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High School Student's Achievement in Science in Relation to Study Involvement

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Abstract

The academic achievement of high school students in science has long been recognized as a crucial indicator of their cognitive development, problem-solving ability, and preparedness for future scientific and technological careers. In recent years, educators have increasingly emphasized the influence of students' study involvement defined as the degree of commitment, interest, and active participation in learning activities on their academic performance. The present study investigates the relationship between high school students' achievement in science and their level of study involvement in Ariyalur District, Tamil Nadu. A sample of 820 students was selected through simple random sampling. The tools used for data collection included an Achievement in Science Test (AST), constructed and validated by the investigator and research supervisor (2024), and the Study Involvement Scale (SIS) developed by Ali, Rejjak, and Das (2022). The results indicated that students exhibited an average level of science performance and a high degree of study engagement. Notable differences were discovered in both achievement and engagement influenced by demographic variables like gender and medium of study. Furthermore, a positive and statistically significant relationship was found between study engagement and science performance. These results highlight the necessity of fostering robust study practices, inspiring students, and establishing supportive educational environments to enhance outcomes in science education. The study provides important insights for schools, educators, and policymakers to improve teaching strategies and encourage meaningful student participation in science learning.

Keywords: *Science Achievement, Study Involvement, High School Students.*

1. Introduction

Science education plays a crucial role in providing students with the knowledge, skills, and attitudes that will enable them to function proficiently in an increasingly technological and scientifically driven world. In high school, science lays the actual foundation for higher education and career pursuits in such fields as engineering, medicine, research, agriculture, technology, and many other emerging areas of this new century. For these reasons, educators and policymakers consider understanding the factors that shape achievement in science as vital. Of these factors, students' study involvement has emerged recently as one of the most powerful determinants of academic success because involvement reflects commitment, motivation, and sustained engagement in the learning process.

Involvement in study is a multifaceted construct that includes behaviors such as attentiveness during lessons, completion of assignments, participation in academic discussions, and time devoted to independent study, as well as attitudes of a disposition to explore ideas beyond the classroom. Students who are more fully involved in their studies tend to exhibit better conceptual understanding, greater retention, and a more enduring interest in academics. Conversely, low involvement contributes to poor achievement, lack of interest, and accumulating learning gaps. The association of involvement with study and academic achievement becomes particularly pertinent as schools seek to raise attainment levels.

The present study shall, therefore, analyze levels of achievement in science, measure the extent of study involvement, compare differences across demographic variables, and determine whether study involvement significantly correlates with science achievement. This study provides substantial evidence, through empirical investigation supported by validated tools, to support educational planning, instructional improvement, and design interventions that promote active learning.

2. Need for the Study

Science education is central to national development, while students' achievements in the subject define their future academic and career destinations. However, achievement cannot be solely understood without looking into the factors that determine it, particularly students' study involvement. This study is justified because a majority of the students at the high school level are unable to sustain interest and involvement in science and this has implications on their achievement in the subject. The identification of the level of study involvement and how it serves as a determinant of science achievement enables teachers to adopt appropriate teaching strategies that can motivate learners to create supportive learning environments. The study is also important in identifying demographic differences like gender, and medium of study that influence learning behavior. By establishing a positive relationship between study involvement and science achievement, the findings give a valid merger for the design of interventions that strengthen study habits, active participation, and consequently overall improved science learning outcomes.

3. Statement of the Problem

The title of the problem proposed for the study may be states as "High School Student's Achievement in Science in Relation to Study Involvement".

4. Objectives of the Study

- To find out the level of achievement in science of high school students.
- To find out the level of a study involvement of high school students.
- To find out the any significant difference in achievement in science of high school students with respect to their gender.
- To find out the any significant difference in achievement in science of high school students with respect to their medium of the study.
- To find out the any significant difference in study involvement of high school students with respect to their gender.
- To find out the any significant difference in study involvement of high school students with respect to their medium of the study.
- To find out the any significant relationship between achievement in science and involvement of high school students.

5. Hypotheses of the Study

- The level of achievement in science of high school students is low

- The level of a study involvement of high school students is low
- There is no significant difference in achievement in science of high school students with respect to their gender.
- There is no significant difference in achievement in science of high school students with respect to their medium of the study.
- There is no significant difference in study involvement of high school students with respect to their gender.
- There is no significant difference in study involvement of high school students with respect to their medium of the study.
- There is no significant relationship between achievement in science and involvement of high school students.

6. Methodology

6.1. Sample and Sampling Technique of the Study

The normative survey method was adopted in the present study. The study was conducted in Ariyalur District, Tamil Nadu. A total of 820 high school students were selected using simple random sampling technique.

6.2. Tools Used in the Study

The following research tools have been used to collect the data related to the selected variables.

- Achievement in Science Test (AST) - Constructed and Validated by the Investigator and Research Supervisor (2024)
- Study Involvement Scale (SIC)- Constructed and Validated by Ali, Rejjak, Das, Arjun Chandra (2022)

6.3. Statistical Techniques Used

- Descriptive analysis (mean and standard deviation).
- Differential Analysis ('t' and 'F' test)
- Correlation Analysis (Karl Pearson Product Moment Correlation)

7. Analysis

7.1. Descriptive Analysis

Result of Hypothesis 1

The level of achievement in science of high school students is low.

Table-1: Mean and Standard Deviation of Achievement in Science

Variable	N	Mean	SD
Achievement in Science	**820**	**32.43**	**5.53**

From the table-1, the mean and standard deviation of the total sample are found to be 32.43 and 5.53 respectively. The mean score falls in between the average range value (27-36), so the framed hypothesis (1) is rejected and it is concluded that the level of Achievement in Science of High School Students is average.

Result of Hypothesis 2

The level of a study involvement of high school students is low.

Table-2: Mean and Standard Deviation Scores for Study Involvement

Variable	N	Mean	SD
Study Involvement	820	163.70	24.42

From the table-2, the mean and standard deviation of the total sample are found to be 163.70 and 24.42 respectively. The mean score of the entire sample fall in the category of high value (160 & above), so the framed hypothesis (3) is rejected and it is concluded that the level of Study Involvement of High School Students is high.

7.2. Differential Analysis

Result of Hypothesis 3

There is no significant difference in achievement in science of high school students with respect to their gender.

Table – 3: Significance of Difference between the mean score of Achievement in Science of High School Students with respect to their Gender

Variable	Gender	N	Mean	SD	't' Value	Level of Significance at 0.05 Level
Achievement in Science	Male	410	32.08	5.18	3.26	Significant
	Female	410	35.14	7.13		

It is found from the table-3 that the calculated 't' value is 3.26 which is higher than the table value of 1.96 at 0.05 level of significance. Hence the above stated null hypothesis is rejected and it is concluded that male and female High School Students differ significantly in their Achievement in Science. It is also inferred that female students have high Achievement in Science than the male students.

Result of Hypothesis 4

There is no significant difference in achievement in science of high school students with respect to their medium of study.

Table-4: Significance of Difference between the mean score of Achievement in Science of High School Students with respect to their Medium of Study

Variable	Medium of Study	N	Mean	SD	't' Value	Level of Significance at 0.05 Level
Achievement in Science	Tamil	510	31.94	5.20	1.16	Not Significant
	English	310	32.21	5.13		

It is found from the table-4 that the calculated 't' value is 1.16 which is lesser than the table value of 1.96 at 0.05 level of significance. Hence the above stated null hypothesis is accepted and it is concluded that Tamil and English medium High School Students do not differ significantly in their Achievement in Science.

Result of Hypothesis 5

There is no significant difference in study involvement of high school students with respect to their gender.

Table-5: Significance of Difference between the mean score of Study Involvement of High School Students with respect to their Gender

Variable	Gender	N	Mean	SD	't' Value	Level of Significance at 0.05 Level
Study Involvement	Male	410	163.03	24.74	2.15	Significant
	Female	410	166.22	25.67		

It is found from the table-5 that the calculated 't' value is 2.15 which is higher than the table value of 1.96 at 0.05 level of significance. Hence the above stated null hypothesis is rejected and it is concluded that male and female High School Students differ significantly in their Study Involvement. It is also inferred that female students have high Study Involvement than the male students.

Result of Hypothesis 6

There is no significant difference in study involvement of high school students with respect to their medium of study.

Table-6: Significance of Difference between the mean score of Study Involvement of High School Students with respect to their Medium of Study

Variable	Medium of Study	N	Mean	SD	't' Value	Level of Significance at 0.05 Level
Study Involvement	Tamil	510	163.09	24.60	1.31	Not Significant
	English	310	164.49	24.87		

It is found from the table-6 that the calculated 't' value is 1.31 which is lesser than the table value of 1.96 at 0.05 level of significance. Hence the above stated null hypothesis is accepted and it is concluded that Tamil and English medium High School Students do not differ significantly in their Study Involvement.

7.3. Correlation Analysis

Result of Hypothesis 7

There is no significant relationship between achievement in science and involvement of high school students.

To test the above stated hypothesis, the Pearson's product moment correlation coefficient (r) between Achievement in Science and Study Involvement of High School Students was computed and is given in the table (4.38)

Table-7: Coefficient of correlation between Achievement in Science and Study Involvement

Variable	N	'r' Value	Level of Significance At 0.01 Level
Achievement in Science and Study Involvement	820	0.414**	Significant

** Correlation is significant at the 0.01 level (2-tailed)

From the table-7, the obtained coefficient of correlation (r) between Achievement in Science and Study Involvement of High School Students is found to be 0.414 which is significant at 0.01 ($p<0.01$). Hence the above stated null hypothesis is rejected at 0.01 level of significance and it is concluded that there is a significant and positive relationship between Achievement in Science and Study Involvement of High School Students, that is, High School Students who are having more sense of Study Involvement have better Achievement in Science and vice-versa.

8. Findings of the Study

- The level of Science Achievement among High School students is average.
- The level of Study Involvement among High School students is high.
- There is a significant difference in the Science Achievement of High School students with regard to the Gender.
- There is no significant difference in Science Achievement of High School students with regard to the Medium of the study.
- There is a significant difference in the Study Involvement of High School students with regard to the Gender.
- There is no significant difference in the Study Involvement of High School students with regard to Medium of the study.
- There is a positive and significant relationship between Science Achievement and Study Involvement of High School students.

9. Educational Implications of the Study

- Since study involvement has a positive relationship with science achievement, teachers should encourage consistent study habits and active participation in learning.

- Teachers should provide individualized feedback and guidance to help students overcome learning difficulties in science.
- Collaborative learning approaches should be encouraged to promote peer interaction and shared learning experiences in science classrooms.

10. Conclusion

The study clearly demonstrates that study involvement plays a vital role in shaping high school students' achievement in science. While students showed an average performance in science, their level of involvement in study activities was found to be high, indicating a promising foundation for academic growth. The significant differences observed across demographic variables highlight the need for targeted support and equitable learning opportunities. Most importantly, the positive and significant relationship between study involvement and science achievement emphasizes the importance of fostering motivation, encouraging active engagement, and strengthening study practices. The findings suggest that teachers, parents, and schools must collaborate to cultivate environments that inspire curiosity and sustained academic effort, ultimately enhancing students' success in science.

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