part in more meetings and conferences targeted at the development of special abilities so that they may pass on their knowledge to students and assist them progress in such areas. Additionally, the educational curriculum need to work toward the development of a higher level of differentiated talents inside the students.

### 3. For School management:

Because an increasing number of females are being hired for their skills and abilities in a range of fields, school curricula should place a larger emphasis on developing greater levels of abilities among girls as well as higher levels of skills across the board.

### 4. For Policy Makers:

Seminars and workshops must be held as part of curriculum creation at both the state and national levels in order to raise educator knowledge of the vast range of students' abilities.

### 5. For Society:

The National Education Policy 2020 aims to assist students in developing knowledge, skills, value systems, and dispositions that support responsible responsibilities for human rights, sustainable development and living, and global well-being. Students will represent the attributes of a true global citizen as a result of this, and the study's findings might be utilised as a reference when the approach is reorganised. The National Policy of Education 2020's objective is to instil in children a deep sense of pride in being Indian, not merely in concept, but also in spirit.

### Conclusion:

The current investigation's effectiveness will be applicative and fruitful, regardless of whether it is related to the multihued degree of child aptitude research. In recent times, inquisitions regarding IQ and EQ have become obsolete, and study into distinct talents is being given increased attention in the field of learning. It is expected that students have a high degree of differential abilities. If we have comparable types of students, India's future can only be bright; otherwise, our graph of educational quality will continue to decline. As a result, while choosing a procedure for picking a student, only his or her merit should be considered. On the basis of their level of Differential abilities, he or she should be offered a form of entrance test. After determining their competency, the score can be used to assess whether or not they should be chosen.

The present has begun to be dominated by a single component that is not particularly noteworthy in and of itself. That researcher is now in charge of an investigation, and they are doing it while keeping in mind the constraints imposed by factors such as money, manpower, and practicality. The investigator has ensured that the participants in the study are safe by taking all reasonable precautions. The study attempted to put a Differential Ability Assessment Test into practise, with the hope that the findings would be useful to academics, educators, managers, and the government as a whole. This will allow for a more organised educational process, as well as support in developing the curriculum that students are required to follow.

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