

Academic Achievement and Reasoning Ability of Senior Secondary School Students in Relation to Their Gender, Social Category and Stream of Study

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Abstract:

The study examined the academic achievement and reasoning ability of senior secondary school students in relation to gender, social category and stream of study. A sample of 300 students of class 10+1 (150 males, 150 females) from different government (10) senior secondary school of Shimla district (Himachal Pradesh, India) affiliated to H.P.S.E.B. Dharamshala were taken. Scores in final examination (10th) was taken as academic achievement of the students. Reasoning Ability Test (RAT) developed by L.N. Dubey was used for data collection. Results of analysis of variance revealed that there were no significant difference and interaction between gender and social category but stream of study differed significantly in relation to academic achievement. Students studying in different streams of study differ significantly in their reasoning ability. The result of studies also indicated that there is a significant relationship between academic achievement and reasoning ability of sr. sec. school students. It is found that the student whose academic achievement is high had high reasoning ability scores.

Keywords: Academic achievement, Reasoning Ability, senior secondary school students

I. INTRODUCTION

Education is a lifelong process, which starts right from cradle and goes on throughout life. Adequate education and knowledge not only hold strongly an individual in home or in society as a whole, but supply strength to retain that position against any or many hurdles of life.

One of the chief objectives of education is to enhance the academic achievement of the students and to enlarge their vision as well as perception. The students' achievement refers to the degree of level of success attained in some specific or general area concerning scholastic or academic work. Academic achievement is the core of the wider term 'Educational growth' which implies growth in all school subjects. Academic achievement refers to the attained ability or degree of competency in the school tasks usually measured by standardized tests and expressed in grades or based on norms derived from a wide sampling of pupil's performance. Achievement is the end product of learning and its level and performance are affected by psychological conditions like intelligence, mental health and reasoning ability etc.

Man's life is an endless stream of problems and situations for which he has no readymade solutions. Reasoning is a productive thinking in which previous experiences are recognized or combined in new ways to solve a problem. Reasoning is then a tool for problem solving and at same time is a form of learning. Reasoning ability is the valuable mental activity which helps to solve the problems pertaining to any field of education. Reasoning plays a significant role in one's adjustment to one's environment. It controls not only one's cognitive activities but may also influence the total behaviour and personality by the proper or improper development of one's reasoning ability. Reasoning must be defined as something manifested in behaviour rather than as a kind of conscious process having an association between a certain classes of responses. Reasoning is a process of controlled

thinking, an association which starts with some problem of interest to the reasoner and is directed towards its solution. More and more exercises in problem solving will develop a child's reasoning ability. If a child starts taking interest in problem solving he will develop self-confidence and thus he may improve his reasoning ability.

Academic achievement and reasoning ability have an unavoidable relationship. Research findings have revealed reasoning ability as one of the factor that affects achievement. Maximum studies have associated high reasoning ability with high academic achievement. Reasoning ability positively affects academic achievement of an individual.

II. OBJECTIVES OF THE STUDY

1. To study the differences in academic achievement of Sr. Sec. School students in relation to gender, social category, stream of study, and interactional effects between them.
2. To study the differences in reasoning ability of Sr. Sec. School students in relation to gender, social category, stream of study, and interactional effects between them.
3. To study the relationship between academic achievement and reasoning ability of sr. sec. school students.

III. SAMPLE

In the present study, the investigator has selected a representative sample of 300 students of both genders (150 SC & 150 Non SC) studying in +1 class of Shimla Districts of Himachal Pradesh by adopting random sampling technique.

IV. TOOL USED

For collecting data scores in final examination (10th) was

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taken as academic achievement of the students. Reasoning Ability Test (RAT) developed by L.N. Dubey was also used

V. RESEARCH DESIGN

In the present study 2x2x3 factorial design consisting of two levels of gender i.e. male and female, two levels of social category i.e. Scheduled Caste and Non Scheduled Caste and three levels of Stream of study i.e. Arts, Science and commerce were used.

VI. RESULT AND DISCUSSION

Academic achievement of senior secondary school students in relation to gender, social category and stream of study

The means of academic achievement scores of students are given in table 1 below

Table 1: Means of Academic Achievement Scores of Students In Relation to their Gender, Social Category and Stream of Study

Social Category	Gender	Arts	Science	Commerce	Mean
SC	Male	390.52	468.76	420.16	426.48
	Female	380.76	469.32	428.60	426.20
Non-SC	Male	392.96	467.84	397.40	419.40
	Female	403.68	472.68	425.36	433.90
	Mean	391.98	469.65	417.88	426.55

From the means of academic achievement scores 'F' values were calculated. The result analyses are given in table 2 below

Table 2: The Complete Summary of Analysis of Variance for Academic Achievement

Sr. No	Source of variation	Sum of squares	df	Mean squares Variance	F-ratio
1.	Gender	3809.203	1	3809.203	1.491
2.	Social category	6.750	1	6.750	0.003
3.	Stream of study	312785.727	2	156392.863	61.2**
4.	Gender X Stream	4659.807	2	2329.903	0.912
5.	Gender X Social category	4084.830	1	4084.830	1.599
6.	Stream of study x Social category	8275.020	2	4137.510	1.620
7.	Gender X social category X Stream of study	1032.540	2	516.270	0.202
8.	Error variance	735601.120	288	2554.171	
9.	Total	1070254.997	299		

** significant at 0.01 level

VII. MAIN EFFECTS

(A) Gender

The obtained value of 'F' for the main effect of gender on academic achievement of students irrespective of their social category and stream of study for df 1 and 288, came out to be 1.49, which is much below than the table value even at 0.05 level of significance. However, from the means score table 1, it is evident that girls have higher means of academic achievement scores (430.06) than boys (422.94) but this difference is not significant statistically.

(B) Social Category

The calculated value of 'F' for the main effect of social category on the academic achievement of students irrespective of their gender and stream of study for df 1 and 288, came out to be 0.002, which is less than the table value even at 0.05 level of significance. However, from the means score table it is evident from table 1 that Non Scheduled caste students have higher means of academic achievement scores (853.30) than Scheduled caste (852.68) but the difference is not significant statistically.

(C) Stream of Study

The calculated value of 'F' for the main effect of stream of study irrespective of their gender and social category for df 1 and 288, came out to be 61.0, which is higher than the table value even at 0.05 level of significance. It may be interpreted that students studying in different stream of study differ significantly in their academic achievement. The comparisons in the academic achievement scores of students studying in different streams of study were made by making use of 't' test. The results are given in table 3 below:

Table 3: Means, SDs and 't' Value for Comparing Academic Achievement of Students Study in Different Stream of Study

Sr. No.	Stream of Study	Number	Mean	SD	M.D	S.E.D	df	't' value
1.	Arts (A)	100	391.98	51.81	77.67 (A-B)	7.25	198	10.7**
2.	Science (B)	100	469.65	50.78	51.77 (B-C)	7.40	198	7.40**
3.	Commerce(C)	100	417.88	48.07	25.9 (A-C)	7.06	198	3.66**

From table 3 it can be interpreted that, 't' value for comparing the academic achievement of sr. sec. Students studying in arts and science streams came out to be 10.7, which is significant at 0.01 level of significance for 1/198 df. From this it is interpreted that students studying in science stream had significantly higher mean of academic achievement scores(469.65) than the students studying in arts stream(391.98).

The obtained value of 't' value for comparing the academic achievement of sr. sec. Students studying in science and commerce streams came out to be 6.9, which is significant at 0.01 level of significance for 1/198 df. From this, it is interpreted that students studying in science stream had significantly higher academic achievement scores (469.65) than their counterparts studying in commerce stream (417.88).

The computed value of, 't' for comparing the academic achievement of sr. sec. Students studying arts and commerce streams came out to be 7.06, which is significant at 0.01 level of significance for 1/198 df. From this it is interpreted that Students studying in commerce stream had significantly higher mean of academic achievement scores(417.88) than the students studying in arts stream(391.98).

VIII. INTERACTIONAL EFFECTS

There is no double and triple interactional effect of gender, social category and stream of study with regard to academic achievement of students.

IX. REASONING ABILITY OF SENIOR SECONDARY SCHOOL STUDENTS IN RELATION TO GENDER, SOCIAL CATEGORY AND STREAM OF STUDY

Table 4: Means of Reasoning Ability Scores of Students in Relation to their Gender, Social Category and Stream of Study

Social Category	Gender	Arts	Science	Commerce	Mean
	Male	47.6	54.12	56.32	52.68
SC	Female	45.72	53.60	53.64	50.98
	Male	48.80	52.00	48.00	49.60
NON SC	Female	47.68	55.72	52.44	51.94
	Mean	47.45	53.86	52.60	51.30

From the means of reasoning ability scores 'F' values were calculated. The result analyses are given in table 5 below:

Table 5: The Complete Summary of Analysis of Variance for Reasoning Ability

Sr. No	Source of Variation	Sum of Squares	df	Mean Squares Variance	F-Ratio
1.	Gender	8.003	1	8.003	0.048
2.	Social category	84.270	1	84.270	0.507
3.	Stream of study	2306.607	2	1153.303	6.94 **
4.	Gender X Stream of study	131.607	2	65.803	0.396
5.	Stream of study X Social category	544.580	2	272.290	1.639
6.	Gender x Social category	306.030	1	306.030	1.842
7.	Gender X stream of study X social category	126.780	2	63.390	0.382
8.	Error variance	47835.520	288		
9.	Total	51343.397	299		

** significant at 0.01 level

X. MAIN EFFECTS

(A) Gender

F value for gender on the reasoning ability of students, came out to be .048, which is much below than the table value even at .05 level of significance. However, from the means score table 4, it is evident that girls have higher means of reasoning ability scores (102.92) than boys (102.28) but the difference is not significant statistically.

(B) Social Category

F value for social category on the reasoning ability of students for df 1 and 288, came out to be 0.507, which is not significant. However, from the means score table 4 it is evident that Scheduled caste students have higher means of reasoning ability scores (103.66) than non Scheduled caste (101.54) but this difference is not significant statistically.

(C) Stream of Study

F value for stream of study on the reasoning ability of students for df 2 and 288, came out to be 6.944, which is significant. So, students studying in different streams differ significantly in their reasoning ability. The comparisons in the reasoning ability scores of students studying in different stream were made by making use of 't' test. The results are given in table 6 below:

Table 6: Means, SDs and 't' Values for Comparing Reasoning Ability of Students Studying in Different Stream of Study

Students studying in arts and science streams came out to be 3.40 which are significant at 0.01 level of significance for

Sr. No	Streams	Number	Mean	SD	M.D	S.E.D	Df	't' value
1.	Arts (A)	100	47.45	13.83	6.41 (A-B)	1.88	198	3.40**
2.	Science(B)	100	53.86	12.85	1.26 (B-C)	1.72	198	0.73
3.	Commerce (C)	100	52.60	11.55	5.15 (A-C)	1.8	198	2.86**

1/198 df. From this it may be interpreted that mean of reasoning ability scores of sr. sec school students studying in science stream(53.86) was significantly higher than the students studying in arts stream(47.45).

However, from the means table 6 it is evident that students studying in science stream had higher mean of reasoning ability scores(53.86) than the students studying in commerce stream(52.60) but this difference is not significant statistically. Students studying in arts and commerce streams came out to be 2.86, which is significant at 0.01 level of significance for 1/198 df. From this it is interpreted that means of reasoning ability scores of sr. sec school students studying in commerce stream(52.60) was significantly higher than their counterparts studying in arts stream(47.45).

XI. INTERACTIONAL EFFECTS

There is no double and triple interactional effect of gender, social category and stream of study with regard to reasoning ability of students.

XII. RELATIONSHIP BETWEEN REASONING ABILITY AND ACADEMIC ACHIEVEMENT

As one of the objective of the study was to finding out the relationship between academic achievement and reasoning ability of Sr. Sec. School Students.

Table 7: Product Moment Coefficient of Correlation between Academic Achievement and Reasoning Ability of Sr. Sec. School Students

Group	N	df	r	Remarks
Academic Achievement	300	298	0.41	Significant at 0.01
Reasoning Ability	300			

Table 7 depicts that the calculated value of product moment coefficient of correlation between academic achievement and reasoning ability of sr. sec students came out to be 0.41, which is significant at 0.01 level of significance. Hence it may be interpreted that academic achievement and reasoning ability are significantly positively related to each other. It indicates that higher the reasoning ability of students, higher will be their academic achievement.

XIII. CONCLUSIONS

On the basis of the analysis of data and interpretation of results the investigator arrived at the following conclusions:

1. Male and female students do not differ significantly in their academic achievement.
2. Students belonging to different social categories do not differ significantly in their academic achievement. However, non scheduled caste students had higher mean of academic achievement scores than scheduled caste students but the difference is not significant statistically.
3. Students studying in different stream of study differ significantly in their academic achievement. Students studying in science stream had significantly higher mean of academic achievement scores than the students studying in arts and commerce streams. The students studying in commerce streams had significantly higher mean of academic achievement scores than the students studying in arts streams.
4. There is no significant double triple interactional effect of gender, social category and stream of study on academic achievement of students.
5. Students studying in different streams of study differ significantly in their reasoning ability. Students studying in science stream had significantly higher mean of reasoning ability scores than the students studying in arts streams. The students studying in commerce streams had not differed significantly with respect to science stream.
6. There is significant relationship between academic achievement and reasoning ability of Senior Secondary School Students. It indicates that higher the reasoning ability of students, higher will be their academic achievement.

XIV. EDUCATIONAL IMPLICATIONS

Every piece of scientific research in education is likely to contribute towards theory building or improvement of existing practices.

1. Senior Secondary School male and female students do not differ significantly in their academic achievement and reasoning ability scores. This is a healthy trend and reveals the fact that both male and female students are getting sufficient and equal educational facilities. It shows that parents and teachers have started providing equal opportunities and facilities for both boys and girls.
2. Senior Secondary students belonging to different social categories do not differ significantly in their academic achievement and reasoning ability scores. This is a healthy and positive trend that the programme of the govt. for the upliftments of socially deprived categories has started bearing fruits in terms of raising achievement level

as well as reasoning ability of the students of these categories.

3. Students belonging to science stream of study had significantly higher mean of academic achievement and reasoning ability scores than their counterpart's studying in arts and commerce stream. It means student having higher academic achievement opt for science stream, students having lower academic achievement opt for arts stream and students having average academic achievement opt for commerce stream.
4. The result of studies also indicated that there is a significant relationship between academic achievement and reasoning ability of sr. sec. school students. It is found that the student whose academic achievement is high had high reasoning ability scores. Teachers and parents should be more attentive for the proper development of children. They should provide proper guidance to the students mainly in adolescence age to develop good academic career. Since reasoning ability emerged as the determiner of the academic achievement, the curriculum designers could take note of these findings that content areas should also cover reasoning components adequately.

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