A Study On Scientific Attitude And Achievement In Tenth Grade Science Among The High School Pupils In Tiruchirappalli District

Abstract

Education is the process of development which consists of the passage of the human being from infancy to maturity and the process whereby he adapts himself gradually in various ways to his physical, social and spiritual environment. But even in this social process, the child need support and freedom from an economic pressure, and that is why education requires long period of social as well as biological infancy when the young would like off the labor of others and be related form self-support. However, assistance will be at least partially discounted unless education at the same time encourages wise and discriminating consumption. The child should not become a parasite. He must pay back by realizing the goals and objectives that education must focus on total and optimal development of human resources. Education is purposeful, conscious or unconscious deliberate or spontaneous, psychological, sociological, scientific and philosophical processes which bring about the all-round development of the individual to its fullest extent in the best of his social interests in such a way that he enjoys maximum happiness and prosperity.

1. Introduction

Science is not a new thing in this world. It is the intellectual heritage of man which has come down to us. Since man became aware of his surroundings and started pondering over the natural phenomena in which he found himself engulfed. This knowledge of physical world not only changed his environment but also his outlook and approach to the problems that he faced in his everyday life. Up to the middle ages, science was considered a part of philosophy and as such was called “natural philosophy”. Since sixteenth century, science started taking quick strides, while it was mostly the product of the intellectual, interest of gifted individuals who worked almost independently in their fields. The importance of attitude may be inferred from the fact that attitudes determine behavior.
Scientific knowledge, in those days, exerted little influence on the common man. But since the turn of this century, even the man in the street becomes aware of the impact of science on the society and new age of science. The development of any county is based on the scientific knowledge. Progress in science depends upon continuous scientific investigations. No doubt, well-organized and well-equipped laboratories are essential but probably the most important factor in this research is the attitude and character of persons working in the laboratories. These persons make plans, devise and conduct experiment and draw suitable inferences from experimental results. The attitude has an effect upon students’ selections of different subjects and also on their interest and achievement in the scientific knowledge. Generally attitudes are considered as the degree of positive or negative effect. Positive or favorable attitude facilitates the learning of subjects while a negative attitude results in poor learning and achievement.

India is one of the developing countries. Science education is very important for her to face the challenges of the time. For such a revolution to take place, India needs a considerable number of scientists in agriculture, industry and research institutes. The situation has improved somewhat in the recent years as a result of the development of modern science programmes. Greater attention is given to the nature of scientific enquiry through the promotion of active student participation in activity-oriented learning experiences. Hence conduct of the present study.

2. Scope Of The Study

The directorate of Extension Programmers for Secondary Education, Government of India, in its brochures on evaluation in general science states one of the objective as ‘pupil should adopt the scientific attitude in making statements, accepting information & forming beliefs. Almost all the commissions & committees on School education which were formed after independence have stated the importance of development of scientific attitude in the students. Students in the 8th, 9th & 10th std. are in the age between 13 to 15 years. This age is important as for as curiosity, critical thinking decision making etc. are concerned.

3. Statement Of The Problem

The problem selected for the present study is, “A Study on Scientific Attitude and Achievement in Science among the Secondary Grade Students in Tiruchirappalli District”. The high school students are faced many problems in their higher education studies. Due to low level of scientific attitude they were suffered the selection of science group studies.

4. Operational Definition Of Terms

- **Attitude**
  A predisposition or a tendency to respond positively or negatively towards a certain idea, object, person, or situation. Attitude influences an individual’s choice of action, and responses to challenges, incentives, and rewards (together called stimuli).
  
  Four major components of attitude are:
  
  (1) Affective: emotions or feelings.
  
  (2) Cognitive: belief or opinions held consciously.
  
  (3) Cognitive: inclination for action.
  
  (4) Evaluative: positive or negative response to stimuli.

- **Scientific attitude**
Scientific attitudes can be regarded as a complex of ‘values and norms which is held to be binding on the man of science. The norms are expressed in the forms of prescriptions, proscriptions, preference and permissions. They are legitimized in terms of institutional values’. The norms and values are supposed to be internalized by the scientist and thereafter they fashion his/her scientific practice.

❖ **Achievement**

Academic achievement refers to investigate what determines academic outcomes of learners; they have come with more questions than answers. In recent time prior literature has shown the learning outcomes (Academic Achievement) has been determined by such variables.

❖ **Secondary Grade Pupils**

Those who are studying secondary school education under the control of State Board of Tamilnadu Government.

5. **Objectives Of The Study**

The objectives of the study are stated as follows:

I. To find out the scientific attitude of secondary grade pupils among sex wise.

II. To find out the scientific attitude of secondary grade pupils among family type wise.

III. To find out the scientific attitude of secondary grade pupils among school type wise.

IV. To find out the scientific attitude of secondary grade pupils among residence wise.

V. To find out the relationship between scientific attitude and science achievement of secondary grade pupils in terms of gender.

VI. To find out the relationship between scientific attitude and science achievement of secondary grade pupils in terms of family type.

VII. To find out the relationship between scientific attitude and science achievement of secondary grade pupils in terms of school type.

VIII. To find out the relationship between scientific attitude and science achievement of secondary grade pupils in terms of residence.

6. **Hypotheses Of The Study**

In the light of the above objectives, the following null hypotheses are formulated for testing.

01. There is no significant difference in scientific attitude of male and female secondary grade pupils.

02. There is no significant difference in scientific attitude of unique and nuclear family type of secondary grade pupils.

03. There is no significant difference in scientific attitude of school type viz., government, aided, self-finance of secondary grade pupils.

04. There is no significant difference in scientific attitude of rural and urban secondary grade pupils.

05. There is no significant relationship in scientific attitude and science achievement of male and female secondary grade pupils.

06. There is no significant relationship in scientific attitude and science achievement of unique and nuclear family of secondary grade pupils.

07. There is no significant relationship in scientific attitude and science achievement of secondary grade pupils school type viz., government, aided, self-finance.
7. Methodology Of The Study

The following methodology was used for this study.

a. Sample
The data of secondary grade students are collected from various high school and higher secondary schools located in Tiruchirappalli district. For the present study a sample of 300 secondary grade students are selected randomly, students are selected irrespective of their sex, locality, school type, viz., four high schools and two higher secondary schools are taken for this study.

b. Instrumentation
Scientific attitude inventory and Science Achievement test questionnaire was developed and validated by the investigator are used to this study.

c. Method
Survey technique was adopted to collect the related information.

d. Statistical Analysis
   - ‘t’-test between the means of large independent sample was employed.
   - Correlation analysis.

Delimitations Of The Study
- 136 Males, 164 Females total 300 students are alone used for this study.
- The research is conducted among secondary grade pupil’s only especially tenth grade pupils.
- The study conducted in selected high and higher secondary schools in Tiruchirappalli district only.

8. Analysis And Interpretation

8.1 Differential Analysis
Hypothesis: 1
There is no significant difference in Scientific Attitude of male as well as Female of Secondary Grade Pupils.

Table: 1 Result shows the difference in Scientific Attitude of male as well as Female of Secondary Grade Pupils.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Sub Variable</th>
<th>Number</th>
<th>Mean</th>
<th>SD</th>
<th>‘t’ Value</th>
<th>Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Scientific</td>
<td>Male</td>
<td>136</td>
<td>12.46</td>
<td>3.237</td>
<td>-3.585</td>
<td>S</td>
</tr>
<tr>
<td>Attitude</td>
<td>Female</td>
<td>164</td>
<td>13.76</td>
<td>3.069</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Inference
From the table number 1 it reveals that the calculated value is higher than the table value and therefore there is a significant difference in Scientific Attitude of Male as well as Female Secondary Grade Pupils. Hence the Hypothesis is rejected.

Hypothesis: 2
There is no significant difference in Scientific Attitude of unique as well as nuclear family of Secondary Grade Pupils.
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Table 2: Result shows the difference in Scientific Attitude of unique as well as nuclear family of Secondary Grade Pupils.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Sub Variable</th>
<th>Number</th>
<th>Mean</th>
<th>SD</th>
<th>‘t’ Value</th>
<th>Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Scientific Attitude</td>
<td>Unique Family</td>
<td>155</td>
<td>12.62</td>
<td>2.938</td>
<td>-1.395</td>
<td>N.S</td>
</tr>
<tr>
<td></td>
<td>Nuclear Family</td>
<td>145</td>
<td>13.56</td>
<td>3.203</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Inference

From the table number 2 it reveals that the calculated value is lesser than the table value and therefore there is no significant difference in Scientific Attitude of unique as well as nuclear family type of Secondary Grade Pupils. Hence the Hypothesis is accepted.

Hypothesis: 3

There is no significant difference in Scientific Attitude of Secondary Grade Pupils among in Trichy district studying in the type of management with regards to their scientific attitude.

Table 3: Result shows the difference in Scientific Attitude of Secondary Grade Pupils among in Trichy district studying in the type of management with regards to their scientific attitude.

<table>
<thead>
<tr>
<th>Source</th>
<th>df</th>
<th>Sum of Squares</th>
<th>Mean Square</th>
<th>Calculated ‘f’ value</th>
<th>Table ‘f’ value</th>
<th>Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Between</td>
<td>2</td>
<td>1.485</td>
<td>1.012</td>
<td>1.049</td>
<td>2.99</td>
<td>N.S</td>
</tr>
<tr>
<td>Within</td>
<td>298</td>
<td>139.66</td>
<td>10.405</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Inference

From the table number 3 it reveals that the calculated value is lesser than the table value and therefore there is no significant difference in Scientific Attitude of government as well as government aided schools of Secondary Grade Pupils. Hence the Hypothesis is accepted.

Hypothesis: 4

There is no significant difference in Scientific Attitude of Secondary Grade Pupils among rural as well as urban schools.

Table 4: Result shows the difference in Scientific Attitude of Secondary Grade Pupils among rural as well as urban schools.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Sub Variable</th>
<th>Number</th>
<th>Mean</th>
<th>SD</th>
<th>‘t’ Value</th>
<th>Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Scientific Attitude</td>
<td>Rural</td>
<td>176</td>
<td>197.34</td>
<td>29.69</td>
<td>2.388</td>
<td>S</td>
</tr>
<tr>
<td></td>
<td>Urban</td>
<td>124</td>
<td>205.66</td>
<td>30.27</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Inference

From the table number 4 it reveals that the calculated value is higher than the table value and therefore there is a significant difference in Scientific Attitude of rural as well as urban schools of Secondary Grade Pupils. Hence the Hypothesis is rejected.

8.2 Correlation Analysis

Hypothesis: 5

There is no significant relationship between Scientific Attitude and Achievement in Tenth Grade Science of male as well as female Secondary Grade Pupils.

Table 5 Result shows the relationship between Scientific Attitude and Achievement in Tenth Grade Science of male as well as female Secondary Grade Pupils.
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### Table 5: Result shows the relationship between Scientific Attitude and Achievement in Tenth Grade Science of Male and Female Secondary Grade Pupils.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Sub Variable</th>
<th>Number</th>
<th>Pearson Correlation (‘r’)</th>
<th>Significance Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Scientific Attitude</td>
<td>Achievement in Tenth Grade Science</td>
<td>Male</td>
<td>-0.317</td>
<td>S</td>
</tr>
<tr>
<td></td>
<td></td>
<td>female</td>
<td>-0.213</td>
<td>S</td>
</tr>
</tbody>
</table>

**Inference**

From the table number 5 it reveals that the calculated value is higher than the table value and therefore there is a significant relationship between Scientific Attitude and Achievement in Tenth Grade Science of Male as well as Female Secondary Grade Pupils. **Hence the Hypothesis is rejected.**

**Hypothesis:** 6

There is no significant relationship between Scientific Attitude and Achievement in Tenth Grade Science of unique as well as nuclear family type of Secondary Grade Pupils.

### Table 6: Result shows the relationship between Scientific Attitude and Achievement in Tenth Grade Science of unique as well as nuclear family type of Secondary Grade Pupils.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Sub Variable</th>
<th>Number</th>
<th>Pearson Correlation (‘r’)</th>
<th>Significance Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Scientific Attitude</td>
<td>Achievement in Tenth Grade Science</td>
<td>Unique Family Type</td>
<td>-0.182</td>
<td>S</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Nuclear Family Type</td>
<td>-0.227</td>
<td>S</td>
</tr>
</tbody>
</table>

**Inference**

From the table number 6 it reveals that the calculated value is higher than the table value and therefore there is a significant relationship between Scientific Attitude and Achievement in Tenth Grade Science of unique as well as nuclear family type Secondary Grade Pupils. **Hence the Hypothesis is rejected.**

**Hypothesis:** 7

There is no significant relationship between Scientific Attitude and Achievement in Tenth Grade Science of Government as well as Government Aided Schools of Secondary Grade Pupils.

### Table 7: Result shows the relationship between Scientific Attitude and Achievement in Tenth Grade Science of Government as well as Government Aided Schools of Secondary Grade Pupils.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Sub Variable</th>
<th>Number</th>
<th>Pearson Correlation (‘r’)</th>
<th>Significance Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Scientific Attitude</td>
<td>Achievement in Tenth Grade Science</td>
<td>Aided</td>
<td>-0.191</td>
<td>S</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Govt.</td>
<td>-0.235</td>
<td>S</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Self-finance</td>
<td>-0.112</td>
<td>NS</td>
</tr>
</tbody>
</table>

**Inference**

From the table number 7 it reveals that the calculated value is higher than the table value and therefore there is a significant relationship between Scientific Attitude and Achievement in Tenth Grade Science of Aided and Govt. Schools of Secondary Grade Pupils. **Hence the Hypothesis is rejected.**

**Hypothesis:** 8

There is no significant relationship between Scientific Attitude and Achievement in Tenth Grade Science of Rural as well as Urban Schools of Secondary Grade Pupils.
Table 8: Result shows the relationship between Scientific Attitude and Achievement in Tenth Grade Science of Rural as well as Urban Schools of Secondary Grade Pupils.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Sub Variable</th>
<th>Number</th>
<th>Pearson Correlation ('r')</th>
<th>Significance Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Scientific Attitude</td>
<td>Achievement in Tenth Grade Science</td>
<td>Rural</td>
<td>0.176</td>
<td>S</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Urban</td>
<td>0.262</td>
<td>S</td>
</tr>
</tbody>
</table>

Inference

From the table number 8 it reveals that the calculated value is higher than the table value and therefore there is a significant relationship between Scientific Attitude and Achievement in Tenth Grade Science of Rural as well as Urban Schools of Secondary Grade Pupils. Hence the Hypothesis is rejected.

9. Major Findings

i.) There is a significant difference in scientific attitude of male and female secondary grade pupils.

ii.) There is no significant difference in scientific attitude of unique and nuclear family type of secondary grade pupils.

iii.) There is no significant difference in scientific attitude of school type viz., government, aided, self-finance of secondary grade pupils.

iv.) There is a significant difference in scientific attitude of rural and urban secondary grade pupils.

v.) There is a significant relationship in scientific attitude and science achievement of male and female secondary grade pupils.

vi.) There is a significant relationship in scientific attitude and science achievement of unique and nuclear family of secondary grade pupils.

vii.) There is a significant relationship in scientific attitude and science achievement of secondary grade pupils school type viz., government, aided, self-finance.

viii.) There is a significant relationship in scientific attitude and science achievement of rural and urban secondary grade pupils.

10. Discussion

The present investigator has found that there is no significant difference between Scientific Attitude of Secondary Grade Pupils regarding Family Type and School Type, but there is a significant difference between Scientific Attitude of Secondary Grade Pupils among Gender and School locality. The present investigator has also found that there is a significant relationship between Scientific Attitude and Achievement in Tenth Grade Science of Secondary Grade Pupils regarding Gender, Family Type, School Type and School Locality.

11. Educational Implications Of The Study

Scientific attitude is a concept of different dimensions of psychology. The above dimension can improve individual values of science in everyday life. The values are very helpful to the students with their daily activities. The findings of the present study have clear and meaningful implications for teachers, teacher educators, parents and educational administrators.

The teachers should make use of different methodology of teaching like Heuristic method, Problem solving and Project method to improve the student achievement in science. The use of teaching aids both projected and non projected materials and experiments may be ensure while...
teaching science subjects for correct understanding of the concept and help them to develop a favorable attitude towards science especially meant for high, average and low achievers where they can improve their science achievements.

12. Suggestions For Further Study
   i.) A comparative study should be conducted on high school and higher secondary school students with regards to their scientific attitude.
   ii.) A comparative study on scientific attitude of the graduate and teacher trainees.
   iii.) The study can be carried out at Kendriya Vidyalaya, Sainik Schools and Navodaya Vidyalaya was class room climate may be different.
   iv.) Since the study was mainly conducted in secondary grade students only, similar studies may taken up in higher secondary students and college students also.

13. References