



ACHIEVEMENT OF HIGHER SECONDARY STUDENTS IN CHEMISTRY IN RELATION TO THEIR CHEMISTRY LEARNING ENVIRONMENT

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ABSTRACT :

The present study was explored to find out the level of achievement in chemistry and chemistry learning environment of higher secondary students. Survey method was conducted on a simple random sample of 800 higher secondary students in Cuddalore District. 'Chemistry Learning Environment Scale' was constructed and validated by the investigator. For Achievement in Chemistry, the higher secondary students' percentage of marks scored in half-yearly examination was taken. Data was analyzed by t-test and 'r' value. Results found that higher secondary students have good chemistry learning environment and shown high achievement in chemistry. Findings also showed that there is significant difference in achievement in chemistry and chemistry learning environment of higher secondary students with regard to gender and locality. Further the study revealed that there is significant positive relationship between achievement in chemistry and chemistry learning environment of higher secondary students.



KEYWORDS : Achievement in Chemistry, Chemistry Learning Environment, Higher Secondary Students.

INTRODUCTION

Science education is the field concerned with sharing science content and process with individuals not traditionally considered part of the scientific community. 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.

Achievement in Chemistry is something a student do or achieve at school, college or university - in class, in a laboratory, library or fieldwork. It does not include sport or music. The achievement in chemistry includes a lot of factors which are closely related to the cognitive, affective and psychomotor domains (Benjamin Bloom - 1979). The scientific attitude, scientific aptitude, science interest, achievement motivation, etc., are examples for some identified factors.

Learning environments are typically constructivist in nature, engaging learners in "sense-making" or reasoning about extensive resource sets. Learning environments typically include four components: an enabling context, resources, a set of tools, and scaffolds (Hannafin, Land, & Oliver, 1999). Authentic or realistic contexts are provided to motivate learners, and typically take the form of complex, full-scale problems representative of real-world tasks. To help students understand their complex problems, extensive resources can be provided. A truly open-ended learning environment would involve students in independent research to find and select their own relevant resources (e.g., in the campus library, on the internet). In some learning environments, however, selected resource sets are provided to learners. A full set of tools

should be provided to help learners for process information, manipulate data, and discuss the data. This relies on facilitating environments conducive to learning. Hence, an environment which is used to help the students to be good in achieving something in chemistry is known as Chemistry Learning Environment.

NEED FOR THE STUDY

There are students who may be bright but perform poorly despite the good learning facilities in their schools. Among the factors that are blamed for the pupils' poor academic performance and low motivation, the learning environment is hardly mentioned. Pupils who are provided with suitable environment are likely to perform well in their examinations particularly in Chemistry subject. Hence the investigator decided to take up this study.

OBJECTIVES OF THE STUDY

- To find out the level of achievement in chemistry and chemistry learning environment of higher secondary students.
- To study the significant difference between the sub-samples of the students under different categories with respect to their achievement in chemistry and chemistry learning environment.
- To examine the significant relationship between higher secondary students' achievement in chemistry and their chemistry learning environment.

METHOD & SAMPLE

In the present study the investigator has used normative survey method. The sample consists of 800 higher secondary students from Cuddalore district of Tamil Nadu. The sample is selected by simple random sampling technique.

Tools Used

- **Chemistry Learning Environment Scale**

This scale consists of 48 items with options as SA-Strongly Agree, A-Agree, UD-Undecided, DA-Disagree, and SDA-Strongly Disagree. The scoring is 4, 3, 2, 1, and 0 for positive statements and reverse for the negative statements.

Percentile Norm for Chemistry Learning Environment Scale

Percentile	Score Range	Norm
Below P ₅₀	0-86	Unfavorable
Above P ₅₀	87-192	Favorable

Lower scores indicate that the presence of poor/unfavorable Chemistry Learning Environment and the Score above the mid-value indicates the presence of good/favorable Chemistry Learning Environment.

Reliability and Validity of the Tool

The reliability of the test by Split-half technique (consistency) followed by the use of Spearman-Brown Prophecy formula is found to be 0.89. The validity has been established by a panel of experts, faculty members from the Department of Education and Higher Secondary School Teachers and it is found to be 0.81.

- **Achievement in Chemistry:** For Achievement in Chemistry, the Higher Secondary students' percentage of marks scored in half yearly examination has been taken for this study.

Data Analysis**Table 1: Mean and SD of Achievement in Chemistry Scores of Higher Secondary Students**

Achievement in Chemistry	N	Mean	SD
	800	70.66	11.09

Table-1 shows that the achievement in chemistry of entire sample of higher Secondary students is high (70.66).

Table 2: Mean and SD of Chemistry Learning Environment Scores of Higher Secondary Students

Chemistry Learning Environment	N	Mean	SD
	800	142.86	22.58

Table-2 depicts that the chemistry learning environment of entire sample of higher secondary students is good (M=142.86).

Table 3: Achievement in Chemistry Scores of Higher Secondary Students based on Gender

Gender	N	Mean	SD	t-value	Result
Male	355	66.72	11.05	9.36	Significant
Female	445	73.80	10.07		

From Table-3, the t-value 9.36 is significant at 0.05 level. Thus there is significant difference between the male and female higher secondary students with respect to their achievement in chemistry.

Table 4: Achievement in Chemistry Scores of Higher Secondary Students based on Locality

Locality	N	Mean	SD	t-value	Result
Rural	400	71.55	11.01	2.28	Significant
Urban	400	69.77	11.11		

From Table-4, the t-value 2.28 is significant at 0.05 level. Thus there is significant difference between rural and urban higher secondary students with respect to their achievement in chemistry.

Table 5: Chemistry Learning Environment Scores of Higher Secondary Students based on Gender

Gender	N	Mean	SD	t-value	Result
Male	355	134.95	22.58	9.21	Significant
Female	445	149.17	20.52		

From Table-5, the t-value 9.21 is significant at 0.05 level. Thus there is significant difference between male and female higher secondary students with respect to their chemistry learning environment.

Table 6: Chemistry Learning Environment Scores of Higher Secondary Students based on Locality

Locality	N	Mean	SD	t-value	Result
Rural	400	144.36	22.77	1.88	Not significant
Urban	400	141.36	22.32		

From Table-6, the t-value 1.88 is not significant at 0.05 level. Thus there is no significant difference between rural and urban higher secondary students with respect to their chemistry learning environment.

Table 7: Relationship between Achievement in Chemistry and Chemistry Learning Environment of Higher Secondary Students

Sub-sample	N	Df	'r' value	Table Value at 0.05	Significant/Not Significant
Entire Sample	800	798	0.911	0.088	Significant
Male	355	353	0.919	0.098	Significant
Female	445	443	0.885	0.088	Significant
Rural	400	398	0.907	0.098	Significant
Urban	400	398	0.911	0.098	Significant

From Table-7, 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 significant positive relationship between the achievement in chemistry and chemistry learning environment.

FINDINGS OF THE STUDY

1. The achievement in chemistry of entire sample of higher secondary students is high.
2. The chemistry learning environment of entire sample of higher secondary students is good.
3. There is significant difference between male and female higher secondary students with respect to their achievement in chemistry.
4. There is significant difference between rural and urban higher secondary students with respect to their achievement in chemistry.
5. There is significant difference between male and female higher secondary students with respect to their chemistry learning environment.
6. There is no significant difference between rural and urban higher secondary students with respect to their chemistry learning environment.
7. There is a significant positive relationship between achievement in chemistry and chemistry learning environment of higher secondary students.

RECOMMENDATIONS

To further increase in the achievement in chemistry of higher secondary students, the teachers and parents should concentrate on students routine educational practices, by means of

- Developing good study habits and strategies
- Managing time
- Organizing material to be studied and learned.
- Avoiding outside pressures due to success/failure consequences (grades, graduation), peer pressure, competitiveness, etc.
- Reviewing past performance on tests to improve and learn from experience.

There is positive magnitude and high relationship between students' Achievement scores and Chemistry Learning Environment. Hence, suitable theoretical and practical learning environment should be

given to students in chemistry. Further, instead of compelling the students to do regular laboratory works, they may be allowed to implement their creative inventions through various scientific experiments.

CONCLUSION

From this investigation it can be inferred that the achievement in chemistry of higher secondary students is high and the learning environment is also found to be good. Further, there is significant positive relationship also found between achievement in chemistry and chemistry learning environment. To enhance the observed positive nature of the variables 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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