

# Correlation among Higher Secondary Students' Achievement in Chemistry, Scientific Aptitude and Chemistry Learning Environment

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**Abstract:-**In this present study an attempt has been made to investigate the relationship of Achievement in Chemistry with Scientific Aptitude and Chemistry Learning Environment of Higher secondary students of *Cuddalore district of Tamilnadu*. For this study a sample of 800 higher secondary students were selected through simple random sampling method. The instruments used for data collection were the Scientific Aptitude Test Battery Developed by *Agarwal.K.K. (1986)* and the Chemistry Learning Environment constructed and validated by the investigator. For Achievement in Chemistry the students' half-yearly examination marks taken as an Achievement score. The result of the study shows that there is a significant positive relationship between the Achievement in Chemistry & Scientific Aptitude, Achievement in Chemistry & Chemistry Learning Environment of higher secondary students. Further it is Scientific Aptitude and of Higher Secondary Students. Further it is noted that there exist a positive relationship between the Scientific Aptitude & Chemistry Learning Environment of higher secondary students. From the findings of the study, to increase the positive magnitudes the scientific aptitude and chemistry learning environment for better learning in Chemistry among students the suitable recommendations were also weaved through which the student community will be benefitted.

**Key words:** Correlation, Achievement, Scientific aptitude and Chemistry learning.

## I. INTRODUCTION

The present era is known as science and technological era. Science leads the human life in a meaningful and peaceful way. Science education plays a vital role in the individual and national development. Today's youths are the pillars of future nation therefore the students are expected to contribute more to the world. The science subjects like physics, chemistry, computer science etc, are technical hence the students should take much effort to achieve a lot in these subjects. To make pupils excellent in science the teachers and parents should extent their hands in a proper ways which leads them for better achievement. The field of science education comprises about the science content, some social science, and some teaching pedagogy. There are many factors that influenced in the Achievement in chemistry such as scientific temper, scientific attitude, science interest, scientific aptitude, learning environment etc. among which Scientific Aptitude and Chemistry Learning Environment plays a vital role in the betterment of achievement in chemistry, therefore here an attempt has been made to see the relationship of achievement in chemistry with scientific aptitude and chemistry learning environment of higher secondary students.

## II. RESEARCH IN SCIENCE EDUCATION

The practice of science education has been increasingly informed by research into science teaching and learning. Research in science education relies on a wide variety of methodologies, borrowed from many branches of science and engineering such as computer science, cognitive science, cognitive psychology and anthropology. Science education research aims to define or characterize what constitutes learning in science and how it is brought about.

## III. CHEMISTRY AND CHEMISTRY EDUCATION

Chemistry is sometimes called "the central science" because it connects physics with other natural sciences such as Geology and Biology. Chemistry is a branch of physical science but distinct from physics. The etymology of the word chemistry has been much disputed. The genesis of chemistry can be traced to certain practices, known as alchemy, which had been practiced for several millennia in various parts of the world, particularly the Middle East. Topics in chemistry education might include understanding how students learn chemistry, how best to teach chemistry, and how to improve learning outcomes by changing teaching methods and appropriate training of chemistry instructors, within many modes, including classroom lecture, demonstrations, and laboratory activities.

There is a constant need to update the skills of teachers engaged in teaching chemistry, and so chemistry education speaks to this need.

#### IV. IMPORTANCE OF CHEMISTRY IN SCHOOL SCIENCE CURRICULUM

4.1. At the Higher Secondary school stage it attempts to

- promote understanding of basic principles in Chemistry while retaining the excitement in Chemistry;
- strengthen the concepts developed at the secondary stage and to provide firm foundation for further learning of Chemistry at tertiary level more effectively;
- develop positive scientific attitude, and appreciate contribution of Chemistry towards the improvement of quality of human life;
- develop problem solving skills and nurture curiosity, aesthetic sense and creativity;
- inculcate values of honesty, integrity, cooperation, concern for life and preservation of the environment;
- make the learner realize the interface of Chemistry with other disciplines of science such as Physics, Biology, Geology, etc;
- equip students to face challenges related to health, nutrition, environment, population, whether industries and agriculture.

4.2. Achievement in Chemistry

The achievement in chemistry means how extent the pupils have achieved the goals of chemistry subject specifically the main objectives such as knowledge, understanding, application, skill and other educational objectives.

#### V. STIMULATING FACTORS THAT AFFECTING ACHIEVEMENT IN CHEMISTRY

According to *Holbrook (2005)*, the stress on conception understanding and appreciation for the nature of science tends not to be relevant for functionality in our lives i.e. relevant to the home, the environment, future employment and most definitely for future changes and developments within the society. *Rensnik (1987; cited in Sirhan, 2007)* found that students will engage more easily with problems that are embedded in challenging real-world contexts that have apparent relevance to their lives. If the problems are interesting, meaningful, challenging, and engaging they tend to be intrinsically motivating for students. Many other researches also have been conducted achievement in chemistry with the variants like science interest, achievement motivation, scientific temper, school environment, test anxiety, scientific attitude etc. *Anders and Berg (2005)* in a research entitled correlatives of the observed attitude change toward learning chemistry lesson among university students, tried to identify these correlatives or factors. This research was done in Sweden. The results of the research showed that more the students were motivated, the more positive change was observed in their attitude toward learning chemistry.

5.1. Scientific Aptitude

Scientific Aptitude is a person's ability acquired or innate, to learn or develop knowledge or a skill in the field of science. Often we find the people who have some special abilities or potentialities which enable them to do well in scientific fields of activity. Such people have special types of aptitude and therefore, they are able to learn and acquire the necessary skills in a specialized field. They are also interested in such activities as are of their liking, further success or achievement in a given field of knowledge or activity depends to a great extent upon attitude and interests.

5.2. Chemistry Learning Environment

Indeed, teachers differentiate themselves according to their learning environments, which reflect their teaching and learning philosophies. Some environments are very innovative and flexible (which may or may not facilitate positive learning experiences), some are traditional (which should not necessarily be seen as negative), and yet others can actually stifle learning. Creating a positive learning environment needs to be a key focus. Understanding what constitutes a positive learning environment requires critical analysis of teaching and learning. Therefore the environment that suit to students to upgrade their achievement in chemistry known as chemistry learning environment.

#### VI. NEED FOR THE STUDY

Although pupils may be of comparable abilities, learn in the same environment and follow the same syllabus, their academic performance still vary. Many factors such as lack of facilities in school, lack of teachers,

unfavorable learning environment, lack of scientific aptitude, low intelligence, anxiety, pupils' need to achieve and so on have been found to cause poor academic performance. Pupils who are motivated are likely to perform well in their examinations particularly in Chemistry subject. There are many factors that may contribute towards pupils' motivation to achieve high grades in school. Hence the investigator decided to take up correlation study of Higher Secondary Students' Achievement in Chemistry in relation to Scientific Aptitude and Chemistry Learning Environment.

#### VII. OBJECTIVES OF THE STUDY

1. To find out is there any significant relationship between Higher Secondary Students' Achievement in Chemistry and their Scientific Aptitude with respect to various biographical variables.
2. To find out is there any significant relationship between Higher Secondary Students' Achievement in Chemistry and their Chemistry Learning Environment with respect to various biographical variables.
3. To find out is there any significant relationship between Scientific Aptitude and Chemistry Learning Environment of higher secondary students with respect to various biographical variables.

#### VIII. HYPOTHESES OF THE STUDY

1. There is no any significant relationship between Higher Secondary Students' Achievement in Chemistry and their Scientific Aptitude with respect to various biographical variables.
2. There is no any significant relationship between Higher Secondary Students' Achievement in Chemistry and their Chemistry Learning Environment with respect to various biographical variables.
3. There is no any significant relationship between Scientific Aptitude and Chemistry Learning Environment of higher secondary students with respect to various biographical variables.

#### IX. METHOD OF STUDY

The present study was undertaken by using Normative Survey Method. The survey method gathers data from a large number of cases at a particular time.

#### X. TOOLS USED.

1. Scientific Aptitude Test Battery Developed by *Agarwal.K.K. (1986)*
2. Chemistry Learning Environment Scale Constructed and Validated by the *Investigator(2015)*.
3. For Achievement in Chemistry, Higher Secondary students' percentage of marks scored in Half yearly Examination has been taken for this study.

#### XI. STATISTICAL TECHNIQUES

In this present investigation the correlation analysis were used as Statistical technique.

#### XII. SAMPLE OF THE STUDY

The present study was conducted with 800 Higher Secondary Students studying in various Higher Secondary Schools of Cuddalore District in Tamilnadu State. The sample was selected by using Simple Random Sampling Technique. The sample forms a representative sample of the entire population.

#### XIV. DATA ANALYSIS

##### 14.1. Correlation between the Achievement in Chemistry & Scientific Aptitude of Higher Secondary Students

In order to realize one of the objectives of the present study, it has been decided to find out the Correlation between the Achievement in Chemistry & Scientific Aptitude of Higher Secondary Students by using Spearman Brown Prophecy formula, The correlation was computed and the values are given in Table No.1.

Table-1: Correlation between the Achievement in Chemistry & Scientific Aptitude of Higher Secondary Students

Sl. No.	Sub-sample	N	Df	'r' value	Table value at 0.05	Significant / Not Significant
1	Entire Sample	800	798	0.997	0.088	Significant
2	Male	355	353	0.998	0.098	Significant
3	Female	445	443	0.995	0.088	Significant
4	Rural	400	398	0.996	0.098	Significant
5	Urban	400	398	0.997	0.098	Significant
6	Govt.	400	398	0.995	0.098	Significant
7	Private	400	398	0.998	0.098	Significant

The correlation for the entire sample is positive and significant. The same trend is witnessed in all cases of sub-samples. Hence it is concluded that there is a significant positive relationship exists between the Achievement in Chemistry & Scientific Aptitude of Higher Secondary Students.

#### 14.2. Correlation between the Achievement in Chemistry & Chemistry Learning Environment of Higher Secondary Students

In order to realize one of the objectives of the present study, it has been decided to find out the Correlation between the Achievement in Chemistry & Chemistry Learning Environment of Higher Secondary Students. The correlation was computed and the values are given in Table No.2.

Table-2: Correlation between the Achievement in Chemistry & Chemistry Learning Environment of Higher Secondary Students

Sl. No.	Sub-sample	N	Df	'r' value	Table value at 0.05	Significant / Not Significant
1	Entire Sample	800	798	0.911	0.088	Significant
2	Male	355	353	0.919	0.098	Significant
3	Female	445	443	0.885	0.088	Significant
4	Rural	400	398	0.907	0.098	Significant
5	Urban	400	398	0.911	0.098	Significant
6	Govt.	400	398	0.852	0.098	Significant
7	Private	400	398	0.971	0.098	Significant

The correlation for the entire sample is positive and significant. The same trend is witnessed in all cases of sub-samples. Hence it is concluded that there is a significant positive relationship exists between the Achievement in Chemistry & Chemistry Learning Environment of Higher Secondary Students.

#### 14.3. Correlation between the Scientific Aptitude and Chemistry Learning Environment of Higher Secondary Students

In order to realize one of the objectives of the present study, it has been decided to find out the Correlation between the Scientific Aptitude & Chemistry Learning Environment of Higher Secondary Students. The correlation was computed and the values are given in Table No.3.

Table-3: Correlation between the Scientific Aptitude & Chemistry Learning Environment of Higher Secondary Students

Sl. No.	Sub-sample	N	df	'r' value	Table value at 0.05	Significant / Not Significant
1	Entire Sample	800	798	0.900	0.088	Significant
2	Male	355	353	0.909	0.098	Significant
3	Female	445	443	0.872	0.088	Significant
4	Rural	400	398	0.899	0.098	Significant
5	Urban	400	398	0.900	0.098	Significant
6	Govt.	400	398	0.836	0.098	Significant
7	Private	400	398	0.968	0.098	Significant

The correlation for the entire sample is positive and significant. The same trend is witnessed in all cases of sub-samples. Hence it is concluded that there is a significant positive relationship between the Scientific Aptitude & Chemistry Learning Environment of Higher Secondary Students.

#### XV. FINDINGS OF THE STUDY

1. There is a significant positive relationship between the Achievement in Chemistry & Scientific Aptitude of Higher Secondary Students.
2. There is a significant positive relationship between the Achievement in Chemistry & Chemistry Learning Environment of Higher Secondary Students.
3. There is a significant positive relationship between the Scientific Aptitude & Chemistry Learning Environment of Higher Secondary Students.

## XVI. RECOMMENDATIONS

On the basis of this study following recommendations are made:

There is positive magnitude and high relationship between students' aptitude and achievement scores. & Chemistry learning environment and achievement scores hence,

- a) At the time of admission in Higher Secondary classes in science education, favorite subjects of the students should be seriously considered with other factors.
- b) Aptitude must be tested at the time of admission at secondary level education and students must be guided to choose subjects according to their aptitude.
- c) Students having science subjects as favorite subject have high science aptitude may allow to entering science education at higher secondary level.
- d) Students having no science aptitude may not be allowed to entering science education at higher secondary level. Otherwise students will not show better performance in science education. This may harmful of the career of the student.
- e) Particularly, since chemistry is to be treated as a laboratory oriented subject instead of mere theoretical subject, the teacher should provide the maximum chances to the students to make use of laboratories and should correlate with day to day utilization also.
- f) Further, instead of compelling the students to do regular laboratory works, they may be allowed to implement their creative inventions through various scientific experiments.
- g) Science climate should be prevailed in all places such as home, School and classroom that enable the students to improve their achievement.

## XVII. CONCLUSION

Through this study it can be inferred that there is close significant positive relationship between the Achievement in Chemistry with Scientific Aptitude and Chemistry Learning Environment of the higher secondary students. Further it is inferred that more appropriate concentration on the development of Scientific Aptitude and promotion of sufficient Chemistry Learning Environment by the parents, teachers, curriculum reformer and policy makers will help to enhance the achievement in chemistry among higher secondary students. To increase the observed positive nature of the variables among the Higher Secondary Students, the relevant recommendations are made in this study. This will help the Higher Secondary Students community for their development in achievement particularly in chemistry subject.

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