Abstract

Science in self-governing society benefits all people, and we must ensure that they become aware of the advantages which science can bring to their lives. Economic and technical growth accrues to a society in percentage to the efficiency with which it uses its scientific talent. Before it is too late, we must prepare our younger generation to assume the responsibility of understanding the social, cultural, economic and technical aspects of science. The pace of development depends crucially on capital formation and technological progress which in turn depends not only on the rate of saving and application of modern ‘Scientific knowledge’ to production process but also on the ‘Societies Outlook’ towards modernization and development. The policy makers of tomorrow will be the immediate next generation that is students. So the development of scientific temper among students is inevitable. Hence the investigator conducts of the present study.

1. Introduction

In Education, Science is a way of understanding the world, a perspective and a pattern of thinking that begins early in one’s life. Scientific advances over the last fifty years have led to revolutionary changes in health, nutrition and communication, and generally enhancing socio-economic development and the quality of our lives. The role of science promises to be greater in the future because of the ever more rapid scientific progress. Our society is becoming increasingly dependent on science and technology. It is essential for the wellbeing of our society that all citizens develop “science literacy”, an appreciation of science, the benefits of technology, and the population risks associated with advances in both. In an effort to boost the interest of students in basic sciences, the Department of Science and Technology (DST), Government of India has announced 2004 as the year of Scientific Awareness” (YSA2004).
1.1 Review of Related Literature

In this chapter, a brief account of the studies most related to the present investigation has been presented.

1.2 Definitions of Temper

The chamber’s compact English Dictionary defines temper as “Constitutional State of Mind”. The champer’s council 20th century dictionary defines temper as “the habitual or actual frame of mind”. Collin’s English Dictionary defines temper as a particular state or condition of mind. The Webster’s new 20th century dictionary (unabridged 2nd edition) defines temper as frame of mind.

1.3 Definitions of Scientific Temper

The Seventh Five Year Plan (1985-90) document of the planning commission defines scientific temper as ‘move an attribute of the human mind and the social decision process than mere knowledge about things which are scientific’. Prof. Nayadamma, Y., defines, ‘scientific temper is an attitude of open, rational mind, questioning curious critical mind a tomorrow’s mind instead of yesterday’s mind resistant to rigidity and resilient to change, “it requires objectivity not jumping into hasty or readymade opinions but patient observation and exploration and then only forming an opinion. In this way, “Scientific is more flexible, open and indiscriminate”.

According to Paul Costello (1996) would like to see more political activity on the part of physicians. But what if this activity simply extends on the ‘scientific temper’ we have seen over the last several months? I quickly went through the archives of our own humble blog to come up with some memorable moments of such scientific temper.

There are two things to ponder as you read through the short list. First, in the world of politics, you make enemies. That’s part of running for office or actively supporting candidates. When part of a political campaign, objectivity is sacrificed to loyalty, facts are turned into spin. If the scholars, scientists, and physicians seek to drag their professions into the political landscape, their professions will have to follow along with these campaign strategies and thus be defined more and more by things such as these memorable moments. Secondly, as more scholars, scientists, and physicians join the political battle, I foresee the list of memorable moments expanding.


2. Background Of The Problem

The contemporary system of education in school or College/University is more of a mechanism stuffing the young minds with dry information, lending little opportunities for independent thinking. It hardly stimulates or sharpens the scientific attitude and scientific outlook and a climate of developing innovation and critical attitude development. The students in our country too are having narrower view of science and they fail to solve the problems in scientific way. They don’t know how to apply the scientific principles in their day today life.

Scientific temper is basically open mindedness, a desire to have accurate knowledge and use of verified knowledge for solution of problems. So, the knowledge of scientific temper is very essential to understand all the problems in our environment. The very reason for this sorry state of affair could be lack of possession of scientific temper. The inculcation of scientific temper among
our students is of great importance for the simple reason that they will be tomorrow’s leaders and policy makers in various walks of life.

As a student of biological science, the investigator has thought of the conduct of the present study which is entitled “Scientific Temper among the B.Ed. Trainees in Ramanathapuram District”.

3. Objectives of the Study

The major objectives of the study are listed below:

I. To measure the level of scientific temper among B.Ed. college Trainees.
II. To find out whether there is any significant difference in the scientific temper among trainees in terms of selected population variables.

4. Hypothesis

There is significant difference in scientific temper among B.Ed. college trainees in terms of their:

(i) Age
(ii) Sex
(iii) Religion
(iv) Educational Qualification
(v) Course of study
(vi) Residence
(vii) Family type

5. Methodology in Brief

- **Sample**
  A stratified representative sample of 490 education college trainees from Ramanathapuram district was constituted with due representation given to the variable via, age, sex, religion, educational qualification, course of study, family type and parents education.

- **Tool**
  Standardized scientific temper inventory developed by Krishnan.K and Bhuvaneshwari.G (1989) was used.

- **Statistical Treatment**
  Test of significance of difference between the mean scores of large independent sample was used.

- **Analysis and Discussion**
  The details of the analysis and interpretation of data are presented below.

- **Scientific Temper among B.Ed. College Trainees**
  The scientific temper score of the B.Ed. College Trainees are 94.25, while the theoretical average is 80 only. Hence, the scientific temper of B.Ed. college trainees is found to be above the average level. In other words, their possession of scientific temper is found to be satisfactory.

6. Result & Interpretation

6.1 Scientific Temper and Sex

The details of results of test of significance of difference between the mean scores of Scientific Temper in terms of sex are given in Table 3
A. Anand, C. Ashok Kumar: A Study On Scientific Temper Among The B.Ed. Trainees In Ramanathapuram Districts

Table 1: Statistical Measures and Results of the Tests of Significance of Difference Between the Mean Scores of Scientific Temper: Sex-Wise

<table>
<thead>
<tr>
<th>Sex</th>
<th>N</th>
<th>Mean</th>
<th>S.D</th>
<th>‘t’ Value</th>
<th>Significance at 0.05 level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>441</td>
<td>94.22</td>
<td>6.81</td>
<td>-0.26</td>
<td>N.S</td>
</tr>
<tr>
<td>Female</td>
<td>49</td>
<td>94.49</td>
<td>6.42</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

N.S.- denotes not significant at 0.05 levels

The obtained ‘t’ value -0.26 is lesser than the critical value 1.96 at 0.05 level. It indicates that there is no significant difference between male and female B.Ed. trainees in their possession of scientific temper.

Comment

The finding can be justified on the ground that both male and female get exposed to as well as educated the same way in the contemporary society.

6.2 Scientific Temper and Age

The details of results of test of significance of difference between the mean scores of Scientific Temper in terms of age are given in Table 2.

Table 2: Statistical Measures And Results of the Tests of Significance of Difference Between the Mean Scores of Scientific Temper: Age-Wise

<table>
<thead>
<tr>
<th>Age</th>
<th>N</th>
<th>Mean</th>
<th>S.D</th>
<th>‘t’ Value</th>
<th>Significance at 0.05 level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Upto 20</td>
<td>330</td>
<td>94.14</td>
<td>6.81</td>
<td>-0.50</td>
<td>N.S</td>
</tr>
<tr>
<td>21 and above</td>
<td>160</td>
<td>94.46</td>
<td>6.70</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

N.S.- denotes not significant at 0.05 levels

The obtained ‘t’ value -0.50 is less than the critical value of 1.96 at 0.05 level. It indicates that there is no significant difference between different age group in their possession of scientific temper.

Comment

This finding can be justified on the ground that all the age group of the B.Ed. trainees equally get more scientific knowledge through various modes like libraries, internet centers and also various mass media. Also they get more chance of expressing their views and ideas through practical’s, workshops, projects, seminars, symposium, exhibitions, field trips and other curricular activities conducted in their own institutions.

6.3 Scientific Temper and Religion

The details of results of test of significance of difference between the mean scores of Scientific Temper in terms of religion are given in Table 3, 4 and 5.

Table 3: Statistical Measures and Results of the Tests of Significance of Difference between the Mean Scores of Scientific Temper: Hindu-Christian B.Ed. Trainees Wise

<table>
<thead>
<tr>
<th>Religion</th>
<th>N</th>
<th>Mean</th>
<th>S.D</th>
<th>‘t’ Value</th>
<th>Significance at 0.05 level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hindu</td>
<td>294</td>
<td>93.57</td>
<td>6.79</td>
<td>-1.80</td>
<td>N.S</td>
</tr>
<tr>
<td>Christian</td>
<td>81</td>
<td>95.11</td>
<td>6.62</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

N.S.- denotes not significant at 0.05 levels
The obtained ‘t’ value -1.80 is lesser than the critical value 1.96 at 0.05 level. It indicates that there is no significant difference between Hindu and Christian B.Ed. trainees in their possession of scientific temper.

**Comment**

There is no significant difference among Hindu and Christian B.Ed. trainees because nowadays all students equally get more scientific knowledge through various modes like libraries, internet centers, practical experience and various mass media. Also they get high chance of expressing their views and ideas through seminars, workshops, exhibitions, field trips and other curricular activities conducted in their own institution.

### 6.4 Scientific Temper: Hindu-Muslim B.Ed. Trainees Wise

**Table 4: Statistical Measures and Results of the Tests of Significance of Difference between the Mean Scores of Scientific Temper: Hindu-Muslim B.Ed. Trainees Wise**

<table>
<thead>
<tr>
<th>Religion</th>
<th>N</th>
<th>Mean</th>
<th>S.D</th>
<th>‘t’ Value</th>
<th>Significance at 0.05 level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hindu</td>
<td>294</td>
<td>93.57</td>
<td>6.79</td>
<td>-2.42</td>
<td>S</td>
</tr>
<tr>
<td>Muslim</td>
<td>115</td>
<td>95.37</td>
<td>6.66</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

S- denotes significant at 0.05 level

The obtained ‘t’ value -2.42 is greater than the critical value of 1.96 at 0.05 level. This indicates that there is a significant difference between Hindu and Muslim B.Ed. trainees in their possession of scientific temper.

**Comment**

It is also revealed that Muslim B.Ed. trainees possess more scientific temper than Hindu B.Ed. trainees. In Ramanathapuram district Muslims are proving to be good in business, strategy and have access to global countries. Hence compared to Hindus, Muslims in Ramanathapuram have more knowledge of relationship, profit tenderness and functional sincerity and also the Muslim students are facing less struggle for academic admissions than Hindus because there are many Muslim institutions in Ramanathapuram district and as their economic status is higher the Muslim B.Ed. trainees are availing many advanced technologies which influences their knowledge and scientific temper.

**Table 5: Statistical Measures and Results of the Tests of Significance of Difference between the Mean Scores of Scientific Temper: Christian-Muslim B.Ed. Trainees Wise**

<table>
<thead>
<tr>
<th>Religion</th>
<th>N</th>
<th>Mean</th>
<th>S.D</th>
<th>‘t’ Value</th>
<th>Significance at 0.05 level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Christian</td>
<td>81</td>
<td>95.10</td>
<td>6.62</td>
<td>-0.29</td>
<td>N.S</td>
</tr>
<tr>
<td>Muslim</td>
<td>115</td>
<td>95.37</td>
<td>6.66</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

N.S- denotes not significant at 0.05 levels

The obtained ‘t’ value -0.29 is less than the critical value of 1.96 at 0.05 level. It indicates that there is no significant difference in scientific temper between Christian and Muslim B.Ed. trainees.

**Comment**

There is no significant difference among Christian and Muslim B.Ed. trainees because nowadays all students equally get more scientific knowledge through various modes like libraries, internet centers, practical experience and various mass media. Also they get high chance of expressing their views and ideas through seminars, workshops, exhibitions, field trips and other curricular activities conducted in their own institution.
In this, there is significant difference in scientific temper between Hindu B.Ed. trainees and Muslim B.Ed. trainees while there is no significant difference between Hindu B.Ed. trainees and Christian B.Ed. trainees as well as between Christian B.Ed. trainees and Muslim B.Ed. trainees. In other words, the hypothesis 1(c) is partially substantiated.

6.5 Scientific Temper and Educational Qualification

The details of results of test of significance of difference between the mean scores of scientific temper in terms of educational qualification are presented in Table-6.

Table 6: Statistical Measures and Results of the Tests of Significance of Difference between the Mean Scores of Scientific Temper: Educational Qualification Wise

<table>
<thead>
<tr>
<th>Educational Qualification</th>
<th>N</th>
<th>Mean</th>
<th>S.D</th>
<th>‘t’ Value</th>
<th>Significance at 0.05 level</th>
</tr>
</thead>
<tbody>
<tr>
<td>UG</td>
<td>198</td>
<td>93.48</td>
<td>6.84</td>
<td>-2.06</td>
<td>S</td>
</tr>
<tr>
<td>PG</td>
<td>292</td>
<td>94.77</td>
<td>6.69</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

S - denotes significant at 0.05 level

The obtained ‘t’ value -2.06 is greater than the critical value of 1.96 at 0.05 level. Hence, there is a significant difference in scientific temper between UG and PG B.Ed. trainees.

Comment

This finding reveals that the PG B.Ed. trainees possess more scientific temper than the UG B.Ed. trainees. This might be due to the fact that the PG B.Ed. trainees get chances of expressing their views and ideas through various curricular and extra-curricular activities as compared to the UG B.Ed. trainees.

6.6 Scientific Temper And Course Of Study

The details of results of test of significance of difference between the mean scores of scientific temper in terms of course of study are presented in Tables 7.

Table 7: Statistical Measures and Results of the Tests of Significance of Difference between the Mean Scores of Scientific Temper: Arts and Science B.Ed. Trainees Wise

<table>
<thead>
<tr>
<th>Course of study</th>
<th>N</th>
<th>Mean</th>
<th>S.D</th>
<th>‘t’ Value</th>
<th>Significance at 0.05 level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Arts</td>
<td>158</td>
<td>93.12</td>
<td>6.75</td>
<td>-3.02</td>
<td>S</td>
</tr>
<tr>
<td>Science</td>
<td>179</td>
<td>95.34</td>
<td>6.73</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

S - denotes significant at 0.05 level

The obtained ‘t’ value -3.02 is greater than the critical value of 1.96 at 0.05 level. This indicates that there is a significant difference between Arts and Science B.Ed. trainees in their possession of scientific temper.

Comment

It is also revealed that Science B.Ed. trainees possess more scientific temper than Arts B.Ed. trainees, because the Science B.Ed. trainees get chances of expressing their views and ideas through various technical aspects and also they are exposed to multiple fields of research and development as compared to Arts.

6.7 Scientific Temper and Residence

The details of results of test of significance of difference between the mean scores of scientific temper in terms of residence are presented in Table-8.
Table 8: Statistical Measures and Results of the Tests of Significance of Difference between the Mean Scores of Scientific Temper: Residence-Wise

<table>
<thead>
<tr>
<th>Residence</th>
<th>N</th>
<th>Mean</th>
<th>S.D</th>
<th>‘t’ Value</th>
<th>Significance at 0.05 level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hosteller</td>
<td>124</td>
<td>95.29</td>
<td>6.28</td>
<td>1.99</td>
<td>S</td>
</tr>
<tr>
<td>Day Scholar</td>
<td>366</td>
<td>93.90</td>
<td>6.90</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

S - denotes significant at 0.05 level

The obtained ‘t’ value 1.99 is greater than the critical value of 1.96 at 0.05 level. This indicates that there is a significant difference between hosteller and day scholar B.Ed. trainees in their possession of scientific temper.

Comment
The higher scientific temper possessed by the hosteller may be attributed to their mingling scholars with high scientific temper. Also they get chances of expressing their views and make their mind to work in an optimistic way and comparatively hosteller’s have less distraction in various means.

6.8 Scientific Temper and Family Type

The details of results of test of significance of difference between the mean scores of scientific temper in terms of family type are presented in Table-9.

Table 9: Statistical Measures and Results of the Tests of Significance of Difference between the Mean Scores of Scientific Temper: Family Type Wise

<table>
<thead>
<tr>
<th>Family Type</th>
<th>N</th>
<th>Mean</th>
<th>S.D</th>
<th>‘t’ Value</th>
<th>Significance at 0.05 level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nuclear</td>
<td>310</td>
<td>94.31</td>
<td>6.70</td>
<td>0.25</td>
<td>N.S</td>
</tr>
<tr>
<td>Joint Family</td>
<td>180</td>
<td>94.15</td>
<td>6.91</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

N.S - denotes not significant at 0.05 level

The obtained ‘t’ value 0.25 is less than the critical value of 1.96 at 0.05 level. It indicates that there is no significant difference in scientific temper between nuclear and joint family type B.Ed. trainees.

Comment
There is no significant difference between nuclear and joint family type B.Ed. trainees, because both of them are mingling with other persons to share their ideas and opinions. They also participate in all cultural programs conducted in their institutions.

6.9 Hypothesis Verification

There is a significant difference between the mean scores of Scientific Temper among B.Ed. College Trainees, in terms of Religion (Hindu/Muslim), Educational Qualification (UG/PG), Course of study (Arts/Science), and Residence (Hosteller/Day scholar) of subcategories of the population variables. There is no significant difference between the mean scores of Scientific Temper among B.Ed. College Trainees in terms of the remaining three population variables. Hence, the hypothesis is partially accepted.

7. Conclusions
The major conclusions emerged out of the present study are listed below:

- The mean scientific Temper score of the basal sample is found to be 94.3 out of a possible maximum of 120. The minimum possible score is 40 and the Theoretical average is 80. Hence
the scientific temper of B.Ed. college trainees is found to be above the average level, in other words the trainees possess the above average scientific temper.

- The B.Ed. College trainees do not differ significantly in their possession of scientific temper in terms of their age, sex, and family type.
- The possession of scientific temper differ significantly in the possession of scientific temper in terms of their religion (Favouring Muslim trainees) educational qualification (favouring PG) Course of study (Favouring Science ) and residence (favouring hostellers).

8. Educational Implications

   This study reveals that scientific tempers of the B.Ed. trainees are found to be above the average level. But scientific temper is fully needed for the development of oneself and for his/her contribution towards the society in general and family in particular. So it must be maximized by designing suitable curriculum in the educational system. Hence a conscious attempt should be made to improve the availability of resources Viz., man, material, finance and information in educational institutions. Steps should be taken for the use of various technologies in instructional strategies which may pave way for innovations, science consciousness and problem solving ability in a wider way.

9. Suggestions for Further Research

   Following are a few areas of research related to the present investigation which deserve explorations.
   - A study of Scientific Temper and Mental Pressure among the Higher Secondary Students.
   - A study of Scientific Temper among College Students in Tamil Nadu.
   - Relationship study on Scientific Temper and Extra Curricular Activities.
   - Correlation studies of Scientific Temper with variables like, socio-economical cultural status, problem solving ability, social adjustment among college students.

10. References

A. Anand, C. Ashok Kumar: A Study On Scientific Temper Among The B.Ed. Trainees In Ramanathapuram Districts