CONCLUSIONS AND SUGGESTIONS

Study in Retrospect
Summary of Findings
Tenability of Hypotheses
Implications
Suggestions for Further Research
CHAPTER V

CONCLUSIONS AND SUGGESTIONS

The present study was undertaken to study the relationship between Intelligence, Scientific Creativity, Achievement Motivation, Home Environment and Achievement in science of Higher Secondary School Pupils of Kerala. The summary of the procedure adopted for the study, findings, implications and suggestions are briefly discussed below.

5.1 STUDY IN RETROSPECT

5.1.1 Objectives of the Study

The major objectives of the study were stated as follows:

1. To compare the three achievement groups in pairs (High-Average, Average-Low and High-Low) in respect of each of the independent variables (Intelligence, Scientific Creativity, Achievement Motivation and Home Environment) for the total sample and sub samples based on gender, place of residence and nature of the institution.

2. To find out the relationship between the independent variables (Intelligence, Scientific Creativity, Achievement Motivation and Home Environment) for the Total sample and sub samples based on gender, place of residence, nature of the institution and achievement levels.

3. To find out the relationship between each of the independent variables (Intelligence, Scientific Creativity, Achievement Motivation and Home Environment) and Achievement in Science for the total sample and sub
samples based on gender, place of residence, nature of the institution and achievement levels.

4. To develop a multiple regression equation to predict the Achievement in Science using best predictors selected from the independent variables.

5. To find out the combined effect of the predictor variables on Achievement in Science.

5.1.2 Hypotheses

1. Each of the independent variables selected will discriminate between students of various achievement levels for the total sample and sub samples.

2. There will be significant relationship between the selected independent variables when each variable is correlated with the other for the total sample and subsamples.

3. There will be significant relationship between each of the selected independent variables and Achievement in Science for the total sample and sub samples.

4. Achievement in Science can be predicted in terms of the highly correlating independent variables which are chosen as best predictors.

5. The combined effect of the predictor variables on Achievement in Science will be significant.

5.1.3 Method Adopted

The investigator adopted Survey Method for the present study.
5.1.4 Sample

The study was conducted on a sample of 1120 Higher Secondary School students.

5.1.5 Tools

The investigator developed the following Tools:

(i) Test of Scientific Creativity for Higher Secondary School Students.
(ii) Home Environment Inventory

Other tools used for the study were

(i) Verbal Group test of Intelligence
(ii) Raven's Progressive Matrices test
(iii) Achievement Motivation Scale

5.1.6 Statistical Techniques Used

(i) Two tailed test of significance of the difference between means
(ii) Pearson's product moment Coefficient of Correlation
(iii) Multiple regression equation
(iv) Multiple correlation coefficient

5.2 SUMMARY OF FINDINGS

The important findings of the study have been presented as follows:

5.2.1 Findings based on Comparative studies
5.2.2 Findings based on Correlational studies
5.2.1. Findings based on Comparative Studies

5.2.1.1. Comparison of HA- AA Pair

Total sample

1. The variables Intelligence, Scientific Creativity, and Home Environment clearly discriminated the HA -AA pair well beyond 0.01 level. Achievement Motivation could not discriminate the pair (CR=1.59, p>0.05).

2. The components of Intelligence namely, Verbal Intelligence and Non verbal Intelligence, and the components of Scientific Creativity namely, Fluency, Flexibility, Originality, Verbal Scientific Creativity and Non verbal Scientific Creativity discriminated the HA -AA pair.

Sub samples

1. The variables Intelligence, Scientific Creativity, Achievement Motivation and Home Environment clearly discriminated the HA -AA pair of Boys, Rural, Government and Private school sub samples. Achievement Motivation could not discriminate the HA -AA pair of Girls, (CR=0.83, p>0.05) and Urban school (CR=1.38, p>0.05) sub samples

2. The components of Intelligence namely, Verbal Intelligence and Non verbal Intelligence, and the components of Scientific Creativity namely, Fluency, Flexibility, Originality, Verbal Scientific Creativity and Non verbal Scientific Creativity discriminated the HA -AA pair of Boys, Girls, Rural Urban, and Private school sub samples. Originality could not
discriminate the HA - AA pair of Government school sub sample (CR=1.22, p>0.05)

5.2.1.2. Comparison of AA- LA pair

Total sample

1. The variables Intelligence, Scientific Creativity, and Home Environment clearly discriminated the AA- LA pair well beyond 0.01 level. Achievement Motivation could not discriminate the pair (CR=0.60, p>0.05)

2. The components of Intelligence namely, Verbal Intelligence and Nonverbal Intelligence, and the components of Scientific Creativity namely, Fluency, Flexibility, Originality, Verbal Scientific Creativity and Nonverbal Scientific Creativity discriminated the AA- LA pair

Sub samples

1. The variables Intelligence, Scientific Creativity, Achievement Motivation and Home Environment clearly discriminated the AA- LA pair of Rural, Urban and Private school sub samples. Achievement Motivation could not discriminate the AA- LA pair of Boys (CR=0.69, p>0.05), Girls (CR=1.32, p>0.05) and Government school (CR=0.83, p>0.05) sub samples.

2. The components of Intelligence namely, Verbal Intelligence and Nonverbal Intelligence, and the components of Scientific Creativity namely, Fluency, Flexibility, Originality, Verbal Scientific Creativity and Non
verbal Scientific Creativity discriminated the HA-AA pair of Boys, Girls, Rural, Urban, Government and Private school sub samples.

5.2.1.3. Comparison of HA-LA pair

Total sample
1. The variables Intelligence, Scientific Creativity, and Home Environment clearly discriminated the HA-LA pair well beyond 0.01 level. Achievement Motivation could not discriminate the pair (CR=1.55, p>0.05)

2. The components of Intelligence namely, Verbal Intelligence and Non verbal Intelligence, and the components of Scientific Creativity namely, Fluency, Flexibility, Originality, Verbal Scientific Creativity and Non verbal Scientific Creativity discriminated the HA-LA pair

Sub samples
1. The variables Intelligence, Scientific Creativity, Achievement Motivation and Home Environment clearly discriminated the HA-LA pair of Boys, Rural, Urban, Government and Private school sub samples. Achievement Motivation could not discriminate the HA-LA pair of Girls (CR=1.82, p>0.05).

2. The components of Intelligence namely, Verbal Intelligence and Non verbal Intelligence, and the components of Scientific Creativity namely, Fluency, Flexibility, Originality, Verbal Scientific Creativity and Non verbal Scientific Creativity discriminated the HA-AA pair of Boys, Girls, Rural, Urban, Government and Private school sub samples.
5.2.2 Findings based on Correlational Studies.

5.2.2.1 Findings Based on Simple Correlations

A. RELATIONSHIP BETWEEN ACHIEVEMENT IN SCIENCE AND INDEPENDENT VARIABLES

I. Relationship between Achievement in Science and Intelligence

1. The relationship between Achievement in Science and Intelligence is positive and significant at 0.01 level for the Total sample ($r=0.4614$), Boys ($r=0.5212$), Girls ($r=0.4015$), Rural ($r=0.4815$), Urban ($r=0.4212$), Government ($r=0.4983$), Private ($r=0.4216$), High Achievement ($r=0.3012$), Average Achievement ($r=0.2814$), and Low Achievement ($r=0.2238$) sub samples.

2. The relationship between Achievement in Science and Verbal Intelligence is positive and significant for the Total sample ($r=0.5235$), Boys ($r=0.5468$), Girls ($r=0.4241$), Rural ($r=0.5126$), Urban ($r=0.5108$), Government ($r=0.4510$), Private ($r=0.5321$), High Achievement ($r=0.3108$), Average Achievement ($r=0.2614$), and Low Achievement ($r=0.2516$) sub samples.

3. The relationship between Achievement in Science and Non Verbal Intelligence is positive and significant for the Total sample ($r=0.3241$), Boys ($r=0.3815$), Girls ($r=0.2916$), Rural ($r=0.2785$), Urban ($r=0.3102$), Government ($r=0.3051$), Private ($r=0.3312$), High Achievement ($r=0.2819$), Average Achievement ($r=0.2011$), and Low Achievement ($r=0.1914$) sub samples.
II. Relationship between Achievement in Science and Scientific Creativity

1. The relationship between Achievement in Science and Scientific Creativity is positive and significant at 0.01 level for the Total sample ($r=0.4832$), Boys ($r=0.4258$), Girls ($r=0.4532$) Rural ($r=0.4701$), Urban ($r=0.4451$), Government ($r=0.4839$), Private ($r=0.4430$), High Achievement ($r=0.3832$) and Average Achievement ($r=0.2121$) sub samples.

   The relationship is positive but not significant for the Low Achievement ($r=0.1039$) sub sample.

2. The relationship between Achievement in Science and Fluency is positive and significant at 0.01 level for the Total sample ($r=0.4351$), Boys ($r=0.4123$), Girls ($r=0.4213$) Rural ($r=0.3935$), Urban ($r=0.3642$), Government ($r=0.4245$), Private ($r=0.4203$), High Achievement ($r=0.3010$), Average Achievement ($r=0.3818$) and Low Achievement ($r=0.1818$) sub samples.

3. The relationship between Achievement in Science and Flexibility is positive and significant at 0.01 level for the Total sample ($r=0.4013$), Boys ($r=0.4000$), Girls ($r=0.4213$) Rural ($r=0.3935$), Urban ($r=0.4138$), Government ($r=0.4244$), Private ($r=0.4108$), High Achievement ($r=0.4242$) and Average Achievement ($r=0.2218$) sub samples.

   The relationship is positive and significant at 0.05 level for the Low Achievement ($r=0.1108$) sub sample.
4. The relationship between Achievement in Science and Originality is positive and significant at 0.01 level for the Total sample \((r=0.3235)\), Boys \((r=0.3232)\), Girls \((r=0.3835)\) Rural \((r=0.3014)\), Urban \((r=0.3018)\), Government \((r=0.3925)\), Private \((r=0.3851)\), High Achievement \((r=0.2914)\) and Average Achievement \((r=0.1814)\) sub samples.

The relationship is positive and significant at 0.05 level for the Low Achievement \((r=0.1120)\) sub sample.

5. The relationship between Achievement in Science and Verbal Scientific Creativity is positive and significant at 0.01 level for the Total sample \((r=0.4732)\), Boys \((r=0.4112)\), Girls \((r=0.4032)\) Rural \((r=0.4833)\), Urban \((r=0.4111)\), Government \((r=0.4618)\), Private \((r=0.4312)\), High Achievement \((r=0.4012)\) and Average Achievement \((r=0.2001)\) sub samples.

The relationship is positive but not significant for the Low Achievement \((r=0.1032)\) sub sample.

6. The relationship between Achievement in Science and Non Verbal Scientific Creativity is positive and significant at 0.01 level for the Total sample \((r=0.3218)\), Boys \((r=0.2832)\), Girls \((r=0.3831)\), Rural \((r=0.3737)\), Urban \((r=0.3832)\), Government \((r=0.3200)\), Private \((r=0.2162)\), High Achievement \((r=0.2210)\), Average Achievement \((r=0.1912)\) and Low Achievement \((r=0.1820)\) sub samples.
III. Relationship between Achievement in Science and Achievement Motivation

The relationship between Achievement in Science and Achievement Motivation is positive and significant at 0.01 level for the Total sample \((r=0.1818)\), Boys \((r=0.1921)\), Girls \((r=0.1664)\) Rural \((r=0.1312)\), Urban \((r=0.1415)\), Government \((r=0.1325)\), Private \((r=0.1145)\) and High Achievement \((r=0.2012)\) sub samples.

The relationship is positive and significant at 0.05 level for the Average Achievement \((r=0.1215)\) and Low Achievement \((r=0.1093)\) sub samples.

IV. Relationship between Achievement in Science and Home Environment

The relationship between Achievement in Science and Home Environment is positive and significant at 0.01 level for the Total sample \((r=0.4814)\), Boys \((r=0.5018)\), Girls \((r=0.4210)\) Rural \((r=0.5120)\), Urban \((r=0.4012)\), Government \((r=0.4245)\), Private \((r=0.4819)\), High Achievement \((r=0.5314)\), Average Achievement \((r=0.4215)\) and Low Achievement \((r=0.4930)\) sub samples.

B. RELATIONSHIP BETWEEN INDEPENDENT VARIABLES

1. Relationship between Intelligence and Scientific Creativity

The relationship between Intelligence and Scientific Creativity is positive and significant at 0.01 level for the Total sample \((r=0.4185)\), Boys \((r=0.4102)\), Girls \((r=0.4012)\) Rural \((r=0.3739)\), Urban \((r=0.3985)\), Government
Conclusions and Suggestions

2. The relationship between Intelligence and Fluency is positive and significant at 0.01 level for the Total sample (r=0.3983), Boys (r=0.4212), Girls (r=0.3985) Rural (r=0.3214), Urban (r=0.3483), Government (r=0.3880), Private (r=0.4200), High Achievement (r=0.2212), Average Achievement (r=0.1835) and Low Achievement (r=0.1919) sub samples.

3. The relationship between Intelligence and Flexibility is positive and significant at 0.01 level for the Total sample (r=0.3751), Boys (r=0.3853), Girls (r=0.3920) Rural (r=0.3432), Urban (r=0.4014), Government (r=0.3725), Private (r=0.3835), High Achievement (r=0.2018), Average Achievement (r=0.2011) and Low Achievement (r=0.2004) sub samples.

4. The relationship between Intelligence and Originality is positive and significant at 0.01 level for the Total sample (r=0.2853), Boys (r=0.295), Girls (r=0.2828) Rural (r=0.2751), Urban (r=0.3012), Government (r=0.282), Private (r=0.2428), High Achievement (r=0.1815) and Average Achievement (r=0.1737) sub samples.

The relationship is positive and significant at 0.05 level for the Low Achievement (r=0.1089) sub sample.

5. The relationship between Intelligence and Verbal Scientific Creativity is positive and significant at 0.01 level for the Total sample (r=0.3985), Boys (r=0.3725), Girls (r=0.3251), Rural (r=0.3014), Urban (r=0.3812), Government (r=0.3602), Private (r=0.3887), High Achievement
Conclusions and Suggestions

6. The relationship between Intelligence and Non Verbal Scientific Creativity is positive and significant at 0.01 level for the Total sample \( r=0.4001 \), Boys \( r=0.4103 \), Girls \( r=0.3831 \) Rural \( r=0.3685 \), Urban \( r=0.4012 \), Government \( r=0.3921 \), Private \( r=0.3029 \), High Achievement \( r=0.3832 \), Average Achievement \( r=0.2002 \) and Low Achievement \( r=0.1779 \) sub samples.

7. The relationship between Verbal Intelligence and Scientific Creativity is positive and significant at 0.01 level for the Total sample \( r=0.4200 \), Boys \( r=0.4139 \), Girls \( r=0.3928 \) Rural \( r=0.4232 \), Urban \( r=0.4110 \), Government \( r=0.4018 \), Private \( r=0.3799 \), High Achievement \( r=0.3982 \), Average Achievement \( r=0.3818 \) and Low Achievement \( r=0.2727 \) sub samples.

8. The relationship between Verbal Intelligence and Fluency is positive and significant at 0.01 level for the Total sample \( r=0.4418 \), Boys \( r=0.4201 \), Girls \( r=0.4190 \) Rural \( r=0.4030 \), Urban \( r=0.3989 \), Government \( r=0.4312 \), Private \( r=0.4203 \), High Achievement \( r=0.2815 \), Average Achievement \( r=0.3108 \) and Low Achievement \( r=0.2018 \) sub samples.

9. The relationship between Verbal Intelligence and Flexibility is positive and significant at 0.01 level for the Total sample \( r=0.3832 \), Boys \( r=0.4008 \), Girls \( r=0.3737 \) Rural \( r=0.3555 \), Urban \( r=0.3833 \), Government
Conclusions and Suggestions

(r=0.3257), Private (r=0.3992), High Achievement (r=0.2302), Average Achievement (r=0.2814) and Low Achievement (r=0.2212) sub samples.

10. The relationship between Verbal Intelligence and Originality is positive and significant at 0.01 level for the Total sample (r=0.2892), Boys (r=0.3014), Girls (r=0.2009) Rural (r=0.2230), Urban (r=0.2212), Government (r=0.2019), Private (r=0.1998), High Achievement (r=0.1814) and Average Achievement (r=0.2012) sub samples.

The relationship is positive and significant at 0.05 level for the Low Achievement (r=0.1213) sub sample.

11. The relationship between Verbal Intelligence and Verbal Scientific Creativity is positive and significant at 0.01 level for the Total sample (r=0.4012), Boys (r=0.4180), Girls (r=0.3919), Rural (r=0.3985), Urban (r=0.3985), Government (r=0.3812), Private (r=0.3785), High Achievement (r=0.3923), Average Achievement (r=0.4012) and Low Achievement (r=0.2324) sub samples.

12. The relationship between Verbal Intelligence and Non Verbal Scientific Creativity is positive and significant at 0.01 level for the Total sample (r=0.3208), Boys (r=0.3215), Girls (r=0.2903), Rural (r=0.2852), Urban (r=0.3212), Government (r=0.2904), Private (r=0.2495), High Achievement (r=0.3014), Average Achievement (r=0.3210) and Low Achievement (r=0.2985) sub samples.

13. The relationship between Non Verbal Intelligence and Scientific Creativity is positive and significant at 0.01 level for the Total sample
Conclusions and Suggestions

(r=0.3514), Boys (r=0.3983), Girls (r=0.3825) Rural (r=0.3800), Urban (r=0.3531), Government (r=0.3612), Private (r=0.3601), High Achievement (r=0.1985), Average Achievement (r=0.2031) and Low Achievement (r=0.2121) sub samples

14. The relationship between Non Verbal Intelligence and Fluency is positive and significant at 0.01 level for the Total sample (r=0.3835), Boys (r=0.4012), Girls (r=0.3732) Rural (r=0.3985), Urban (r=0.3642), Government (r=0.3518), Private (r=0.3737), High Achievement (r=0.2031), Average Achievement (r=0.2212) and Low Achievement (r=0.1818) sub samples.

15. The relationship between Non Verbal Intelligence and Flexibility is positive and significant at 0.01 level for the Total sample (r=0.3732), Boys (r=0.3523), Girls (r=0.3414) Rural (r=0.3018), Urban (r=0.3812), Government (r=0.3212), Private (r=0.3008), High Achievement (r=0.220), Average Achievement (r=0.1815) and Low Achievement (r=0.1421) sub samples.

16. The relationship between Non Verbal Intelligence and Originality is positive and significant at 0.01 level for the Total sample (r=0.2980), Boys (r=0.2758), Girls (r=0.2632) Rural (r=0.2952), Urban (r=0.2710), Government (r=0.2200), Private (r=0.2802), and Average Achievement (r=0.1614) sub samples.

The relationship is positive and significant at 0.05 level for High Achievement (r=0.1235) and Low Achievement (r=0.1332) sub samples.
17. The relationship between Non Verbal Intelligence and Verbal Scientific Creativity is positive and significant at 0.01 level for the Total sample \( r=0.3735 \), Boys \( r=0.3112 \), Girls \( r=0.3032 \), Rural \( r=0.3833 \), Urban \( r=0.3111 \), Government \( r=0.3618 \), Private \( r=0.3312 \), High Achievement \( r=0.3012 \) and Average Achievement \( r=0.4012 \) sub samples.

The relationship is positive but not significant for the Low Achievement \( r=0.1032 \) sub sample.

18. The relationship between Non Verbal Intelligence and Non Verbal Scientific Creativity is positive and significant at 0.01 level for the Total sample \( r=0.3218 \), Boys \( r=0.2832 \), Girls \( r=0.3731 \) Rural \( r=0.3235 \), Urban \( r=0.3200 \), Government \( r=0.2162 \), Private \( r=0.2210 \), High Achievement \( r=0.1912 \) and Average Achievement \( r=0.1820 \). The relationship is positive but not significant for the Low Achievement \( r=0.1009 \) sub sample.

II Relationship between Intelligence and Achievement Motivation

1. The relationship between Intelligence and Achievement Motivation is positive and significant at 0.01 level for the Total sample \( r=0.1214 \), Boys \( r=0.1198 \), Girls \( r=0.1211 \) Rural \( r=0.1185 \), Urban \( r=0.1203 \), Government \( r=0.1312 \) and Private \( r=0.1385 \) sub samples.

The relationship is positive but not significant for the High Achievement \( r=0.1002 \), Average Achievement \( r=0.0933 \) and Low Achievement \( r=0.0223 \) sub samples.
2. The relationship between Verbal Intelligence and Achievement Motivation is positive and significant at 0.01 level for the Total sample \( (r=0.1138) \), Boys \( (r=0.1123) \), Girls \( (r=0.1081) \) and Government \( (r=0.1212) \) sub samples. The relationship is positive and significant at 0.05 level for Rural \( (r=0.1030) \), Urban \( (r=0.1051) \), Private \( (r=0.1181) \) and Average Achievement \( (r=0.1102) \) sub samples.

The relationship is positive but not significant for the High Achievement \( (r=0.0981) \), and Low Achievement \( (r=0.0124) \) sub samples.

3. The relationship between Non Verbal Intelligence and Achievement Motivation is positive and significant at 0.01 level for the Total sample \( (r=0.1432) \), Boys \( (r=0.1200) \), Girls \( (r=0.1332) \) Rural \( (r=0.1185) \), Urban \( (r=0.1312) \), Government \( (r=0.1451) \) and Private \( (r=0.1504) \) sub samples.

The relationship is positive but not significant for the High Achievement \( (r=0.1011) \), Average Achievement \( (r=0.0783) \) and Low Achievement \( (r=0.0218) \) sub samples.

III. Relationship between Intelligence and Home Environment

1. The relationship between Intelligence and Home Environment is positive and significant at 0.01 level for the Total sample \( (r=0.2080) \), Boys \( (r=0.2132) \), Girls \( (r=0.2191) \), Rural \( (r=0.2322) \), Urban \( (r=0.2085) \), Government \( (r=0.2131) \), Private \( (r=0.2048) \), High Achievement \( (r=0.1883) \), Average Achievement \( (r=0.1713) \) and Low Achievement \( (r=0.2431) \) sub samples.
2. The relationship between Verbal Intelligence and Home Environment is positive and significant at 0.01 level for the Total sample \((r=0.2385)\), Boys \((r=0.2203)\), Girls \((r=0.2111)\) Rural \((r=0.2432)\), Urban \((r=0.2208)\), Government \((r=0.2191)\), Private \((r=0.2083)\), High Achievement \((r=0.2121)\), Average Achievement \((r=0.1882)\) and Low Achievement \((r=0.2994)\) sub samples.

3. The relationship between Non Verbal Intelligence and Home Environment is positive and significant at 0.01 level for the Total sample \((r=0.2142)\), Boys \((r=0.2083)\), Girls \((r=0.2281)\) Rural \((r=0.1985)\), Urban \((r=0.2099)\), Government \((r=0.2120)\), Private \((r=0.2030)\), and Average Achievement \((r=0.2142)\) sub samples.

   The relationship is positive and significant at 0.05 level for High Achievement \((r=0.1083)\), and Low Achievement \((r=0.1232)\) sub samples.

IV. Relationship between Scientific Creativity and Achievement Motivation

1. The relationship between Scientific Creativity and Achievement Motivation is positive and significant at 0.01 level for the Total sample \((r=0.1185)\).

   The relationship is positive and significant at 0.05 level for Boys \((r=0.1018)\), Girls \((r=0.0985)\), Urban \((r=0.1075)\), Government \((r=0.0994)\), Private \((r=0.1022)\) and Average Achievement \((r=0.1010)\) sub samples.

   The relationship is positive but not significant for Rural \((r=0.0801)\), High Achievement \((r=0.0803)\) and Low Achievement \((r=0.1001)\) sub samples.
2. The relationship between Fluency and Achievement Motivation is positive and significant at 0.01 level for the Total sample \( (r=0.1818) \), Boys \( (r=0.1921) \), Girls \( (r=0.1664) \), Rural \( (r=0.1312) \), Urban \( (r=0.1415) \), Government \( (r=0.1325) \), Private \( (r=0.1145) \), High Achievement \( (r=0.2014) \), Average Achievement \( (r=0.1816) \) and Low Achievement \( (r=0.1614) \) sub samples.

3. The relationship between Flexibility and Achievement Motivation is positive and significant at 0.01 level for the Total sample \( (r=0.1183) \), Boys \( (r=0.1214) \) and High Achievement \( (r=0.1982) \) sub samples.

   The relationship is positive and significant at 0.05 level for Girls \( (r=0.1031) \), Rural \( (r=0.0981) \), Government \( (r=0.1018) \) and Private \( (r=0.0980) \) and Average Achievement \( (r=0.1232) \) sub samples.

   The relationship is positive but not significant for Urban \( (r=0.0814) \) and Low Achievement \( (r=0.0201) \) sub samples.

4. The relationship between Originality and Achievement Motivation is positive but not significant for the Total sample and sub samples.

5. The relationship between Verbal Scientific Creativity and Achievement Motivation is positive and significant at 0.01 level for the Total sample \( (r=0.1057) \), Boys \( (r=0.1212) \), Girls \( (r=0.1138) \), and Rural \( (r=0.1238) \) sub samples.

   The relationship is positive and significant at 0.05 level for Urban \( (r=0.1032) \), Government \( (r=0.1081) \) and Average Achievement \( (r=0.1231) \) sub samples.
The relationship is positive but not significant for High Achievement (r=0.0981) and Low Achievement (r=0.1032) sub samples.

6. The relationship between Non Verbal Scientific Creativity and Achievement Motivation is positive and significant at 0.01 level for the Total sample (r=0.0814).

The relationship is positive and significant at 0.05 level for Urban (r=0.0987) and Government (r=0.0884) sub samples.

The relationship is positive but not significant for Boys, Girls, Rural, and Private and for the three Achievement Groups sub samples.

V. Relationship between Scientific Creativity and Home Environment

1. The relationship between Scientific Creativity and Home Environment is positive and significant at 0.01 level for the Total sample (r=0.2124), Boys (r=0.2081), Girls (r=0.1983), Rural (r=0.2212), Urban (r=0.1812), Government (r=0.1943), Private (r=0.1781), High Achievement (r=0.1888), Average Achievement (r=0.2018) and Low Achievement (r=0.2224) sub samples.

2. The relationship between Fluency and Home Environment is positive and significant at 0.01 level for the Total sample (r=0.2843), Boys (r=0.2525), Girls (r=0.2323) Rural (r=0.2203), Urban (r=0.2012), Government (r=0.2114), Private (r=0.2245), High Achievement (r=0.2048), Average Achievement (r=0.2185) and Low Achievement (r=0.1907) sub samples.

3. The relationship between Flexibility and Home Environment is positive and significant at 0.01 level for the Total sample (r=0.2385), Boys
Conclusions and Suggestions

1. The relationship between Originality and Home Environment is positive and significant at 0.01 level for the Total sample \((r=0.1235)\), Boys \((r=0.1173)\), Girls \((r=0.1081)\), Rural \((r=0.1325)\), Urban \((r=0.1185)\), and Government \((r=0.1421)\) sub samples.

The relationship is positive and significant at 0.05 level for Girls \((r=0.1081)\), Private \((r=0.1210)\) and Average Achievement \((r=0.1021)\) sub samples.

The relationship is not significant for High Achievement \((r=0.0814)\) and Low Achievement \((r=0.1031)\) sub samples.

2. The relationship between Verbal Scientific Creativity and Home Environment is positive and significant at 0.01 level for Total sample \((r=0.2080)\), Boys \((r=0.2132)\), Girls \((r=0.2191)\), and Rural \((r=0.2322)\), Urban \((r=0.2085)\), Government \((r=0.2100)\), Private \((r=0.2084)\), High Achievement \((r=0.1883)\), Average Achievement \((r=0.2115)\) and Low Achievement \((r=0.2121)\) sub samples.

3. The relationship between Non Verbal Scientific Creativity and Home Environment is positive and significant at 0.01 level for Total sample \((r=0.2012)\), Boys \((r=0.1985)\), Girls \((r=0.2121)\), Rural \((r=0.1873)\), Urban
(r=0.177), Government (r=0.2100), Private (r=0.1985) and High Achievement (r=0.1735) sub samples.

The relationship is positive and significant at 0.05 level for Average Achievement (r=0.1235) and Low Achievement (r=0.1105) sub samples.

VI. Relationship between Achievement Motivation and Home Environment

The relationship between Achievement Motivation and Home Environment is positive but not significant for Total sample (r=0.0765), Boys (r=0.0428), Girls (r=0.0819), Urban (r=0.0523), High Achievement (r=0.1018), Average Achievement (r=0.0718) and Low Achievement (r=0.0983) sub samples.

The relationship is positive and significant at 0.05 level for Rural (r=0.0915), Government (r=0.0993) and Private (r=0.0812) sub samples.

5.2.2.2. Findings based on Multiple Correlations

1. The Multiple correlation coefficients obtained is positive and significant (R=0.66) for the Total sample.

2. Nearly 44% of variance of Achievement in Science can be attributed to differences in the predictor variables namely Intelligence, Scientific Creativity and Home Environment.

The relative influence of each independent variable to the variance of criterion variable, Achievement in Science is as follows.

12% is the contribution of Intelligence.

14% is the contribution of Scientific Creativity.
18% is the contribution of Home Environment.

This shows that Home Environment is the most influencing factor of Achievement in Science.

The remaining 56% of the variance of Achievement in Science can be attributed to variables not included in this study.

5.2.2.3. The Regression Equation

Considering Achievement in Science as the criterion variable ($X_1$) and Intelligence ($X_2$), Scientific Creativity ($X_3$) and Home Environment ($X_4$) as the predictor variables Multiple Regression Equation was found out as

$$X_1 = 0.02X_2 + 0.02X_3 + 0.03X_4 + 28.44$$

This equation helps us to predict Achievement in Science from known values of $X_2$ (Intelligence, $X_3$ (Scientific Creativity) and $X_4$ (Home Environment).

5.3 CONCLUSIONS

The major conclusions of the study drawn from the findings are given below.

1. The variables Intelligence, Scientific Creativity, and Home Environment clearly discriminated the High, Average and Low achievement groups. So these variables have significant association with Achievement in Science.

The correaltional studies indicate that Intelligence, Scientific Creativity, and Home Environment have close relationship with Achievement in Science.
Conclusions and Suggestions

2. Achievement Motivation do not discriminate the three achievement groups. Thus the High, Average and Low achievement groups do not differ significantly in their mean scores of Achievement Motivation.

The correlational studies show that there exist very low relationship between Achievement Motivation and Achievement in Science of Higher Secondary School Students.

3. The components of Intelligence namely, Verbal Intelligence and Non verbal Intelligence are equally important variables in discriminating the High, Average and Low achievement groups when taken in pairs. So Verbal Intelligence and Non verbal Intelligence are associated with Achievement in Science. The correlational studies confirm the high relationship of Achievement in Science with Verbal Intelligence and Non verbal Intelligence.

4. The components of Scientific Creativity namely, Verbal Scientific Creativity and Non verbal Scientific Creativity have similar effect in discriminating the High, Average and Low achievement groups. So Verbal Scientific Creativity and Non Verbal Scientific Creativity are associated with Achievement in Science.

The correlational studies imply that the relationship of Achievement in Science with Verbal Scientific Creativity and Non verbal Scientific Creativity is very high.

5. The components of Scientific Creativity namely, Fluency, Flexibility and Originality discriminated the High, Average and Low achievement groups
when taken in pairs. Among these variables Fluency discriminated the three groups more and Originality less. This shows that Fluency is the prime component of Scientific Creativity that influences the Achievement in Science.

The correlational studies show that Fluency, Flexibility and Originality have high relationship with Achievement in Science.

6. Intelligence and Scientific Creativity are closely related variables. The components of Intelligence namely, Verbal Intelligence and Non verbal Intelligence, and the components of Scientific Creativity namely, Fluency, Flexibility, Originality, Verbal Scientific Creativity and Non verbal Scientific Creativity are mutually related variables.

7. Achievement Motivation has a very low association with Intelligence whereas its influence on Scientific Creativity and Home Environment is negligible.

8. Home Environment has significant influence on Intelligence and Scientific Creativity. Conducive Home Environment will foster the Intelligence and Scientific Creativity of a learner.

9. From the known values of Intelligence, Scientific Creativity and Home Environment Achievement in Science can be predicted using the developed Regression Equation.

10. The combined effect of Intelligence, Scientific Creativity and Home Environment on Achievement in Science is very high and Home
Conclusions and Suggestions

Environment is the most influencing factor of Achievement in Science of Higher Secondary School Students.

5.4 TENABILITY OF HYPOTHESES

The study provides sufficient evidence to decide the validity of the hypotheses set for. An attempt has been made to examine the validity of the hypotheses.

1. Tenability of Hypothesis I

The three achievement groups (HA, AA and HL) differ significantly with respect to the selected independent variables for the total sample. The variable Achievement Motivation does not discriminate the three groups of a few sub samples. So Hypothesis I is mostly substantiated.

2. Tenability of Hypothesis II

When independent variables were correlated with each other, Achievement Motivation has negligible relationship with Scientific Creativity and Home Environment. All other independent variables have significant positive relationship with each other. So Hypothesis II is mostly substantiated.

3. Tenability of Hypothesis III

There is significant relationship between each of the independent variables and Achievement in Science for the total sample and sub samples except for two cases. So Hypothesis III is mostly substantiated.

4. Tenability of Hypothesis IV

Achievement in science can be predicted with the help of the Multiple Regression Equation developed. So Hypothesis IV is wholly substantiated.
5. **Tenability of Hypothesis V**

The multiple correlation coefficient obtained is significant. So Hypothesis V is wholly substantiated.

5.4 **IMPLICATIONS**

The study revealed the interactive effect among the variables Intelligence, Scientific Creativity, Achievement Motivation, Home Environment and Achievement in Science. Since all these variables are important, the present study indicates certain factors to be borne in mind while we train and nurture our children. The implications revealed by the study are given below.

5.4.1 **Implications for Teachers**

- Verbal Intelligence and Nonverbal Intelligence develop through reasoning, critical thinking and problem solving. So Science teaching must be aimed at the development of higher order thinking skills.

- Provide opportunities for children to express their ideas through verbal as well as nonverbal media.

- 'Create' should be taken as a major objective of Science Teaching.

- Promote divergent thinking and originality of ideas.

- Understanding the home environment of the learner is a pre requisite for effective teaching.

- Emotional stress is a major cause for cognitive decline and low achievement. So teachers must render comfortable emotional atmosphere for students.
Conclusions and Suggestions

- Establishing a cordial relationship with parents of students' and timely interactions with them may help students to cope with many difficulties. Help learners to set realistic goals and motivate them to achieve their goals.

- Use positive reinforcers for developing proper achievement behaviour.

- Promote Achievement Motivation by combining strong hope for success with low fear of failure.

- Proper guidance and counselling facilities can be provided to solve the problems and render help for the needy students.

5.4.2 Implications for Parents

- Encourage children's critical questioning and divergent thinking habits.

- Discuss daily life situations with children to help them to draw right conclusions and decisions.

- Develop awareness that examination result is not the only criteria for assessing children.

- Their creative potentialities are to be reinforced.

- Emotional support is the most important factor to be provided at home.

- Provide tension free and emotionally relaxed home atmosphere for children.

- Inculcate good values in children through proper interactions.

- Help children to face failures successfully.

- Develop positive attitude among children to boost their self concept.
- Harsh punishments, sarcastic comments and negative attitudes are to be avoided to develop good self-concept and achievement motivation.

5.4.3 Implications for Students

- Good reading skill, writing skill and vocabulary skills are to be developed for verbal intelligence and creative expression of ideas.
- Present imaginative ideas through verbal as well as nonverbal paths
- Think for novelty and originality.
- Elaborate and extend the thought process.
- Accept the home environment with all its limitations and try to overcome the deficiencies of the home environment.
- Set realistic goals and plan to achieve the goal.
- Motivation added with hard work is the key component of success in life.

5.5 SUGGESTIONS FOR FURTHER RESEARCH

On the basis of the findings of the present study, the investigator would like to suggest the following areas for further research.

(i) The present study was confined to the Verbal and Non verbal components of Intelligence. More comprehensive studies on the interaction of components of Multiple Intelligence with cognitive and affective variables may be conducted.

(ii) Scientific Creativity with a wider variety of creative measures like elaboration spontaneity etc., and its effect on Achievement may be studied
(iii) The Achievement in Science for Higher Secondary school students can be measured in terms of written tests as well as practical tests.

(iv) The effect of more number of cognitive, affective and social variables on performance of the students may be conducted.

(v) Replication of the study may be conducted in other subject areas also.

(vi) More studies related to the impact of Home Environment on Personality development and Achievement is to be conducted.