

## A STUDY OF SCIENTIFIC ATTITUDE AMONG SECONDARY SCHOOL STUDENTS IN NAMAKKAL DISTRICT

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### **Abstract**

*Science is one of those human activities that man has created to gratify certain human needs and desires. The primary goal of education should be the intellectual development of the individual. With its accelerating importance in our society science has become an increasingly important part of general knowledge. Scientific education is best fostered as a part of a general emphasis on intellectual activity. The students of Secondary course studying in Schools just enter the adolescent stage, which is a stage of stress and storm. In this period, they must be properly guided and counseled, otherwise there arises the problem of maladjustment. If the adolescents are once properly guided and aroused right educational aspirations, they will excel in all aspects of life and education. Governments have been spending crores on Higher Secondary education. But the results are not in proportion to the expenditure incurred. Only nearly 40 to 60 percent of the students are successful, this too from the contribution of private Schools. In other words, two thirds of the educational expenditure is squandered away for nothing.*

*The results of this study will help the educational planners, teachers and students to modify the present state of affairs as many students fail in Secondary school level.*

**Keywords:** Achievement in science, scientific attitude, Knowledge

### **Introduction**

The investigation of students' attitudes towards studying science has been a substantive feature of the work of the science education research community for the past 30-40 years. Its current importance is emphasized by the now mounting evidence of a decline in the interest of young people in pursuing scientific careers (Department for Education 1994; Smithers and Robinson 1988). Combined with research indicating widespread scientific ignorance in the general populace (Durant and Bauer 1997; Durant, Evans, and Thomas 1989; Miller, Pardo, and Niwa 1997), and an increasing recognition of the importance and economic utility of scientific knowledge and its cultural significance, the falling numbers choosing to pursue the study of science has become a matter of considerable societal concern and debate (for example, House of Lords 2000; Jenkins 1994; Lepkowska 1996). Consequently, the promotion of favourable attitudes towards science, scientists and learning science, which has always been a component of science education, is increasingly a matter of concern. However, the concept of an attitude towards science is somewhat nebulous, often poorly articulated and not well understood.

### **Role of Science in the Present Context**

Science is one of those human activities that man has created to gratify certain human needs and desires. Disinterested curiosity has been the greatest motive power of scientific research. The 'search of truth' became the dominant motive in the persecution of science. It has been pursued for so many centuries and attracted ever-wider extent of attention of a much persisted group of people. Science is valued mostly for its practical advantages though it is also valued for gratifying disinterested curiosity and as an object of great aesthetic charm. It is quite obvious that the bulk of mankind value science chiefly for the practical advantages it brings with it.

### **Scientific Attitude**

Singh (1988), Scientific Attitude is defined as a set of emotionally toned ideas about science, scientific methods and related directly or indirectly to the course of action in the literature of science education. The term Scientific Attitude applies such qualities of mind as intellectual curiosity, passion for truth, respect for evidences, and appreciation of the necessity of free communication in science. Thus, scientific attitude is open-mindedness; a desire for accurate knowledge, confidence in procedures, seeking knowledge and expectation that solution of the problem will come out through the use of verified knowledge.

Science attitude is an opinion or position taken with respect to a psychological object in the field of science. According to Sekar, P and Mani, S (2013), science attitude is normally associated with the mental processes. These habits are important in the daily life of everyone. Scientific attitudes possess attributes thought to be either false and do not express an evaluative quality.

The teacher bears the responsibility of developing scientific attitude among students. Without scientific attitude aims of science cannot be attained (Sharma, 2005). Scientific attitude, now days, is found to be lacking even in highly educated persons, teachers and students. This is a hindrance in the path of acquiring knowledge. The teachers and students need to have a scientific outlook. They must make themselves free from false beliefs and irrational thinking.

### **Need and Importance of the Study**

The students of Secondary course studying in Schools just enter the adolescent stage, which is a stage of stress and storm. In this period, they must be properly guided and counseled, otherwise there arises the problem of maladjustment. If the adolescents are once properly guided and aroused right educational aspirations, they will excel in all aspects of life and education. Governments have been spending crores on Higher Secondary

education. But the results are not in proportion to the expenditure incurred. Only nearly 40 to 60 percent of the students are successful, this too from the contribution of private Schools. In other words, two thirds of the educational expenditure is squandered away for nothing.

The results of this study will help the educational planners, teachers and students to modify the present state of affairs as many students fail in Secondary school level. So the present attempt is made to study the Scientific Attitude of Secondary School students.

### **Objective of the Study**

The study was taken up with the following objectives.

1. To find out the level of Secondary School students to their Scientific Attitude.
2. To find out the difference, if any, between boys and girls Secondary schools students in respect of their Scientific Attitude.
3. To find out the difference, if any, between Government and Private Secondary schools students in respect of their Scientific Attitude.
4. To find out the difference, if any, between Urban and Rural Secondary schools students in respect of their Scientific Attitude.
5. To find out the difference, if any, between Tamil medium and English medium Secondary schools students in respect of their Scientific Attitude.

### **Review of Related Literature**

Al-rabaani (2014) investigated the acquisition of science process skills by Omani's pre-service social studies' teachers. Data were collected using a questionnaire which consisted of 14 items covering basic and integrated science process skills. The questionnaire was distributed to all 59 social studies students' teachers in the college of education at Sultan Qaboos University in the Sultanate of Oman. The results showed that they had moderate acquisition of science process skills and there was no difference due their gender.

Dr.R.S.Yeli, Sadiqa.A.Dafedar (2013) has been made to study the learning achievement in science of secondary school students in relation to their scientific aptitude. The results show that the secondary school students with high scientific aptitude have higher learning achievement scores. The urban secondary school students have significant higher scientific aptitude scores as compared to rural students. The English medium secondary school students have significant higher scientific aptitude scores as compared to Kannada medium students. The boy and girl students of secondary schools of Karnataka have similar scientific aptitude scores.

Mrs. C.Daisy Nambikkai, Dr. R.John Louis Manoharan (2014) studied with a view to find out whether differences exist in the science attitude of secondary school students with

respect to gender, locality, religion, father educational qualification, father's annual income. The study carried out on a sample of secondary government school students in Pondicherry region. This study reflects on the relevance of learning by doing method with theoretical learning from the secondary school stage.

Bang and Baker (2013) investigated the effect of high schools' gender organization on Korean tenth-grade students' science achievements, and their attitudes towards science. Three schools, three principals, three science teachers, and 302 tenth-grade students from their respective school types responded to an initial survey, and eleven academically outstanding students were subsequently interviewed. Results indicated that the male and female students from the co-ed school had significantly higher science achievement and positive attitudes towards science.

Feyzioglu, Demirdag, Akyildiz and Altun (2012) studied the validity and reliability of science process skills for secondary students. The test was applied on 222 students from a vocational high school in Turkey. The test consisted of 30 multiple-choice questions; the reliability of the test was (0.83). The test consisted of sub-dimensions such as, observing, classifying, measuring, communicating, inferring, predicting, formulating hypotheses, identifying variable, organizing data, and interpreting it, designing investigations, acquiring data. The results of the confirmatory factor analysis supported validity and reliability of the test.

Ozgelen (2012) studied the student's science process skills within a cognitive domain framework. The test was applied on 306 sixth and seventh grade students from public, private, and bussed schools. The Turkish integrated process skills test was used to measure scientific process skills, and the findings showed generally low scores. private schools students had higher scores compared to public and bussed school students.

Zeidan (2010) investigated the relationship between the attitudes toward biology and perceptions of biology learning environment among Grade 11 students (N = 190) in Tulkarm district, Palestine, and. The study used a 30-item attitude toward biology questionnaire and a 32-item learning environment questionnaire. The association between attitudes toward biology and biology learning environment was significant with a correlation coefficient of 0.366. The results of the study indicated that there were significant gender differences in attitudes toward biology, favoring females.

Yoo (2010) selected four early childhood educators for a case study. Portfolios were used and each teacher used for their science activities. Results showed that teachers were able to empower risk-taking attitudes regarding their learning and teaching science when they teach early science fields in classroom. Study shown that early childhood teacher had positive attitude toward science than before. Teachers, who had more positive attitude toward science, performed in understanding children's curiosity about science better than

what these teachers expect. These results were coming from development of portfolio during the science method.

Varley, Murphy, and Veale (2008) worked with 1530 students who were different ages and grades. They used a survey method for taking students' attitudes toward school and science. The returns numbered 1030, and they were coded for protecting participants' rights. For school science, results showed that 55% of pupils found school science interesting, and 43% of pupils found science was easy. Researchers also stated that some pupils didn't enjoy science because it was too difficult. Some students appeared to enjoy science because it was challenging. Thirty percent of people appeared to like science better than other subjects. As a result of research, pupils have positive attitudes about school life and towards school science.

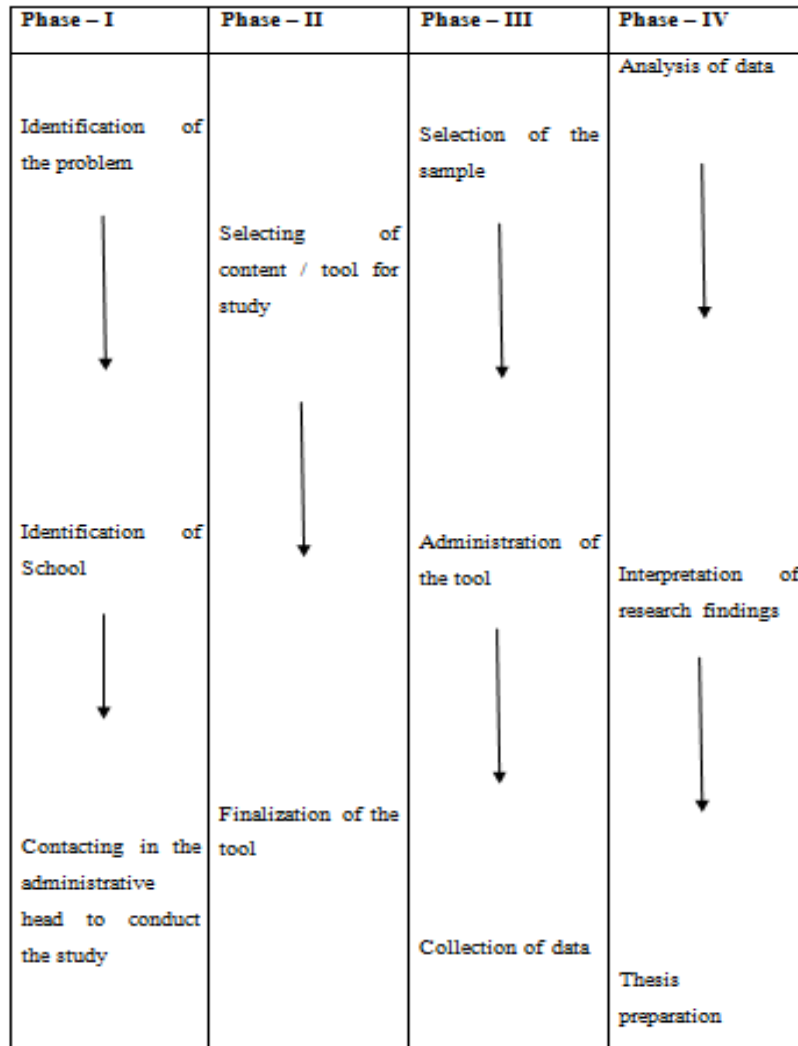
Sönmez (2007) studied preschool teachers' attitudes toward science teaching and its impact practices and science activities in classroom. Researcher investigated impacts of teachers' attitudes toward science such as educational level, teaching experience, undergraduate course work on science, in service training, number of children in classroom and age of children. For this study researcher used Childhood Teacher's Attitudes toward Science Teaching Scale (ECTASTS) AND worked 292 preschool teachers who worked in public and private schools in different districts of Ankara, Turkey during the second semester of 2006-2007 academic years. Results showed that there was statistically significant relationship between teachers' attitudes toward science and science activities. Teachers' attitudes had positive effects from all factors except age and in service training.

Arpita Kumar and Pratik Upadhyaya (2007) carried out environmental attitude among college students. Objectives of the study, 1. To compare the environmental attitude among male and female students of college level. 2. To compare the environmental attitude among college level students belonging to science and arts stream.

### **Research Design**

A research design is the arrangement of conditions for collection and analysis of data in a manner that aims to combine relevance to the research purpose with economy in procedure. In fact, the research design is true conceptual structure with which research is conducted; it constitutes the blue print for the collections, measurement and analysis of data.

**Research Design**



**Design of the Study**

Design is the heart of research upon which the entire process of research is carried out. In this study, the investigator followed the survey method is used to assess the scientific attitude in science among secondary school students. Thus this study attempts to explore the relationship in scientific attitude in science with respect to their types of management, location of school, gender and medium of instruction.

### Method of Study

In order to realize the above said objectives, normative survey method was employed. Normative survey method describes and interprets what exists at present. They are concerned with existing conditions or relations, prevailing practices, beliefs and attitudes etc.

Such investigations are termed in research literature as “Descriptive Survey” or “Normative Survey”. The term “Normative implies the determination of typical conditions or practices. The term “Survey” suggest the gathering of evidences related to prevailing conditions or practices.

### Tool Used

The data are necessary for carrying out research. Investigation must be collected with the aid of special instruments or devices. The successful research represents a proper selection of tools. For the present investigation, the research has chosen the following tools:

The investigator used a tool - Scale of Attitude towards Science Learning (SATSL) constructed and standardized by Likert.

### Testing of Hypotheses

#### Hypothesis: 1

There is no significant difference between girls and boys students studying at Secondary School level with respect of their Scientific Attitude.

**Table 1: Scientific Attitude of Girls and Boys in Secondary School Students**

Gender	N	Mean	SD	't' value	Table Value	Level of significant
Boys	150	61.13	7.12	0.47	1.96	NS
Girls	150	60.76	6.61			

NS - Not Significant

NS from the above table show that the calculated 't' value 0.47 is lesser than the tabulated value of 1.96 at 0.05 level of significance. Hence, the hypothesis is accepted.

Therefore it is concluded that there is no significant difference between boys and girls students at secondary level.

#### Hypothesis: 2

There is no significant difference between Government and Private school students in respect of their Scientific Attitude.

**Table 2: Scientific Attitude of Government and Private in Secondary School Students**

Type of school	N	Mean	SD	't' value	Table Value	Level of significant
Government	150	60.12	6.42	8.08	1.96	S
Private	150	61.76	7.20			

S - Significant

S from the above table show that the calculated 't' value 8.08 is greater than the tabulated value of 1.96 at 0.05 level of significance. Hence, the hypothesis is rejected.

Therefore it is concluded that there is significant difference between Government and Private school students at secondary level. Moreover, the Private school students (Mean=61.76) are found to be better than their Government school counter parts (Mean=60.12) in their Scientific Attitude.

#### Hypothesis: 3

There is no significant difference between Rural and Urban school students in respect of their Scientific Attitude.

**Table 3: Scientific Attitude of Rural and Urban in Secondary School Students**

Type of school	N	Mean	SD	't' value	Table Value	Level of significant
Rural	150	58.37	6.88	2.08	1.96	S
Urban	150	64.23	5.27			

S - Significant

S from the above table show that the calculated 't' value 2.08 is greater than the tabulated value of 1.96 at 0.05 level of significance. Hence, the hypothesis is rejected.

Therefore it is concluded that there is significant difference between rural and urban school students at secondary level. Moreover, the urban school students (Mean = 64.23) are found to be better than their rural school counter parts (Mean = 58.37) in their Scientific Attitude.

#### Hypothesis: 4

There is no significant difference between Tamil and English medium students in respect of their Scientific Attitude.

**Table 4: Scientific Attitude of Tamil and English in Secondary School Students**

Type of Medium	N	Mean	SD	't' value	Table Value	Level of significant
Tamil	180	62.11	7.82	1.53	1.96	NS
English	150	59.36	6.82			

NS - Not Significant



NS from the above table show that the calculated 't' value 1.53 is lesser than the tabulated value of 1.96 at 0.05 level of significance. Hence, the hypothesis is accepted.

Therefore it is concluded that there is no significant difference between rural and urban school students at secondary level. It is concluded that the Tamil medium and English medium Secondary students are having favorable attitude towards science.

#### **Limitations of the Study**

There are some limitations for the study. The very nature of the research in implies certain limitation or restriction about the sample and nature of the area.

1. The study is limited to four variables namely Gender, Type of management, Location and Medium of instructions.
2. The investigation is carried out only at Secondary level students.
3. The study is conducted only to 300 numbers of students.
4. The present study is also limited to Government and Private schools in around Namakkal.
5. By considering constraint of time, money and geographical places, the investigator has taken Namakkal Educational District only.

#### **Major Findings of the Study**

1. There is no significant difference between Male and Female in respect of their Scientific Attitude.
2. There is significant difference between Government and Private school students in respect of their Scientific Attitude.
3. There is significant difference between Rural and Urban area students in respect of their Scientific Attitude.
4. There is no significant difference between Tamil and English medium students in respect of their Scientific Attitude.

#### **Conclusion**

The present study was made on the Secondary School student's attitude towards science. The findings of the present study indicate that the students should maintain the present status of their attitude and their competence in Science subject. Therefore, teachers and parents should encourage and equip their children to become competent in science field, keeping in mind their valuable time and work that creates better nation.

The investigator concluded by this study that has shown that Male and Female students had no significant difference in respect of their Scientific Attitude. Government and Private school students, Rural and Urban area students differ significantly in their Scientific Attitude.

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