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ANALYSIS OF STUDENTS' SELF-ESTEEM AND PHYSICS ACHIEVEMENT OF STUDENTS IN HIGHER SECONDARY SCHOOLS IN PURBA BARDHAMAN

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Abstract

Self-esteem is the cognitive and affective perception an individual has about one self's worth. Self-esteem is one of the influential factors that affect students' academic achievement. Physics achievement is important aspect for academic achievement of the higher secondary science students. Researchers have selected 200 higher secondary student who are studying physics subject from Govt.-aided and private institutions in Purba Bardhaman district through simple random sampling technique. The study reveals a strong relationship between self-esteem and physics achievement. Further, it may be concluded that both the variables are influenced by gender but these are not influenced by type of institutions. This study may be helpful in suggesting self-esteem building courses for physics students of higher secondary level.

Keywords: *Self-esteem, Physics Achievement, Higher Secondary Student, Purba Bardhaman*

Introduction

Self-esteem is one of the influential factors that affect students' academic achievement (Farhan & Khan, 2015) which has received increasing attention. According to Murphy, Stosny, and Morrel (2005), self-esteem can be seen of as a tool for measuring one's own worth because it involves both emotive experiences of the self and cognitive assessments of one's own general worth. Self-esteem is the cognitive and affective perception an individual has about oneself's worth.

Rosenberg self-esteem scale (1965) is the most popular instrument used in determining the state of an individual's self-esteem. The scale assumes that the respondent's self-esteem increases as their score increases. The scale has been revalidated in 2023 (Kerriche, 2023).

Review of Related Literature

Self-esteem is an important factor for academic achievement (Alves-Martins et.al., 2002). Studies have identified self-esteem as an important determinant of emotional maturity (Sutradhar, 2019). El-Anzi, (2005) have found a significant positive correlation between academic achievement and both optimism and self-esteem – whereas the correlations were negative between academic achievement and both anxiety and pessimism. Naderi et. al., (2009) have studied on 153 participants and found no relationship between self-esteem and academic achievement. Yang et. al., (2019) have studied academic achievement, self-esteem, and subjective well-being in school among elementary school students and found positive co-relations. Häussler and Hoffmann (2000) shows that students' interest in physics as a school subject is hardly related to their interest in physics, but mainly to the students' self-esteem of being good achievers. Topçu and Leana-Taşcılar (2018) have revealed a significant correlation between self-esteem, motivation and achievement among Turkish gifted students. Gafoor (2010) have suggested anarchic style has

negative influence on short-term and long-term achievements of girls and long-term achievement of boys. Oladejo et. al., (2011) have concluded that the utilization of improvised instructional materials promotes and enhance effective teaching-learning process, thus, Physics teachers should be encouraged to use them in secondary education programme. Gungor, Eryılmaz and Fakıoglu (2007) proposed to pay attention to the students' achievement motivation in physics if the aim is to increase students' physics achievement. Lawrenz et. al., (2009) have shown that the physics achievement gap was narrowed between boys and girls and between students with different attitudes toward physics.

Purpose of the Study

The purpose of the study was to investigate students' self-esteem and achievement in physics in higher secondary schools in Purba Bardhaman with respect to gender and type of institutions.

Hypotheses

H_{01}: There is no significant relationship between self-esteem and students' physics achievement in higher secondary schools in Purba Bardhaman.
H_{02}: There is no significant difference of self-esteem between male and female students in higher secondary schools in Purba Bardhaman.
H_{03}: There is no significant difference of students' physics achievement between male and female students in higher secondary schools in Purba Bardhaman.
H_{04}: There is no significant difference of self-esteem between students in higher secondary govt.-aided and private schools in Purba Bardhaman.
H_{05}: There is no significant difference of students' physics achievement between students in higher secondary govt.-aided and private schools in Purba Bardhaman.

Methodology: The study was carried out in Purba Bardhaman. Purba Bardhaman is one of the twenty-three districts of West Bengal State. There are many private and public higher secondary schools operating within different boards. The study adopted ex post facto design. This design was used because the population of the study was all higher secondary science students in Purba Bardhaman district.

Sampling of the study was done using simple random sampling techniques. Five public secondary schools were randomly selected and a lottery method was used to randomly select ten Physics students in each of the five higher secondary schools. Thus, the total sample size was 200. Among the fifty samples, 120 were males while 80 were females. There were two instruments used for this study:

Physics Achievement Test (PAT): This test comprises 36 multiple choice questions which cover Physics subject. Each of the test questions carries one (1) mark for correct answer out of five options. Total time is 40 minutes (Physics Achievement Test, 1966).

Rosenberg Self-esteem Scale: This is a standardized questionnaire commonly used to measure self-esteem. A 10-item scale that measures global self-worth by measuring both positive and negative feelings about the self. The scale is believed to be unidimensional. All items are answered using a 4-point Likert scale format ranging from strongly agree to strongly disagree. It is a 10-item scale that measures global self-worth by measuring both positive and negative feelings about the self. The scale is believed to be unidimensional. All items are answered using a 4-point Likert scale format ranging from strongly agree to strongly disagree (Rosenberg, 1965).

Result and Discussion
From the collected data we can find the following:

Table 1: Descriptive Statistics for self-esteem and physics achievement.

	N	Minimum	Maximum	Mean	Std. Deviation
Self-Esteem	200	4	9	6.94	1.176
Physics Achievement	200	21	35	28.16	3.327

H_{01}: There is no significant relationship between self-esteem and students' physics achievement in senior secondary schools in Purba Bardhaman.

Table 2: Correlations for self-esteem and physics achievement.

		Self-Esteem	Physics Achievement
Self-Esteem	Pearson Correlation	1	.758**
	Sig. (2-tailed)		.000
	N	200	200
Physics Achievement	Pearson Correlation	.758**	1
	Sig. (2-tailed)	.000	
	N	200	200
**. Correlation is significant at the 0.01 level (2-tailed).			

Table 2 presents the result of the hypothesis tested at 0.01 level of significance. The hypothesis was tested to show whether a relationship exists between students' self-esteem and students' achievement in physics. The result showed that the r-value is 0.758. This implies that there is a strong positive relationship between the two variables under study, that is students' self-esteem and their achievement.

This implies that the null hypothesis is rejected; that is, there is a significant relationship between self-esteem and students' physics achievement in senior secondary schools in Purba Bardhaman.

H_{02}: There is no significant difference of self-esteem between male and female students in higher secondary schools in Purba Bardhaman.

Table 3: Group Statistics for self-esteem

	Gender	N	Mean	Std. Deviation	Std. Error Mean
Self-Esteem	Male	120	7.37	1.144	.104
	Female	80	6.30	.906	.101

Table 4: Independent Samples Test for self-esteem

		t-test for Equality of Means						
		t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
							Lower	Upper
Self-Esteem	Equal variances assumed	7.000	198	.000	1.067	.152	.766	1.367
	Equal variances not assumed	7.331	192.159	.000	1.067	.145	.780	1.354

The above table shows that, the obtained p-value i.e., 0.000 is less than 0.05, i.e., p-value is significant at the 0.05 level of significance. Hence the hypothesis H_{02} "There is no significant difference of self-esteem between male and female students in higher secondary schools in Purba Bardhaman" is rejected.

Therefore, alternative hypothesis "There is significant difference of self-esteem between male and female students in higher secondary schools in Purba Bardhaman" is accepted.

H_{03}: There is no significant difference of students' physics achievement between male and female students in higher secondary schools in Purba Bardhaman.

Table 5: Group Statistics for Physics Achievement

	Gender	N	Mean	Std. Deviation	Std. Error Mean
Physics Achievement	Male	120	29.47	3.225	.294
	Female	80	26.20	2.394	.268

Table 6: Independent Samples Test for Physics Achievement

		t-test for Equality of Means						
		t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
							Lower	Upper
Physics Achievement	Equal variances assumed	7.745	198	.000	3.267	.422	2.435	4.098
	Equal variances not assumed	8.210	195.663	.000	3.267	.398	2.482	4.051

The above table shows that, the obtained p-value i.e., 0.000 is less than 0.05, i.e., p-value is significant at the 0.05 level of significance. Hence the hypothesis H_{03} "There is no significant difference of students' physics achievement between male and female students in higher secondary schools in Purba Bardhaman" is rejected.

Therefore, alternative hypothesis "There is significant difference of students' physics achievement between male and female students in higher secondary schools in Purba Bardhaman" is accepted.

H_{04}: There is no significant difference of self-esteem between students in higher secondary govt.-aided and private schools in Purba Bardhaman.

Table 7: Group Statistics for Self-Esteem

	Type of Institution	N	Mean	Std. Deviation	Std. Error Mean
Self-Esteem	Govt.-Aided	100	7.00	1.206	.121
	Private	100	6.88	1.148	.115

Table 8: Independent Samples Test for self-esteem

		t-test for Equality of Means						
		t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
							Lower	Upper
Self-Esteem	Equal variances assumed	.721	198	.472	.120	.167	-.208	.448
	Equal variances not assumed	.721	197.527	.472	.120	.167	-.208	.448

The above table shows that, the obtained p-value i.e., 0.472 is greater than 0.05, i.e., p-value is significant at the 0.05 level of significance. Hence the hypothesis H_{04} "There is no significant difference of self-esteem between students in higher secondary govt.-aided and private schools in Purba Bardhaman" is accepted.

H_{05}: There is no significant difference of students' physics achievement between students in higher secondary govt.-aided and private schools in Purba Bardhaman.

Table 9: Group Statistics for Physics Achievement

	Type of Institution	N	Mean	Std. Deviation	Std. Error Mean
Physics Achievement	Govt.-Aided	100	28.44	3.471	.347
	Private	100	27.88	3.170	.317

Table 10: Independent Samples Test for academic achievement

		t-test for Equality of Means						
		t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
							Lower	Upper
Physics Achievement	Equal variances assumed	1.191	198	.235	.560	.470	-.367	1.487
	Equal variances not assumed	1.191	196.389	.235	.560	.470	-.367	1.487

The above table shows that, the obtained p-value i.e., 0.235 is greater than 0.05, i.e., p-value is significant at the 0.05 level of significance. Hence the hypothesis H_{05} "There is no significant difference of students' physics achievement between students in higher secondary govt.-aided and private schools in Purba Bardhaman" is accepted.

Conclusion

From the findings of the study, we found that three null hypotheses are rejected out of five. The strong co-relation between self-esteem and physics achievement suggests that both are interdependent and to increase physics achievement few self-esteem building courses may be suggested. The study also reveals that the self-esteem of students is significantly different for different genders and type of institutions. It is also found that males have superior self-esteem and physics achievement than females. But govt.-aided and private institutions cannot play any vital role for both the variables. This study may be helpful in suggesting self-esteem building courses for physics students of higher secondary level.

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