



## ACADEMIC ACHIEVEMENT IN SCIENCE: A STUDY OF INFLUENCE OF GENDER, SETTLEMENT AND SES

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**ABSTRACT** The present study used descriptive-cum-survey method, the study aimed to examine the influence of gender, settlement and SES on academic achievement of 12<sup>th</sup> grade student in science of Arunachal Pradesh. Data for the study was collected from nine government higher secondary schools situated in rural and urban areas. A total of 221 12<sup>th</sup> grade science students were randomly selected as a sample of this study. The result of the analyses of variance (3-way ANOVA) shows that there exist significance differences in academic achievement of 12<sup>th</sup> grade students in science subject in relation to gender, settlement and SES.

**KEYWORDS** : Academic Achievement In Science, Gender, Settlement, SES

### INTRODUCTION

Science plays an important role in the modern world. Science education is believed to serve as the foundation of technological development and a key factor in economic growth. A discussion on scientific methods and attitudes presupposes the concept of what science is. Science has been defined in different ways by different authors. It has already been mentioned elsewhere that science is not just a body of knowledge as it used to be considered in earlier times; it is a static view presenting science as a host of facts, principles, laws and theories along with the vast of systematised information used for interpreting the events in our environment and universe at large. It is true that ever since men tried to understand nature and to adjust themselves for existence and survival, human knowledge has accumulated. Men then began to study nature's laws and behaviour systematically and classified the gathered knowledge for convenience. But under the current wider context, science is much more than this. Science is dynamic. It is knowledge as well as process of its continuous development and refinement. Science is thus both a product as well as process. It is an endless process of observation, exploration and acquisition through empirical and conceptual means. The characteristic of this process is growth through continuous acquisition, generalisation and refinement.

Many studies have reported that SES has a positive correlation with academic achievement (Lalithamma, K.N. 1975; Pathak, A.B. 1974; Khanna, M. 1980; and Mehra, S. 1986). Study on investigation of science achievement models for low and high, achieving schools and gender differences in Turkey highlighted that SES, gradual learning and views on lab works significantly contributed to the science achievement and also indicates that girl's students' outperformed boys on gradual learning, knowledge of cognition, and importance of science (Acar, O. 2018). Kaki, M. & Babu (2008); Mishra, M. (1986) and Hariskrishan, M. (1992) pointed out that there exists significant difference between male and students with female scores higher in their academic achievement while Cheung, D. (2017) found that gender and grade level to be non-significant. A study investigated by Benny, A. (1990) reported that high scores on SES favoured students' achievement and sex difference in science achievement favouring males existed. Another study undertaken by K.N. Nisa (2005) on scholastic achievement of higher secondary students in science stream and factors responsible for success in science stream identified that SES and academic achievement in science in case of boys were found to be negatively significant while in case of girls it was found to be positively significant. Girls from high SES and boys from low SES have been found to achieve high in science achievement. And also academic achievement of a students' is not influenced by his/her intellectual and personal character rather family background was found to be one of the important variables that determine the academic achievement of students in science stream.

With regards to settlement, Joshi, (1981) made an attempt to study between urban and rural areas and found that for the rural areas, there was low relationship between the creative scores and the achievement scores. On the other hand, an urban area shows positive significant

relationship between the achievement scores and essay performance. Some research on influence of SES on academic achievement of students concluded that academic achievement of urban students was higher than their counterpart rural students (Mishra, M. 1986; and Tok Boa, R. 2005).

Much attention has been given to the correlation between academic achievement and SES in the teaching and learning process. Present study deals with the influence of gender, settlement and SES on academic achievement of science subject.

### OBJECTIVE OF THE STUDY

1. To Study the Influence of Gender, Settlement, SES and their Interactions on the Academic Achievement of 12<sup>th</sup> Grade Students in Science.

### HYPOTHESIS

1. There will be no Significant Influence of the interaction of Gender, Settlement and SES on the Academic Achievement of 12<sup>th</sup> Grade Students in Science.

### PROCEDURES

The present study used descriptive-cum-survey method. The investigator collected the data from nine different government higher secondary school having science stream situated in rural and urban areas. A total of 221 12<sup>th</sup> grade science students were included in the sample through random sampling technique.

### TOOL USED

- i. SES scale developed and standardised by Tech, J. (2007) were adapted.
- ii. The academic achievement score is the final marks obtained by the class-XII (AISSE) science students.

### ANALYSIS AND INTERPRETATION

To find out the influence of gender, settlement, SES and their interaction on the academic achievement of 12<sup>th</sup> grade students in science, researcher has perform 3-way ANOVA and interpretation of the result were shown below.

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### HYPOTHESIS:

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To study the influence of gender, settlement, SES and their interaction on academic achievement of 12<sup>th</sup> grade students in science, 3-way ANOVA table were established. 3-Way ANOVA means three variables, each having two or more than two levels or factorial design.

The present study comprises of (2x2x3) factorial design as gender have two levels (male and female), settlement also have two levels (rural and urban) and SES have three levels (high, average and low).

The 3-way ANOVA table were shown in table 1a. The influence and interaction between two or more variables were calculated and the analysis of variance sheets were established as under;

**Table 1a: Analysis of Variance of Academic Achievement of 12<sup>th</sup> Grade Students in Science in relation to Gender, Settlement and SES**

Source of Variance	df	Sum of Squares	Mean Squares	F-Value	Remarks
Settlement (A)	1/221	12722099.94	12722099.94	28.42	S*
Gender (B)	1/221	191239.75	19123975.08	42.73	S*
SES (C)	1/221	15590208.99	15590208.99	34.83	S*
AXB	1/221	16921269.63	16921269.63	37.80	S*
BXC	1/221	12548658.86	12548658.86	28.03	S*
AXC	1/221	18199584.14	18199584.14	40.66	S*
AXBXC	1/221	233228.62	233228.620	5.21	S*
Error	213		447601.06		
Total	221				

NS\*\*=Not significant, cal 'F' < tab 'F', S\*=Significant, cal 'F' > tab 'F' at 0.05 level

#### INTERPRETATION OF THE RESULT:

The table F-value for df (1, 221) is 3.87 at 0.05 level of significant or 95% confidence interval for all the sources of variance. Analysis of variance of Academic Achievement of 12<sup>th</sup> Grade Students in Science in relation to gender, Settlement and SES can be summarised as follows:

##### ***Influence of Settlement (rural and urban) on Academic Achievement of 12<sup>th</sup> Grade Students in Science:***

From the above table it can be seen that the F-value of 28.42 for settlement (rural/urban) is significant as the obtained F-value (28.42) was found to be greater than the table F-value (3.87) at 0.05 level of significant or 95% confidence interval. It indicates that the mean scores of academic achievement of 12<sup>th</sup> grade students in science studying in rural and urban area scores differ significantly. So, there was significant influence of settlement on academic achievement of 12<sup>th</sup> grade students in science. Thus the null hypothesis that there is no significant influence of settlement on the academic achievement of 12<sup>th</sup> grade students in science was rejected. Further, the mean scores of academic achievement of 12<sup>th</sup> grade students in science for urban was 224 which is significantly higher than that of rural students whose mean scores was found to be 188.34. It may therefore be said that students studying in urban area were found to have higher academic achievement as compared to rural students.

##### ***Influence of Gender (male and female) on Academic Achievement of 12<sup>th</sup> Grade Students in Science:***

The F-value for gender was obtained as 42.73 which is significant as the obtained F-value (42.73) was found to be greater than the table F-value (3.87) at 0.05 level of significant or 95% level of confidence with df (1,221). It indicates that the mean scores of academic achievement of male and female students differ significantly. So, there was a significant influence of gender on academic achievement of 12<sup>th</sup> grade students in science. Thus, the null hypothesis that there is no significant influence of gender on academic achievement of 12<sup>th</sup> grade students in science was rejected. It may therefore be said that the male and female students mean scores was found to be differ significantly and female (212.76) outperformed their counterpart male (202.55) students in science subject though their mean scores fall under average category.

##### ***Influence of SES (high, average and low SES) on Academic Achievement of 12<sup>th</sup> Grade Students in Science:***

The F-value of 34.83 for SES (high, average and low) is significant as the obtained F-value (34.83) was found to be greater than the table F-value (3.87) at 0.05 level of significant or 95% confidence interval. It indicates that the mean scores of academic achievement of 12<sup>th</sup> grade students in science of socio-economic status scores differ significantly. So, there was significant influence of SES on academic achievement of 12<sup>th</sup> grade students in science. Thus the null hypothesis that there is no significant influence of SES on the academic achievement of 12<sup>th</sup> grade students in science was rejected. Further, the mean scores of academic

achievement of 12<sup>th</sup> grade students in science for high SES : was 257.29, average SES was 213.03 and low SES was 188.65. It may therefore be said that students of high SES background were found to have higher academic achievement, which was followed by average SES background then by low SES background.

##### ***Influence of Interaction between Settlement and Gender (AXB) on Academic Achievement of 12<sup>th</sup> Grade Students in Science:***

The F-value for the interaction between settlements (rural/urban) and sex (male/female) is 37.80 which are significant as the obtained F-value (37.80) was found to be greater than the table F-value (3.87) at 0.05 level of significant or 95% confidence interval. It indicates that the mean scores of academic achievement of male and female 12<sup>th</sup> grade students in science belonging to schools situated in rural and urban area scores differ significantly. So, there was significant influence of interaction between settlements and gender on academic achievement of 12<sup>th</sup> grade students in science. Thus the null hypothesis that there is no significant influence of interaction between settlements and gender on academic achievement of 12<sup>th</sup> grade students in science was rejected. Further, the mean scores of academic achievement of 12<sup>th</sup> grade students in science for urban was 224 which is significantly higher than that of rural students whose mean scores was found to be 188.34. It may therefore be said that students studying in urban area were found to have higher academic achievement as compared to rural areas students.

##### ***Influence of Interaction between Gender and SES (BXC) on Academic Achievement of 12<sup>th</sup> Grade Students in Science:***

The F-value for the interaction between gender (male/female) and SES (high, average and low SES) is 28.03 which are significant as the obtained F-value (28.03) was found to be greater than the table F-value (3.87) at 0.05 level of significant or 95% confidence interval. It indicates that the mean scores of academic achievement of gender and SES of 12<sup>th</sup> grade students in science mean scores differ significantly. So, there was significant influence of interaction between gender and SES on academic achievement of 12<sup>th</sup> grade students in science. Thus the null hypothesis that there is no significant influence of interaction between gender and SES on academic achievement of 12<sup>th</sup> grade students in science was rejected. Further, the mean scores of academic achievement of 12<sup>th</sup> grade students in science for female with high SES (276.44), female with average SES (217.82), female with low SES (193.88) were found to be significantly higher than male with high SES (242.54), male with average SES (207.17), male with low SES (181.06) respectively. It may therefore be said that female students belonging to all the categories of socio-economic status were found to have higher academic achievement as compared to male students belonging to high, average and low SES backgrounds.

##### ***Influence of Interaction between Settlement and SES (AXC) on Academic Achievement of 12<sup>th</sup> Grade Students in Science:***

The F-value for the interaction between settlement (rural/urban) and SES (high, average and low SES) is 40.66 which are significant as the obtained F-value (40.66) was found to be greater than the table F-value (3.87) at 0.05 level of significant or 95% confidence interval. It indicates that the mean scores of academic achievement of settlement and SES of 12<sup>th</sup> grade students in science mean scores differ significantly. So, there was significant influence of interaction between settlement and SES on academic achievement of 12<sup>th</sup> grade students in science. Thus the null hypothesis that there is no significant influence of interaction between settlement and SES on academic achievement of 12<sup>th</sup> grade students in science was rejected. Further, the mean scores of academic achievement of 12<sup>th</sup> grade students in science for urban high SES (280.21), urban average SES (224.87), and urban low SES (196.17) were found to be significantly higher than rural high SES (210), rural average SES (207.17), and rural low SES (173.63) respectively. It may therefore be said that urban 12<sup>th</sup> grade students belonging to all the categories of socio-economic status were found to have higher academic achievement as compared to rural 12<sup>th</sup> grade students belonging to high, average and low SES backgrounds.

##### ***Influence of Interaction among Settlement, Gender and SES (AXBXC) on Academic Achievement of 12<sup>th</sup> Grade Students in Science:***

The F-value for the interaction among settlement (rural/urban), gender (male/female) and SES (high, average and low SES) is 5.21 which are significant as the obtained F-value (5.21) was found to be greater than the table F-value (3.87) at 0.05 level of significant or 95% confidence interval with df=1/221. It indicates that the mean scores of academic

achievement of settlement, gender and SES of 12<sup>th</sup> grade students in science mean scores differ significantly. So, there was significant influence of interaction among settlement, gender and SES on academic achievement of 12<sup>th</sup> grade students in science. Thus the null hypothesis that there is no significant influence of interaction among settlement, gender and SES on academic achievement of 12<sup>th</sup> grade students in science was rejected. Further, it is evident that students studying in schools situated in urban and rural areas as the socio-economic-status changes from high to average to low there is inclined in academic achievement of both male and female 12<sup>th</sup> grade students in science. But it is higher in case of female (212.76) than male (202.55) 12<sup>th</sup> grade students. The female 12<sup>th</sup> grade students studying both in urban and rural areas have higher academic achievement in science than their counter part male 12<sup>th</sup> grade students.

## CONCLUSION

It may therefore be, concluded that gender, settlement and SES highly influence the academic achievement of 12<sup>th</sup> grade students in science. So there is definite relationship exists between all the variables with female and urban 12<sup>th</sup> grade students showed higher mean scores than that of male and rural students. Result also highlighted that 12<sup>th</sup> grade students with high SES has higher academic achievement in science than that of remaining two categories i.e. average and low SES.

## REFERENCES

1. Synrem, E. & Syiem, S.I. (2018). Relationships between Scientific Aptitude and Achievement in Science Subject of Class IX Students in Ri Bhoi District of Meghalaya. *International Journal of Research and Analytical Reviews*, 5(3), 1738-1742. Retrieved from P.D.F. [www.ijrar.com/irar\\_issue\\_1532](http://www.ijrar.com/irar_issue_1532) on 1st April 2019 at 4.30 p.m
2. Del Rio, F.M et al (2017). Distinct Influences of Mothers and Fathers on Kindergartners' Numeracy Performance: The role of Math Anxiety, Home Numeracy Practices, & Numeracy Expectations. *Early Education & Development*, 28(8), 939-955. Retrieved from <https://doi.org/10.1080/15248372.2016.1228652>
3. Blums, A. et al (2016). Building Links between Early SES, Cognitive Ability, & Math & Science Achievement. *Journal of Cognition & Development*, 18(1), 16-40. Retrieved from <https://doi.org/10.1080/15248372.2016.1228652>
4. Thakur K, (2015). Moral judgement as Related to Family Environment of Students at Elementary Level. *Journal of Educational Research*, vol 10, pp. 125-132. <https://doi.org/10.1080/15248372.2016.1228652>
5. Mishra R, (2002). *Issues and Approaches to Science Teaching*. Akansha Publishing House, New Delhi.