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**RESEARCH PAPER**

## **A Study of Scientific Mindset of Primary School Students of Kheda District**

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**Key words:** *Scientific Mind-set, Primary school students etc.*

### **ABSTRACT**

*This study was based on the Scientific Mind-set of Primary School Students of Kheda district. The sample consisted of 300 students from various Primary Schools of Kheda district. A self-made tool was constructed to measure the Scientific Mind-set of students. The statistical techniques used for this study were Mean, S.D. and t-value. Finding of the study revealed that there was significant difference in the mean scores of Scientific Mindset of students with respect to Gender and type of schools.*

### **Introduction**

Science not only inculcates the spirit of curiosity among the students but helps in developing scientific mind-set. This scientific mind-set or scientific attitude is basically characterized by the traits like a healthy scepticism, universalism, freedom from prejudice or bias, objectivity, open mindedness and humility, willingness to suspend judgment without sufficient evidence, rationality, perseverance and positive approach to failure. Normally, persons having scientific attitude, uses the method of science in their daily lives in decision making process, knowingly or unknowingly. India's first Prime Minister, Jawaharlal Nehru was very fond of using the term "Scientific Mind-set". He was keen that we should not learn science superficially' i.e. just the facts of biology or chemistry and physics. He wanted people to possess scientific mind-set so that they could be better scientists, better citizens and capable of governing their personal thoughts and actions in a scientific manner.

The importance of developing scientific mind-set is very clearly established by the fact that it is one of our fundamental duties to develop scientific mind-set and spirit of inquiry amongst fellow citizens. Article-51A of our constitution which deals with fundamental duties makes it a duty of every citizen to develop a Scientific Mind-set. Article-51A of our constitution also makes it a duty of every citizens to develop humanism & spirit of inquiry and reform. Our science-policy also reiterates the same thoughts. For developing scientific mind-set among the students a number of efforts are being made by the Government and as well as several Non-Government Organizations. The National Curriculum

Framework (NCF-2005), which is now considered as the liable of the school education, has also pointed out that sciences, like the systems of mathematics, have their own concepts, often interconnected through theories, and are attempts to describe and explain the natural world. Scientific inquiry involves observation and experimentation to validate predictions made by theory (hypotheses), which may be aided by instruments and controls. The National focus group on “Teaching of Science” suggested prevention of marginalization of experiment based learning in school science curriculum.

In fact, for an overall growth and development of any organization or the country as a whole, we have to foster a Scientific Mind-set in the citizens with absolute capacity for critical evaluation. The lack of Scientific Mind-set weakens our ability to take rational decisions. This may be the reason why the concept of “Scientific Mind-set” was built in our constitution. Science education has an important role to play in the all-round cultural and societal development of human kind and for evolving a civilized society. The essence of scientific spirit is to think globally and act locally. Since scientific knowledge is universal in nature, the fruit of science have some specificity.

### **What do We mean by Scientific Mind-set?**

Scientific mind-set is not like any other human emotions. It is a combination of eagerness and unpolluted and non-corruptible enthusiasm to seek the truth even though one is aware of that the real truth is farther away from the reach. Scientific mind-set deals with what one sees, hears and feels in reality or conceptually seeking the truth in real sense. Education is the foundation for scientific and technological advancements and personal training of human beings. In the midst of overall anxiety of the modernization drive, education, especially science education, should automatically receive a strategic priority. One can at this stage ask ‘why should we foster the spirit of inquiry among our students?’ That is too a scientific inquiry.

### **Objectives of the Study**

- (1) To study the level of scientific Mindset of Primary school students of Kheda district.
- (2) To find the difference between the mean scores of Scientific Mindset of boy and girl students of Primary school of Kheda district.
- (3) To find the difference between the mean scores of Scientific Mindset of government and private Primary school students of Kheda district.

### **Hypothesis of the Study**

Ho<sub>1</sub>: There will be no significant difference between the mean scientific mind-set score of Primary school students with respect to Gender.

Ho<sub>2</sub>: There will be no significant difference between the mean scientific mind-set score of Primary school students with respect to type of school.

**Methodology**

Survey Method was used in this study.

**Population & Sample**

The Sample for the study consisted of 300 Primary school students in Kheda district in Gujarat state. Stratified random sampling technique was used to select the sample. 150 students were selected from government primary schools and 150 from private primary schools, in which 75 boy and 75 girl students were selected from government schools and 75 boy and 75 girl students were selected from private schools through random sampling in this study. Thus, the researcher selected 300 students in total from primary schools of Kheda district.

**Tool of the study**

Scientific Mind-set Scale was constructed and validated by the researcher with the help of experts to measure the Scientific Mind-set of students. The scale consisted of 30 items to measure the factors of Scientific Mind-set.

**Analysis and Interpretation of Data**

- (1) Distribution of level of Scientific Mindset among the sample.

The researcher analyzed the scores of Scientific Mindset of Primary school students by using various statistical methods such as mean, standard deviation and t-test. Then the researcher classified the students as below average, average and above average based on the formula  $M + 1\sigma$  and  $M - 1\sigma$ . The students who came between  $M + 1\sigma$  and  $M - 1\sigma$  are average students, those who came above  $M + 1\sigma$  are above average students and those came below  $M - 1\sigma$ , were below average students.

Table No.-1  
Classification of all students in terms of level of Scientific Mindset

Below Average	Average	Above Average
17.30 %	63.10 %	19.60 %

From the Table No-1, it was found that, out of the 300 students, 17.30% were below average in Scientific Mindset. 65.10% were average in Scientific Mindset and 19.60% were in above average Scientific Mindset.

- (2) Comparison of Scientific Mindset scores of boy and girl students of Primary schools.

The Scientific Mindset scores of Primary school students based on Gender basis were compared to find out whether the Groups differed significantly or not. The details of the data and the results of the comparison are shown in the Table No.-2.

Table No.-2  
Comparison of Scientific Mindset Scores of Students based on Gender

Variable	Group	Mean	S.D.	t-value	Level of significant
Gender	Boy	15.53	21.79	4.35	Significant
	Girls	20.22	25.15		

The Table No.-2 indicates that the mean scores of Scientific Mindset scores of boys is 15.53 and girls was 20.22 and standard deviation of boy students is 21.79 and standard deviation of girl students is 25.15. The difference in their mean was tested for significance. The t-value was obtained 4.35, which was greater than the table value of significance at 0.01 level. Thus, it can be inferred that there is significant difference in the mean Scientific Mindset scores of students in context to Gender. The mean difference showed that the girl students had higher Scientific Mindset than the boy students. Opportunities to conduct experiments, carry out demonstrations and manipulate equipment. Girls enjoyed science learning more than that of the boys. They read science articles, watched science television shows and completed innovative science projects.

- (3) Comparison of Scientific Mindset scores of government and private students of Primary school.

The Scientific Mindset scores of Primary school students based on type of schools were compared to find out whether the Groups differ significantly or not. The details of the data and the results of the comparison are shown in the Table No.-3.

Table No.- 3

Comparison of Scientific Mindset Scores of Students based on type of school

Variable	Group	Mean	S.D.	t-value	Level of significant
Type of school	Government	17.56	19.22	8.45	Significant
	Private	24.43	28.86		

The mean value of Scientific Mindset scores of students from government schools were 17.56 and private schools were 24.43, and standard deviation of government students were 19.22 and 28.86. The t-values obtained were 8.45, which was greater than the table value of significant at 0.01 levels. This led to the conclusion that there is significant difference in mean Scientific Mindset scores of students in context to type of school. The mean difference is in favor of students from private schools. The private schools are well equipped in many aspects such as library and laboratory facilities, use of audio visual aids in teaching, exposure to science fairs, better educational atmosphere etc.. It is likely to enhance Scientific Mindset among students.

### **Educational Implications**

The present study, clearly established the importance of Scientific Mindset of students in the educational scenario. The findings of the study revealed that Girl students and students from private

schools displayed more Scientific Mindset than that of boy-students and students from government schools. Therefore there is significant difference in the mean Scientific Mindset scores with respects to Gender and type of schools.

The major findings of the study and conclusion drawn from the findings, helped *the researcher to frame some measures to develop the Scientific Mindset of students.*

- To develop the scientific mindset among the student they need to be placed in situations through puzzles, role play, quizzed, model making etc., where critical and rational thinking is needed.
- We also need to make them aware of the impact of science on society by arranging visits to factories, hospitals, research laboratories, showing suitable video films, organizing talks by eminent scientists and technologists and encouraging them to participate in science exhibitions.
- Innovative methods should be adopted to stimulate scientific mindset. As a facilitator and a guide the teacher can develop the scientific mindset.
- Teaching science with using scientific aids available in schools or improvised by the teacher will help in better understanding and development of scientific mindset and skills.
- Teachers need to try developing conceptual understanding in students through activities.

Scientific Mindset is the best developed during the childhood while the child is still learning how to respond to the vagaries of everyday life. It is therefore essential that the school curriculum should respond adequately to this important need. This demands inculcation of values like spirit of inquiry, courage (to question), objectivity, honesty and truthfulness which are precursors to the development of various traits characterizing scientific mindset. Clearly teaching of science in this manner would greatly develop scientific mindset among the students.

## CONCLUSION

Scientific mindset is an intrinsic quality, which has to be imbibed and not merely imparted. But we seem to have resorted to imparting scientific mindset in our education curriculum and not inculcating this spirit in our young minds through activities and real experience. To reverse this trend, the teacher and the taught both have great roles and responsibility in this endeavour. Scientific mindset has to be an inherent quality in our young minds and it should be cultivated in them as a matter of routine. Curriculum-based attempts will not always be complete and it has to be a societal responsibility as well. Critical analysis is a quality and if it is cultivated, it will somehow help in developing Scientific Mindset. Indian Constitutional Obligation Page 25 is quite often missing in our education system due to our anxiety to impart formal knowledge at an early stage of the students' career without even considering whether assimilation and acquiring such knowledge will have some use or not. But our

teachers need to contemplate and devise methods to incorporate scientific mindset in our young minds. If it is done, it will go a long way along with the technological progress of this country.

The educational structure adopted by our country currently, is now often questioned by the leading educationists of that whether we have an appropriate system of learning in the schools. We therefore, need to revise, rethink and reset our educational system to help develop an adequate mindset among our students from the very beginning so that we may grow as an advanced nation throughout.

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