Scientific Aptitude of Higher Secondary School Students in the State of Tamilnadu

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Abstract

Science plays a huge part in our culture today. In the present world, science dictates our way of life. Students and parents see learning science as a status symbol. Scientific aptitude is a critical component of improving student scientific learning. As a result, the researcher advised researching the scientific ability of Tamilnadu's upper secondary students, with a particular emphasis on the Tiruchirappalli, Tiruverumbur, and Musiri educational districts. The survey included 1000 upper secondary students from both urban and rural schools throughout the three educational districts. It was decided to employ startified random sampling. The SAS, which was built by the investigator, was used to gather data. The findings and outcomes are described. Students in Higher Secondary School, Scientific Aptitude

Keyword: Scientific Aptitude, Higher Secondary, School, Students.

Introduction

The total growth of the kid is the primary goal of education. Each person has both generic and unique characteristics. Such characteristics are inherited and acquired from birth. To develop such inner talents, a suitable atmosphere is always essential. Learning is heavily influenced by a learner's individual features and talents, which determine their characteristics (Banerjee,2016). Their life success varies depending on their abilities. Science knowledge is crucial in many aspects of life. Human comforts have improved thanks to science. A guy with scientific aptitude may readily take advantage of these advantages, making his life happier and more comfortable (Roy & Goel,2018). Science learning increases logical understanding and sharpens the learners' mental

powers, despite the fact that each field of study has its own set of goals and objectives (Kalaivani,2018). The study of science changes the learner's behaviour and enhances his or her character and personality (Moshahid,2016).

Scientific aptitude is the result of a complex interplay of inherited and environmental factors that result in predispositions or talents (Mishra,2020). We often come across persons who possess unique qualities or potentialities that allow them to excel in scientific subjects (Manickavasagan,2019). Scientific aptitude is a test that assesses a person's natural abilities. It also shows the impact of education on the development of higher-order cognitive abilities (Vadivu,Sridhar and Kumar,2016). It is a gadget that is used to determine a person's probable capacity to execute a certain sort of specialized activity (Manichander and Brindhamani,2014). Some pupils may exceed others in scientific subjects and abilities connected to them in schools. Students with scientific aptitude are those who, in addition to their overall intellect, have a special talent or aptitude for science courses (Lalmuanzuali et.al,2019).

The term scientific aptitude refers to a number of factors, including scientific knowledge (which has a strong correlation with student learning).

Literature Review

Patel (2019) looked at secondary school pupils' scientific ability in relation to a number of characteristics. Gender, location, and standard were all factors in the research. A total of 3154 kids were chosen from Gujarat's secondary schools.

Boys have higher scientific aptitude than girls, according to Mishra (2020), and urban pupils have more scientific aptitude than rural students.

Roy and Goel (2018) researched secondary school students' scientific aptitude and attitude, concluding that scientific abilities should be shown among students for better living.

According to Manickavasagan(2019), parents, teachers, curriculum reformers, and policymakers should focus on the development of scientific aptitude and the creation of an adequate learning environment in order to improve science success among higher secondary students.

Kalaivani (2018) looked at the differences in gender success in chemistry and scientific aptitude among XI students in upper secondary school. In terms of scientific aptitude, male and female pupils varied.

The Scientific Aptitude Test for Secondary Students was developed and verified by Vadivu, Sridhar, and Kumar (2016). The authors said that there are new potential studies for future investigation in the selected area, namely scientific aptitude tests and academic stress in school pupils.

Banerjee (2016) investigated Achievement in Life Science and its Relationship with Life Science Aptitude and Scientific Attitude in Secondary Students in West Bengal's North 24 Parganas.

Manichander and Brindhamani (2014) investigated the Academic Achievement and Scientific Aptitude in Science among students in Tamilnadu's Perambalur district's Standard X pupils. Students in urban schools have a greater Scientific Aptitude than students in rural schools. In comparison to male pupils, female students have a greater Scientific Aptitude.

In Telegana State, Moshahid (2016) examined scientific aptitude among English and Urdu medium secondary school students. Students in secondary school who studied in English had a higher degree of scientific aptitude than students in secondary school who studied in Urdu.

Synrema and Syiem (2018) investigated the link between scientific aptitude and science accomplishment in Class IX students in Meghalaya's Ri Bhoi District.

Lalmuanzuali et al. (2019) compared scientific aptitude and accomplishment in science among Mizoram and Meghalaya upper secondary science students associated with the Mizoram Board of School Education (MBSE) and the Meghalaya Board of School Education, respectively (MBOSE).

Subhashchandra and Patel (2016) developed a standardised Scientific Aptitude Test for Students in the 12+ Age Group.Gender has little influence on the scientific ability of pupils in remote region schools.

Methodology of the Study

Secondary students from the state of Tamilnadu made up the study's population. Students in classes XI and XII, learning Science in 12 different schools throughout three educational districts in Tamilnadu, namely Tiruchirappalli, Tiruvernmbur, and Musiri were chosen as sample (N=1000). The data was collected from both urban and rural schools, and the sample included both boys and girls. For the selection of the schools, stratified and random sampling procedures were utilised. The research used an investigator-developed Scientific Aptitude scale. Basic Vocabulary, Numerical Ability, Scientific Information, and Reasoning were the dimensions of the test whichconstitute 350 items. The correct answer received one mark, while the incorrect answer received zero mark. The highest possible score is 350, while the lowest possible score is 0 points. After receiving appropriate approval from the subject and the authorities, the instrument was given to the sample. For statistical analysis, the mean, standard deviation, t-test, and ANOVA were computed.

Objectives of the Study

- To estimate the Scientific Aptitude of Higher Secondary School students in Tamilnadu.
- To assess the level of Scientific Aptitude of Higher Secondary School students on the basis of gender.
- To identify the Scientific Aptitude of Higher Secondary School students in context of their class studied.
- To identify the Scientific Aptitude of Higher Secondary School students in context to their Gender.
- To identify the Scientific Aptitude of Higher Secondary School students in context of their Locale.
- To identify the Scientific Aptitude of Higher Secondary School students in context of their district of study.

Results and Discussion

Hypothesis: 1

In terms of reasoning aptitude, numerical ability, scientific information, scientific vocabulary, and scientific aptitude, there is no substantial difference between XI and XII standard pupils.

Table 1

Difference Between XI And XII Standard Students in Their Scientific Aptitude

Scientific Aptitude and its dimensions	XI (N= 630)		XII (N = 370)		Calculated Value of 't'	Remarks at 5% level
	Mean	S.D	Mean	S.D		
Reasoning Aptitude	40.36	3.78	42.78	3.89	0.860	NS
Numerical Ability	33.76	3.95	30.81	3.49	0.172	NS
Scientific Information	36.42	3.60	36.49	3.67	0.521	NS
Scientific	32.40	3.68	31.28	3.61	0.232	NS

Vocabulary						
Scientific Aptitude	254.75	18.23	255.34	18.648	0.422	NS

(At 5% level of significance, the table value of 't' is 1.96)

The null hypothesis is accepted since the estimated value of 't' is smaller than the table value at the 5% level of significance. As a result, there is no substantial difference in reasoning aptitude, numerical ability, scientific information, scientific vocabulary, or scientific aptitude between XI and XII standard pupils.

Hypothesis: 2

In terms of reasoning aptitude, numerical ability, scientific information, scientific vocabulary, and scientific aptitude, there is no substantial difference between boys and girls.

Table 2

Difference Between Boys and Girls in their Scientific Aptitude

Scientific Aptitude and its dimensions	Boys (N= 464)		Girls (N = 536)		Calculated Value of 't'	Remarks At 5% level
	Mean	S.D	Mean	S.D		
Reasoning Aptitude	41.45	3.628	41.65	3.841	0.870	NS
Numerical ability	32.77	3.465	32.81	3.656	0.171	NS
Scientific Information	31.51	3.659	31.39	3.706	0.511	NS
Scientific Vocabulary	32.32	3.573	32.38	3.729	0.242	NS
Scientific Aptitude	255.30	17.874	254.80	18.897	0.422	NS

(At 5% level of significance, the table value of 't' is 1.96)

The hypothesis is accepted since the estimated value of 't' is smaller than the table value at the 5% level of significance. As a result, there is no significant difference in the Reasoning

Aptitude, Numerical Ability, Scientific Information, Scientific Vocabulary, and Scientific Aptitude of Boys and Girls pupils.

Hypothesis: 3

In terms of Reasoning Aptitude, Numerical Ability, Scientific Information, Scientific Vocabulary, and Scientific Aptitude, there is no substantial difference between urban and rural pupils.

Table 3

Difference Between Urban and Rural Students in their Scientific Aptitude

Scientific Aptitude and its dimensions	Urban (N= 480)		Rural (N = 520)		Calculated Value of 't'	Remarks At 5% level
	Mean	S.D	Mean	S.D		
Reasoning Aptitude	41.56	3.697	41.56	3.788	0.005	NS
Numerical Ability	32.80	3.624	32.78	3.517	0.084	NS
Scientific Information	31.46	3.645	31.44	3.720	0.094	NS
Scientific Vocabulary	32.49	3.583	32.22	3.720	1.151	NS
Scientific Aptitude	255.22	18.663	254.86	18.213	0.313	NS

(At 5% level of significance, the table value of 't' is 1.96)

The hypothesis is accepted since the estimated value of 't' is smaller than the table value at the 5% level of significance. As a result, there is no significant difference in reasoning aptitude, numerical ability, scientific information, scientific vocabulary, and scientific aptitude between urban and rural pupils.

Hypothesis: 4

Higher secondary school pupils from Tiruchirappalli, Tirverumbur, and Musiri educational districts have similar Reasoning Aptitude, Numerical Ability, Scientific Information, Scientific Vocabulary, and Scientific Aptitude.

Table 4

Difference among Tiruchirappalli, Tirverumbur and Musiri Educational District Students in their Scientific Aptitude

Scientific Aptitude and its dimensions	Source	Sum of Squares	Degrees of Freedom	Mean square Value	Calculated value of 'F'	Remarks at 5% level
Reasoning Aptitude	Between	114.226	2	57.113	4.102	**S**
	Within	13880.293	997	13.922		
Numerical Ability	Between	84.779	2	42.390	3.347	**S**
	Within	12626.277	997	12.664		
Scientific Information	Between	70.028	2	35.014	2.590	**NS**
	Within	13479.371	997	13.520		
Scientific Vocabulary	Between	70.295	2	35.147	2.639	**NS**
	Within	13280.904	997	13.321		
Scientific Aptitude	Between	4371.568	2	2185.784	5.028	**S**
	Within	334652.471	997	335.659		

(At 5% level of significance, for (2,997) df the table value of 'F' is 3.02)

The hypothesis is rejected because the estimated value of 't' is bigger than the table value at the 5% level of significance. As a result, there is a considerable variation in reasoning aptitude, numerical ability, and scientific aptitude among pupils in Tiruchirappalli, Tiruvermbur, and Musiri educational districts.

The hypothesis is accepted since the estimated value of 't' is smaller than the table value at the 5% level of significance. As a result, there is no substantial difference in Scientific Information and Scientific Vocabulary between Tiruchirappalli, Tiruvermbur, and Musiri educational district pupils.

When comparing the mean Reasoning Aptitude scores of Tiruchirappalli (Mean = 41.97), Tiruvermbur (Mean = 41.37), and Musiri (Mean = 41.20) district students, Tiruchirappalli district students outperform Tiruvermbur and Musiri district students.

When comparing the mean numerical ability scores of Tiruchirappalli (Mean = 33.14), Tiruvermbur (Mean = 32.47), and Musiri (Mean = 32.64) district students, Tiruchirappalli district students outperform Tiruvermbur and Musiri district students.

When comparing the mean results of Tiruchirappalli (Mean = 29.41), Tiruvermbur (Mean = 29.53), and Musiri (Mean = 28.60) district kids in their Scientific Information, the Tiruchirappalli and Musiri district students are superior.

When comparing the mean scores of Tiruchirappalli (32.12), Tiruvermbur (31.76), and Musiri (31.01) district students in their Scientific Vocabulary, Tiruchirappalli district students outperform Tiruvermbur and Musiri district students.

When comparing the mean scores of Tiruchirappalli district students (Mean = 257.46), Tiruvermbur district students (Mean = 254.26), and Musiri district students (Mean = 252.56) in their Scientific Aptitude, Tiruchirappalli district students outperform Tiruvermbur and Musiri district students.

The data suggest that differences in educational districts are reflected in pupils' scientific abilities. As previously stated, the learning environment has a substantial impact on students' scientific abilities. These school districts may provide a variety of learning opportunities, which might explain the wide range of scientific aptitude ratings. It may be stated that differences in scientific aptitude are context specific rather than variations due to other characteristics such as gender, location, or study class. More research may be done in different educational districts to investigate whether there are any variations among upper secondary school pupils.

Conclusion

Effective scientific learning is crucial not just for one's own growth, but also for a learner's ability to contribute meaningfully to a nation's progress. Many parents and kids now see scientific learning as a status symbol, particularly at the secondary level. Students are assigned to a scientific track based on their performance in the Xth board exams. The accomplishment level of pupils in

upper secondary schools is not determined just by their grades. Academic achievement is enthralled by the right kind of scientific aptitude. Measuring scientific aptitude improves teacher, student, and administrator awareness of students' science learning abilities and helps them develop strategies to improve the learning capacity of higher secondary school students.

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