

STUDY OF ACHIEVEMENT IN PHYSICS, STUDY HABITS AND SELF CONCEPT AMONG SENIOR SECONDARY SCHOOL STUDENTS

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Abstract:

In Indian education system for senior secondary students of any board i.e., central, any university or any state board physics is a core subject. But besides being one of the most important subjects it remains one of the most difficult subjects at school curriculum. The difficulty of a subject may be due to several institutional, psychological, personal, familial, environmental or teacher related factors which effects a student's achievement in any subject. Among these factors, personal factors such as study habits and self-concept play a vital role and are great predictors of a student's achievement in any subject. As study habits include the habitual manners a student plans his study and self-concept is one's own perception about him-self, both could be good predictors of a student's achievement in subject physics as well. The present study is an attempt to study the relation of physics achievement with study habits and self-concept of senior secondary school students. A sample of 204 senior secondary school students comprising 100 boys and 104 girls was collected. Two standardized tools along with student's achievement in physics subject were used to collect data, and the results are analyzed by ANOVA and co-relational techniques.

Key Words: Achievement, Physics, Study Habits, Self Concept.

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Introduction:

In our present scientific civilization, the society is completely drawn into scientific environment and science has become an integral part of our life and living. It is preeminent nature of science that Kothari Education Commission (1964-1966) rests on deep conviction that the progress, welfare and security of the nation depend critically on a rapid, planned and sustained growth in the quality and extent of education and research in science and technology. National Policy on Education 1986 (as modified in 1992) also states that science education will be strengthened so as to develop in the child well defined abilities and values such as the spirit of enquiry, creativity, the courage to question, and an aesthetic sensibility. It further highlighted that for accelerating the growth of the national economy science education and research should receive high priority and therefore science and mathematics should be an integral part of general education till the end of the secondary stage.

Following these science is taught as compulsory subject up to high school level in India as well, but at senior secondary stage (10+2) science stream students have to make choice among three major groups i.e., PCM (Physics, Chemistry and Mathematics), PCB (Physics, Chemistry and Biology) or PCMB (Physics, Chemistry, Mathematics and Biology) groups in all of the states & central boards in India. Physics as branch of science occupies a core position, as the subject plays key role in progress of humankind also this subject generates fundamental knowledge needed for the future technological advances that will continue to drive the economic engines of the world. But besides being the core subject the subject physics is perceived to be a difficult course because of its abstract nature (Isola, 2010). Poor performance of students in physics as compared to other science subjects justifies its difficult nature. Assefa (2008) identified four major causes that lead to poor performance in physics namely: lack of interest, poor problem solving skills, poor understanding of the concept of physics, and lack of skill in practical work respectively Jegede(1992) stressed that a professionally qualified science teacher no matter how well trained, would unable to put his ideas into practice if the school setting lacks the equipment and materials necessary for him or her to translate his competence into reality. Onwioduokit (1996) attributed this to insufficient man power, equipment, poor attitude (technological) of students and poor understanding of the concepts due to their difficult nature. The findings of several studies

reported that male students were more successful than their female peers at learning physics (Kost 2007, Finkelstein 2009, Finkelstein 2010). The studies examining the relationship between achievement in physics and gender present findings demonstrating that factors such as student's age (Beaton et al. 1996; Meece 1994), attitude and interest towards physics (Riley 1993, Leary 1995, Farenga & Joyce, 1997; Rua 2000) and social and linguistic behavior (Benke et.al 2000) are pretty effective moderator variables regarding this relationship. Another student variable that is thought to correlate with achievement in physics is learning strategies (Mayer, 1986).

Oliver and Simpson (1988), in their study, investigated the influence of science academic self-concept on achievement and found that academic self-concept has a strong relationship with achievement in science. Ramaswamy(1990) found that proper study habits are very important for good achievement. Kalra(1996), Verma(1996), Baland (1999) and Onwuegbuzie (2001) all researches reported that there is a high correlation between study habits and academic achievement. Babara (2000) and Purkey (2000) stated that self-concept and self-confidence are required for a person to achieve success in all human endeavors especially in academic endeavors. Rehman (2001) conducted a study which indicated that self-concept is positively correlated with educational success. Chien (2008) found that students with higher academic self-concept tend to be more successful in learning activities. Stephen Utibeabasi (2011) investigated that physics students with higher self-concept achieved high in physics. Dupe (2013) revealed that academic self-concept is potent factor to be taken into account when explaining student's achievement in physics. Emmanuel (2014) found that study habit, attitude to and interest of students in Physics are better predictors of students' performance in Physics.

The review of the above mentioned researches indicates that academic achievement in general and physics achievement in particular depends upon a number of factors. It is highly indispensable to study the factors and their influence on physics achievement. In order to fill the gap the present study is designed to analyze the influence of two important personal factors i.e., study habits and self-concept on the achievement in physics of senior secondary school students.

Objectives of the Study:

The present study was taken up with following objectives;

- a. To find the extent of relationship between dependent variable (achievement in physics) and independent variables (study habits and self-concept) for the total sample, total male and total female samples.
- b. To compare the physics achievement, self-concept and study habits of male and female students of senior secondary schools.
- c. To analyze the influence of study habits on achievement in physics for total sample.
- d. To analyze the influence of self-concept on achievement in physics of total sample.

Hypotheses of the Study:

The following null hypotheses were formulated keeping in view the objectives framed;

- a. There would be no significant relationship between achievement in physics and study habits and self-concept for total sample, total male and total female samples.
- b. There would be no significant difference in between male and female samples on the measure of physics achievement, self-concept and study habits.
- c. There would be no significant difference between the excellent, average and poor study habits groups for total sample in relation to achievement in physics.
- d. There would be no significant difference between the high, average and low self-concept groups for total sample in regard to achievement in physics.

Material and Methods:

- Sample: A random sample of 204 students was taken from the five secondary schools of Aligarh.
- Tools Utilised:
 - i. Study Habit inventory developed by B.V. Patel, the test is based on seven major areas of study habits i.e., home environment and planning of work, reading and note taking, planning of subject, habits of concentration, preparation for examination, general habits and attitudes, school environment. The reliability of this test is established by test-retest method and split-half method, are reported to be 0.79 and 0.82 respectively and the validity was 0.50.
 - ii. Self-Concept questionnaire developed by Dr Raj Kumar Saraswat, it possesses six separate dimensions of self-concept i.e., physical, social, intellectual, moral, educational and

temperamental self-concept. The reliability of the inventory was found to be 0.91 by test-retest method, the validity of the inventory was established by the opinions of the experts.

- The marks obtained by the students in subject physics were considered as the achievement in physics.
- Statistical techniques used: The main statistical techniques used were bivariate correlation, ANOVA, and t-test. The data was analysed with the help of SPSS to get results.

Analysis and Interpretation of Results:

Table1: Correlation matrix of dependent and independent variables for total sample total male and total female sample groups.

Independent Variables	Dependent Variable: Achievement in Physics		
	Total Sample	Male Sample	Female Sample
Study Habits	N= 204	N=100	N=104
	0.378**	0.406**	0.274**
Self-Concept	N=204	N=100	N=104
	0.582**	0.540**	0.497**

** Correlations are significant at 0.01 level of significance.

Table1 reveals that the correlation coefficients of study habits and self-concept with the achievement in physics for total sample, total male and total female samples are significant at 0.01 level of confidence. This indicates that there exists a positive correlation between both study habits & self-concept and physics achievement of the students. These findings are in line with the studies by Dupe (2013) and Samuel et.al. (2014) who founded that physics achievement is positively correlated with study habits and self-concept. Thus, hypothesis H_{01} is rejected.

Table2: Comparison between male & female sample mean scores on measure of achievement in physics, study habits and self-concept.

Variables	Group	N	Mean	S.D.	t	Remarks
Achievement in Physics	Male	100	79.57	12.978	6.549	Significant at 0.01 level
	Female	104	68.20	11.804		
Study Habits	Male	100	168.92	12.876	2.874	Significant at 0.01 level

	Female	104	163.09	15.896		
Self-Concept	Male	100	181.28	17.302	4.916	Significant at 0.01 level
	Female	104	169.42	17.140		

Table 2 signifies that the t- values for male and female samples on the measure of achievement in physics, study habits and self-concept are statistically significant at 0.01 level of confidence. It indicates the significant difference between male and female samples on the measure of these three variables. Furthermore the mean scores of male sample on measure of all three variables are greater than the mean scores of the female sample, thus evincing that male senior secondary school physics students are superior to their female counterparts in achievement in physics, study habits and self-concept. This may be due to the fact that male students are better able to perceive the concepts, theory and practice of the subject. It might also be the fact that females have lack of enthusiasm and thus absorption in the subject is low. The results are thus in alignment to the study of Misra (2005), by Hoffman (2002) and by Madine Baran & Kadir Maskan (2011) but in negation to study of Blummer & Richards (1997) and by Baland (1999). Thus, hypothesis H_{02} is also rejected.

Table3: Comparison of excellent, average and poor study habits groups of the total sample on measure of physics achievement.

Excellent Study Habits (N=47)		Average Study Habits (N= 110)		Poor Study Habits (N= 47)		F- value	Remarks
Mean	S.D.	Mean	S.D.	Mean	S.D.		
78.87	13.220	75.23	12.552	65.28	12.814	14.869	Significant at 0.01 Level.

The table 3 reveals that the computed F-ratio (14.896) between excellent, average and poor study habits groups with respect to the achievement in physics is statistically significant at 0.01 level of confidence, which indicates that there exists a significant difference between these study habits groups on the measure of achievement in physics.

In order to find out the actual difference between the groups under investigation t-test was used. And the results are presented below.

Table4: t- value comparison of excellent, average and poor study habits of the total sample on the measure of achievement in physics:

Groups	Excellent Study Habits	Average Study Habits	Poor Study Habits
Excellent Study Habits	–	1.640	5.063**
Average Study Habits		–	4.521**

** Significant at both 0.01 level.

Further Table4 presents that the calculated t-value (1.640) for the excellent & average study habits on measures of achievement in physics is insignificant, which proclaims that there exists no significant difference between excellent and average study habits on measure of achievement in physics. This finding is in contradiction to the study done by Sarode (1995). However for the excellent & poor and for average & poor study habits the calculated t-values (5.063, 4.521 respectively) are significant at 0.01 level of significance, thus divulging that there exists a significant difference between these groups on the measure of achievement in physics. So the hypothesis H_{03} is partially rejected.

Table5: Comparison of high, average and low self-concept groups of the total sample on the measure of achievement in physics.

High Self Concept N=47		Average Self Concept N= 110		Low Self Concept N= 47		F- value	Remarks
Mean	S.D.	Mean	S.D.	Mean	S.D.	36.199	Significant at 0.01 level.
84.6	9.929	73.3	11.942	64.06	12.831		

It is noticeable from table 5 that the computed F-ratio (36.199) between high, average and low self-concept groups with respect to the achievement in physics is statistically significant at 0.01 level, which reveals a significant difference between the high, average and low self-concept on

the measures of achievement in Physics. The findings are in harmony with the findings of the studies done by Darlene(1995), and Parkins (2005).

In order to find out the actual difference between the groups under investigation t-test was used. And the results are presented below.

Table6: t- value comparison of high, average and low self-concept of the total sample on the measure of achievement in physics:

Groups	High Self Concept	Average Self Concept	Low Self Concept
High Self Concept	–	5.695**	8.676**
Average Self Concept		–	4.340**

** Significant at 0.01 level.

Table6 presents that the calculated t-values for the high & average, high & low and average & low self-concept on measures of achievement in physics are all significant at 0.01 level, divulging that there exists a significant difference between all the groups of self-concept on measure of physics achievement. And these findings are in congruence with the study done by Moller & Pohlmann (2010). Thus the hypothesis H_{04} is not accepted.

Conclusions and Suggestions:

The present study clearly connotes that physics achievement is positively correlated with the study habits and self-concepts i.e. better the study habits and self-concept higher will be the achievement in physics. This study highlights the fact that study habits and self-concept factors of the learner need special assiduity. Thus, effective strides should be taken to escalate the interest and achievement of students in the subject physics.

- In this study male students speculate high attainment in subject physics than female students thus, remedial classes, special classes & lectures need to be organized to iron out the complications for physics students in general and physics female students in particular.

- As good study habits are an influential aspect which clouds the academic achievement in general and physics achievement in particular. Thus, cooperative and constructive efforts should be taken by the school, principal, parents and guidance committee to develop sound study habits among the students.
- Constructive steps should be taken to increase the self-concept of the students, especially the academic self of the individual. Awareness about self is the basic goal of education. Strength of the students must be known to the students, this lead to develop better self-concept. It should be the joint effort of the teacher, parent and guidance workers to help the child to develop a good self-concept by providing psychological safe and encouraging environment. Proper arrangement of conferences, individual & group counselling, motivational lectures by experts, provision of co-curricular activities etc. should be organized by the school to develop a good self-concept among the students.
- Counselling of the parents is equally essential to guide them about the importance of study habits in achieving higher grades in physics, and to know about the importance of home environment in building positive self-concept of the students.
- It is highly essential that over all school environments must be democratic and sensitive to the needs, interests and aspirations of the students.
- Science museum, science fairs, science quizzes and other such activities with their special focus on subject physics should be organized on regular basis in order to develop curiosity in the subject and to have a positive attitude towards the subject physics.
- Orientation courses for the physics teachers to understand the new techniques and tactics to teach the physics in order to intensify their concern towards the subject and finally helping so they achieve up to potential in all the subjects including physics.

References:

1. Assefa B., 2008, Action research on enhancing academic excellence in a study program, Ethiopian Journal of Education and Sciences, 3, pp. 71-80. <http://dx.doi.org/10.4314/ejesc.v3i2.42008>
2. Baland D., 1999, An investigation into study habits, reading interest, attitude towards teaching and their bearing upon achievement of the pre-service teachers, Ph.D. Thesis in Education, M.D. University.

3. Baran. M., and Maskan K, 2011, A study of relationship between academic self-concept: Some selected variables and physics course achievement, *International Journal of Education*, 3(1), ISSN 1948-5476.
4. Barbara A., 2000, Self-concept among secondary school pupils, *Journal of Educational Research*, 17(1), pp. 41 – 46.
5. Beaton A.E., et al., 1996, Science achievement in the middle school years: IEA's third international TIMSS. Chestnut Hill, MA: Boston College.
6. Benke G., et al., 2000, Do boys and girls understand physics differently? , *Physics Education*, 35(6), pp. 417–422.
7. Blummer. H., and Richard C.H, 1997, Study habits and academic achievement of engineering students, *Journal of Engineering Education*, 29, p. 125.
8. Chien. C.L., and Jen T. H, 2008, The influences of the academic self-concept on academic achievement: From a perspective of learning motivation (Draft), *The Proceedings of IRC*. pp. 1-8.
9. Darlene G., 1997, The relationship among academic self-concept, academic achievement, and persistence with self-attribution, study habits, and perceived school environment, Ph.D. Education, Purdue University.
10. Dupe. and Oludipe B, 2013, Predicting student's achievement in physics using academic self-concept and locus of control scale scores, *International Journal Social Science and Education*, 3(4), p. 1149.
11. Education and National Development: Report of the Education Commission, 1964-66 (Kothari Commission). NCERT. 1971.
12. Emmanuel A.O., 2014, Achievement motivation, academic self-concept and academic achievement among high school students, *European Journal of Research and Reflection in Educational Sciences*, 2(2), ISSN 2056-5852.
13. Finkelstein N. D., et al., 2009, Characterizing the gender gap in introductory physics, *Physical Review Special Topics-Physics Education Research*, 5(1), 010101.
14. Finkelstein N. D., et al., 2010, Gender disparities in second-semester college physics: The incremental effects of a smog of bias, *Physical Review Special Topics - Physics Education Research*, 6(2), 020112.

15. Haussler and Hoffmann 2002, An intervening study to enhance girl's interest and self-concept and achievement in physics, *Journal of Research in Science Teaching*, 39(9), pp. 870-888.
16. Isola O.M., 2010, Affects of standardized and improvised instructional materials student's academic achievements in secondary school physics. M. Ed Thesis, of Ibadan, Ibadan.
17. Jegede O.J., et al., 1992, Assessments of the learning environment of Nigerian science laboratory classes, *Journal of the Science Teachers Association of Nigeria*, 27, pp. 1-17.
18. Joyce. B.A., and Farenga S.J, 1997, What children bring to the classroom: Learning science from experience. *School Science and Mathematics*, 97, pp. 248-252.
19. Kalra. R., and Pyari A, 1996, A comparison of study habits of the students belonging to the different streams, *Experiments in Education*, 9, pp. 136-141.
20. Kost., et al., 2007, Reducing the gender gap in the physics classroom: How sufficient is interactive engagement, *Physical Review Special Topics - Physics Education Research*, 3 (1), 010107.
21. Leary. R., and Baker D, 1995, Letting girls speak out about science, *Journal of Research in Science Teaching*, 32, pp. 3-27.
22. Mayer. R. E., and Weinstein C. E, 1986, The teaching of learning strategies in M.C. Wittrock (Ed.) *Handbook of research on teaching*, MacMillan, New York, pp. 315-327.
23. Meece. J., and Kahle J.B, 1994, Research on Gender Issue in the Classroom in D. L. Gabel (Ed). *Handbook of Research on Science Teaching and Learning*, Macmillan, New York, USA, pp. 542-558.
24. Misra M., 2005, Factors related to achievement in physics with special reference to secondary school students in the city of Lucknow, Ph.D. thesis, Education, Kanpur University.
25. Oliver. J. S., and Simpson S. D, 1988, Influences of attitude toward science, achievement motivation and science self-concept on achievement in science: A longitudinal study. *Science Education*, 72 (2), pp. 143-155.
26. Onwioduokit F. A., 1996, Difficult concepts in physics as experienced by senior secondary students in Akwa Ibom state, Nigeria, *Journal of Research Information*, 1 (1), pp. 19-28.
27. Onwuegbuzie. A. J., et al., 2001, The role of study skills in graduate level educational research courses, *Journal of Educational Research*, 94(4), pp. 238-246.

28. Parkins E. J., et al., 2005, A longitudinal study of student's academic self-concept in a streamed settings : The Singapore context, *British Journal of Educational Psychology*, 75, pp. 567-586. doi:10.1348/100709905X42239.
29. Patel B.V., (1975) *Manual Habits Inventory*, National Psychological Corporation, Agra.
30. Purkey., 2000, *Self-concept and school achievement*, Englewood Cliffs, New Jersey, Prentice-Hall.
31. Ramaswamy R., 1990, Study habits and academic achievements, *Experiments in Education*, 18(10), pp. 255-260.
32. Rehman A., 2001, A study of relationship of self-concept with classroom environment, gender role, cognitive development and academic achievement of the students at secondary school level, Ph.D. Thesis, Allama Iqbal Open University, Islamabad.
33. Riley D., et al., 1993, Gender differences in science education: Building a model. *Educational Psychologist*, 28(4), pp. 379-404.
34. Rua M.J., et al., 2000, Gender differences in student's experiences, interest, and attitudes toward science and scientist, *Science Education*, 84, pp. 180-192.
35. Saraswat R.K., 1984, *Manual for Self Concept questionnaire*, National Psychological Corporation, Agra.
36. Sarode V.B., 1995 A study of impact of SES, study habits, and achievement motivation on academic achievement of higher secondary students of rural areas, Ph.D. Education, Pune University.
37. Samuel A., et.al. 2014, Student's variables as predictor of secondary school students' performance in physics, *International Journal of Scientific and Research Publications*, 4(8), ISSN 2250-3153.
38. Utibeabasi S., 2011, Self-concept and secondary school student's academic achievement in physics, *African Research Review: An International Multi-Disciplinary Journal*, Ethiopia, 5(1), pp. 365-371.
39. Verma B.P., 1996, Test anxiety and study habits: A study of main and interaction effects on academic Achievement, *Indian Journal of Applied Psychology*, 33(2), pp. 55-61.