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A STUDY ON PROBLEM SOLVING ABILITY AND ACHIEVEMENT IN PHYSICS OF HIGHER SECONDARY STUDENTS IN COIMBATORE DISTRICT

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Abstract

The competence of problem solving has an energetic role in students' academic outcomes and their construction of the ideas. Keeping this in vision, the current research has been planned out to inspect the effect of problem solving ability and the achievement in physics of higher secondary students in Coimbatore district. This study is under taken with an understanding to examining the association with problem solving ability and achievement in physics of different higher secondary students with the volume of 326 as sample size. The result concluded from the study that there is no significant relationship between problem solving ability and achievement in physics of higher secondary school students.

Keywords: Problem Solving Ability; Achievement; Education; Physics.

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1. Introduction

The problem is the actual evidences of life that everybody in the world has tactlessly, problems are not always insulated. They tend to be like onions where difficulties disappear one after another. In short, they always face difficulties, complications chase people every day and night, even youngsters have their own problems they face in the classroom and at home. Children can deal with any type of difficulty in their own way. Some of the methods they use can be very systematic, while others are much lower. In many cases, the methods that children use to solve their difficulties are at best elementary for children; this can mean a lot of things. If children do not solve their problems, they may feel disappointed and frustrated. On the other hand, children who solve problems can feel very safe and courageous. The best truth of the current education system is that a student-branded related subject is used as a yardstick for assessing student

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achievement or school performance on that topic. Homes and schools must make available an appropriate learning environment for the child to attain success and liberation. The school must provide support for active learning by posing a soft coordination and supporting it to discover one's own solution. If this is done in a sincere way, we can stand-in the development of the child as a self-confident, logical, creative, elastic and independent thinking that endorses academic and social success. Problem solving helps the individual develop a stronger and more cohesive sense of self among students. Further; the finding of this study will be useful for varying the physics curriculum and also bring in a new general method of physics assessment if necessary.

1.1 Objectives of the Study

The general and specific objectives for the present study have been mentioned below

1.1.1. Objectives in General

- To identify the problem solving ability and achievement in physics of higher secondary students in Coimbatore district.
- To implement questionnaire on problem solving ability among higher secondary school students.

1.1.2. Objectives in Specific

- To know the level of problem solving ability among higher secondary students.
- To identify the level of achievement in physics of higher secondary students.
- To find out the association between problem solving ability and the achievement in physics between higher secondary students.
- To find out the influence of personal variables like Mediumof Institution,Sex, Location of the School, Type of School, Educational Qualification of father, Educational qualification of mother, Occupation of father and occupation of mother on problem solving ability among

2. Research Design

The research design has been set to analyze the higher secondary school students' problem solving skills and the impact level in their academic achievement in the physics subject using survey method with the help of standardized tool. The sample respondents 326 have been taken from thirteen schools which is located in and near Coimbatore district. Simple random sampling technique has been applied in the data collection method.

Table 1: Frequency and Percentage Analysis of Personal Data Sheet

S.NO	Group	Subdivisions	No.	%	Total
1.	Medium of Institution	Tamil	162	49.7	326
		English	164	50.3	
2.	Gender	Male	164	50.3%	326
		Female	162	49.7%	
	Location of the	Urban	108	33.1%	326

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3.	School	Rural	218	66.9%	
4.		Govt.	132	40.5%	326
		Aided	58	17.8%	
		Private	136	41.7%	
5.	Educational Qualification of Father	Below 10^{th}	221	67.8%	326
		UG	79	24.2%	
		PG	19	5.8%	
		Professional	7	2.1%	
6.	Educational Qualification of Mother	Below 10^{th}	218	66.9%	326
		UG	84	25.8%	
		PG	16	4.9%	
		Professional	8	2.5%	
7.	**Occupation of Father**	**Daily Wagers**	**130**	**39.9%**	**326**
		Farmers	7	2.1%	
		Govt.Job	27	8.3%	
		Private	108	33.1%	
		Business	54	16.6%	
8.	Occupation of Mother	Daily Wagers	120	36.8%	326
		Farmers	6	1.8%	
		Govt.Job	22	6.7%	
		Private	135	41.4%	
		Business	43	13.2%	

2.1. Scoring Procedure

Table 2: Marks allotted to questions

Variable	**Questions**	**Very Often**	**Often**	**Sometims**	**Rarely**	**Not at all**
Problem Solving Ability	1 to 16	5	4	3	2	1

Table 3: Ranks assigned for the scores:

Problem solving ability	
Scores	**Rank**
Less than 45	Low
46 to 63	moderate
64 to 80	High

Achievement in physics	
Scores	**Rank**
1 to 14	Low
15 to 21	Moderate
22 to 24	High

2.2. Testing the Hypothesis

HYPOTHESIS 1:
There will be a significant difference in the level of problem solving ability among higher secondary students.

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Table 4: Mean Score difference – Problem Solving Ability

PROBLEM SOLVING ABILITY								
Low			**Moderate**			**High**		
Q1	**F**	**%**	**Q2**	**F**	**%**	**Q3**	**F**	**%**
25	30	9.20%	50	100	30.67%	75	196	60.12%

Table 4 exhibits 9.20% belongs to low level, 30.67% of belongs to moderate level and 60.12% belong to high level.

HYPOTHESIS 2:
There will be a significant difference in the level of achievement in physics among higher secondary students.

Table 5: Mean Score difference – Achievement in Physics

ACHIEVEMENT IN PHYSICS								
Low			**Moderate**			**High**		
Q1	**F**	**%**	**Q2**	**F**	**%**	**Q3**	**F**	**%**
25	4	1.2	50	104	31.9	75	218	66.9

Table 5 exhibits 1.2% belong to low level, 31.9% belong to moderate level and 66.9% belong to high level.

Table 6: HYPOTHESIS 3 - There will be a significant mean score difference towards problem solving ability between medium of institution among higher secondary students.

Medium of Instruction	**Mean**	**N**	**Std. Deviation**	**df**	**t-value (A)**	**p-value**	**Table Value - 0.05 (B)**	**Remarks**
Tamil	65.1975	162	7.43656	324	0.0321	0.9744	1.96	(A<B) Not Significant
English	65.1707	164	7.65082					
Total	65.1840	326	7.53351					

Table 7: HYPOTHESIS 4 - There will be a significant mean score difference towards problem solving ability between gender among higher secondary students.

Gender	**Mean**	**N**	**Std. Deviation**	**df**	**t-value (A)**	**p-value**	**Table Value - 0.05 (B)**	**Remarks**
Male	64.7378	164	7.66785	324	1.0764	0.2826	1.96	(A<B) Not Significant
Female	65.6358	162	7.39125					
Total	65.1840	326	7.53351					

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Table 8: HYPOTHESIS 5 - There will be a significant mean score difference towards problem solving ability between location of the school among higher secondary students.

Location of the school	Mean	N	Std. Deviation	df	t-value	p-value	Table Value - 0.05 (B)	Remarks
Urban	65.1019	108	8.03606	324	0.1384	0.8900	1.96	(A<B) Not Significant
Rural	65.2248	218	7.29054					
Total	65.1840	326	7.53351					

Table 9: HYPOTHESIS 6 - There will be a significant difference towards problem solving ability between types of school among higher secondary students.

Type of school	Sum of Squares	df	Mean Square	F (A)	0.05 Significant level (B)	Remarks
Between Groups	120.277	2	60.139	1.060	2.63	(A<B) Not Significant
Within Groups	18324.680	323	56.733			
Total	18444.957	325				

Table 10: HYPOTHESIS 7 -There will be a significant difference towards problem solving ability between educational qualification of father among higher secondary students.

Educational qualification of Father	Sum of Squares	df	Mean Square	F (A)	0.05 Significant level (B)	Remarks
Between Groups	302.111	3	100.704	1.787	2.63	(A < B) Not Significant
Within Groups	18142.846	322	56.344			
Total	18444.957	325				

Table 11: HYPOTHESIS 8 - There will be a significant difference towards problem solving ability between educational qualification of mother among higher secondary students.

Educational Qualification of Mother	Sum of Squares	df	Mean Square	F (A)	0.05 Significant level (B)	Remarks
Between Groups	152.594	3	50.865	.895	2.63	(A < B) Not Significant
Within Groups	18292.363	322	56.809			
Total	18444.957	325				

Table 12: HYPOTHESIS 9 - There will be a significant difference towards problem solving ability between occupation of father among higher secondary students.

Occupational of Father	Sum of Squares	df	Mean Square	F (A)	0.05 Significant level (B)	Remarks
Between Groups	247.146	4	61.786	1.090	2.63	(A < B) Not Significant

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Within Groups	18197.811	321	56.691			
Total	18444.957	325				

Table 13: HYPOTHESIS 10- There will be a significant difference towards problem solving ability between occupation of mother among higher secondary students.

Occupation of Mother	**Sum of Squares**	**df**	**Mean Square**	**F (A)**	**0.05 Significant level (B)**	**Remarks**
Between Groups	157.243	4	39.311	.690	2.39	(A < B) Not Significant
Within Groups	18287.714	321	56.971			
Total	18444.957	325				

Table 14: HYPOTHESIS 11 - There will be a significant mean score difference towards achievement in physics between medium of institution among higher secondary students.

Medium of Instruction	**Mean**	**N**	**Std. Deviation**	**df**	**t-value (A)**	**p-value**	**Table Value - 0.05 (B)**	**Remarks**
Tamil	20.1667	162	2.87039	324	1.42	0.1561	1.96	(A<B) Not Significant
English	19.7195	164	2.81222					
Total	19.9417	326	2.84572					

Table 15: HYPOTHESIS 12 - There will be a significant mean score difference towards achievement in physics between gender among higher secondary students.

Gender	**Mean**	**N**	**Std. Deviation**	**df**	**t-value (A)**	**p-value**	**Table Value - 0.05 (B)**	**Remarks**
Male	19.9451	164	2.75871	324	1.0764	0.97	1.96	(A<B) Not Significant
Female	19.9383	162	2.93975					
Total	19.9417	326	2.84572					

Table 16: HYPOTHESIS 13 - There will be a significant mean score difference towards achievement in physics between location of the school among higher secondary students.

Location of the school	**Mean**	**N**	**Std. Deviation**	**df**	**t-value (A)**	**p-value**	**Table Value - 0.05 (B)**	**Remarks**
Urban	19.9074	108	3.00012	324	0.14	0.8815	1.96	(A<B) Not Significant
Rural	19.9587	218	2.77300					
Total	19.9417	326	2.84572					

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Table 17: HYPOTHESIS 14 - There will be a significant difference towards achievement in physics between types of school among higher secondary students.

Type of school	**Sum of Squares**	**df**	**Mean Square**	**F (A)**	**0.05 Significant level (B)**	**Remarks**
Between Groups	69.713	2	34.857	4.394	2.63	(A > B) Significant
Within Groups	2562.179	323	7.932			
Total	2631.893	325				

Table 18: HYPOTHESIS 15 -There will be a significant difference towards achievement in physics between educational qualification of father among higher secondary students.

Educational qualification of Father	**Sum of Squares**	**df**	**Mean Square**	**F (A)**	**0.05 Significant level (B)**	**Remarks**
Between Groups	15.920	3	5.307	0.653	2.63	(A < B) Not Significant
Within Groups	2615.972	322	8.124			
Total	2631.893	325				

Table 19: HYPOTHESIS 16 -There will be a significant difference towards achievement in physics between educational qualification of mother among higher secondary students.

Educational Qualification of Mother	**Sum of Squares**	**df**	**Mean Square**	**F (A)**	**0.05 Significant level (B)**	**Remarks**
Between Groups	26.195	3	8.732	1.079	2.63	(A < B) Not Significant
Within Groups	2605.698	322	8.092			
Total	2631.893	325				

Table 20: HYPOTHESIS 17 -There will be a significant difference towards achievement in physics between occupation of father among higher secondary students.

Occupational of Father	**Sum of Squares**	**df**	**Mean Square**	**F (A)**	**0.05 Significant level (B)**	**Remarks**
Between Groups	14.404	4	3.601	.442	2.63	(A < B) Not Significant
Within Groups	2617.489	321	8.154			
Total	2631.893	325				

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Table 21: HYPOTHESIS 18 –There will be a significant difference towards achievement in physics between occupation of mother among higher secondary students.

Occupation of Mother	Sum of Squares	df	Mean Square	F (A)	0.05 Significant level (B)	Remarks
Between Groups	8.766	4	2.192	.268	2.63	(A < B) Not Significant
Within Groups	2623.126	321	8.172			
Total	2631.893	325				

Table 22: HYPOTHESIS 19 –There will be a significant relationship between problem solving ability and achievement in physics among higher secondary students

Variable	N	r- value	Remarks
Problem Solving Ability	326	0.073	Not Significant at 0.05 sig. level
Achievement in Physics			

3. Conclusion

- Majority of the problem solving ability is 'Low' only.
- Majority of the level of achievement in physics is 'Moderate' only.
- There is no significant mean score difference towards problem solving ability with respect to gender ,medium of institution, location of the school, type of school, educational qualification of father, educational qualification of mother, occupation of father, occupation of mother among higher secondary students.
- There is a significant mean score difference towards achievement in physics with respect to type of school among higher secondary students.
- There is no significant mean score difference towards achievement in physics with respect to medium of institution, gender, location of the school, educational qualification of father, educational qualification of mother, occupation of father and occupation of mother among higher secondary students.
- There is no significant relationship between problem solving ability and achievement in physics of higher secondary school students.

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