

## **SOCIAL COMPETENCE AS A CORRELATE OF PROBLEM SOLVING ABILITY IN PHYSICS AMONG HIGHER SECONDARY SCHOOL STUDENTS**

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### **Abstract**

The study mainly was intended to find out the relationship between social competence and Problem Solving Ability in physics among higher secondary school students. For this, the investigator selected a representative sample of 781 Higher Secondary School Students studying in XII standard of science stream selected from Kannur, Palakkad, Thrissur, Kottayam, and Thiruvananthapuram Districts of Kerala state. The sample was selected using a random sampling technique. The investigator selected gender as the classificatory variable for the present study. The social competence scale and Problem Solving Ability test in physics were the tools used for the study. To find out the correlation between Social Competence and Problem Solving Ability in Physics, Pearson's Product Moment Coefficient of Correlation analysis was used. The difference in correlation between Social Competence and Problem Solving Ability in Physics with respect to gender was estimated using the 'z' test. The result showed a positive relationship between Social Competence and Problem Solving Ability in Physics for the total sample of Higher Secondary School Students and no significant difference in correlation between Social Competence and Problem Solving Ability in Physics was found in the case of male and female Higher Secondary School Students.

### **Keywords: Social Competence, Problem Solving Ability in Physics**

Education is considered the medium which develops knowledge, information, and skills to know understand and respect the duties we have towards our society, families, and nation. Hence education has a profound influence on life. It also helps to attain the highest levels of achievement for all students. Education moulds each and every individual in a country to be a dignified and responsible citizen and such improvement among individuals in a country ensures the attainment of a better quality of life. And this enrichment again is possible only by transforming raw human beings into human resources by providing proper education. Education targets to widen both the cognitive and the noncognitive domains of a student. Research at the international, national, and school level is increasingly looking at the value of non-cognitive skills or socio-emotional skills and how the education system fosters its development. Nowadays most educational researchers realized the importance of non-cognitive factors in the achievement of students (*Smitha, 2019*).

The various skills associated with scientific thinking are observation, comparison, organization, prediction, experimentation, evaluation, application, inference, and Problem Solving (Kuhn, 2010), and out of these according to cognitive psychologists, Problem Solving is the one which needs more concern and can be associated with scientific thinking. One of the most important cognitive variables which the researchers want to explore in the present educational setting is Problem Solving Ability. Problem Solving is basic human nature. Every human being in his daily life performs various tasks to solve different kinds of problems. The most considerable aspect of human behavior is problem-solving, a means to success. Educational psychology considers its major challenge as the development of Problem Solving abilities among students and it has been a demand in all educational institutions (*Mayer & Wittrock, 2006*). According to educational Large-Scale Assessments (LSAs) done all over the world, Problem Solving is considered a core domain that provides complementary concepts against the classical concept of learning school subjects. Problem Solving Ability is considered a twenty-first-century skill that is essential for enhancing a satisfied life in the universe. In psychology, Problem Solving is regarded as one's need to achieve a goal that is not directly seen but can be reached by eliminating all the constraints. It is one of the authentic and the most relevant activity that students can depend on for achieving something high (*Praveen, 2006*).

Many studies have been conducted based on Problem Solving Ability. It was noticed that Problem Solving Ability is not a variable associated with the cognitive variables only but with many variables associated with different domains. (*Mayer, 1998; Jonassen, 2011*) highlighted the importance of cognition, metacognition, motivation, and social

competencies while Solving problems. So, it is very crucial to view Problem Solving Ability in terms of variables related to different domains. Hence, the present study is an investigation to explore Problem Solving Ability in Physics as a correlate of social competence among higher secondary school students in Physics.

### **Variables of the study**

The major variables of the study are as follows: **Social Competence** - Social Competence is operationally defined as the abilities associated with social skills and empathy to engage in effective social interaction and successful environmental adaptation rooted in the sub-components of understanding others, developing others, service orientation, leveraging diversity, political awareness, influence, communication, leadership, collaboration and cooperation, team capabilities, change catalyst, conflict management, and building bonds.

### **Problem Solving Ability in Physics**

For the present study Problem Solving Ability in Physics can be operationally defined as the cognitive capability to perform physical or mental operations based on the basic concepts of Physics with respect to the components of comprehending the problem, clarifying the problem, and finding a solution to the problem for Solving conceptual problems in Physics.

### **Major objectives**

#### **The major objectives of the study are cited below:**

1. To find out the relationship between social competence and Problem Solving Ability in physics among higher secondary school students for the total sample
2. To find out the significant difference in the relationship between Social Competence and Problem Solving Ability in Physics among higher secondary school students for the sub-sample gender

### **Hypotheses**

The present study has the following hypotheses

1. There exists no significant relationship between Social Competence and Problem Solving Ability in Physics among Higher Secondary School Students for the total sample
2. There exists no significant difference in the relationship between Social Competence and Problem Solving Ability in Physics among Higher Secondary School Students for the sub-sample gender

### **Methodology**

The various aspects of the methodology are described below.

#### **Sample**

The population for the present study was Higher Secondary School Students of the science stream in Kerala state who follow the Kerala state syllabus. The present study was carried out on a representative sample of 781 Higher Secondary School Students studying in XII standard of science stream selected from Kannur, Palakkad, Thrissur, Kottayam, and Thiruvananthapuram Districts of Kerala state. The sample was selected using a random sampling technique. The investigator selected gender as the classificatory variable for the present study. So the selected sample of Higher Secondary School Students includes male and female students.

#### **Tools Used for the Study**

The present study used two tools for the collection of data is cited below.

**Social Competence Scale** - Social Competence was measured using Social Competence Scale. The scale was prepared and standardized by the investigator. The scale consists of 34 items based on two major components viz., Empathy and Social skills.

**Problem Solving Ability test in Physics** - The test consists of 45 questions based on three major components of Problem Solving Ability namely, Comprehending the Problem, Clarifying the Problem, and Finding a solution to the Problem.

#### **Statistical Analysis**

##### **Preliminary analysis**

The preliminary analysis includes the calculation of basic statistical constants. The following gives the descriptive statistics of the two variables

##### ***Descriptive statistics of Social Competence for Higher Secondary School Students.***

The important statistical constants for the distribution of Social Competence of Higher Secondary School Students for the total sample were calculated and presented in Table 1.

**Table 1**  
*Descriptive Statistics of Social Competence for Higher Secondary School Students*

Variable	Mean	Median	Mode	Std. Deviation	Skewness	Kurtosis
Social Competence	131.60	133.00	129.00	12.21	-0.36	0.04

From the values cited above, it can be inferred that the distribution is slightly negatively skewed and leptokurtic.

***Descriptive Statistics of Problem Solving Ability in Physics for Higher Secondary School Students.***

The important statistical constants for the distribution of Problem Solving Ability in Physics of Higher Secondary School Students for the total sample were calculated and presented in Table 2.

**Table 2**  
*Descriptive Statistics of Problem Solving Ability in Physics of Higher Secondary School Students*

Variable	Mean	Median	Mode	Std. Deviation	Skewness	Kurtosis
Problem Solving Ability in Physics	24.40	25.00	25.00	5.53	-0.52	0.45

From the values cited above, it can be inferred that the distribution is slightly negatively skewed and leptokurtic.

**Correlation Analysis for the Total Sample**

To find out the correlation between Social Competence and Problem Solving Ability in Physics, Pearson's Product Moment Coefficient of Correlation analysis was used. The value of 'r' obtained and its significance is discussed in this section. Table 3 shows the data and results of the correlation analysis between Social Competence and Problem Solving Ability in Physics for the total sample.

**Table 3**  
*Data and Results of the Relationship of Social Competence and Problem Solving Ability in Physics of Higher Secondary School Students for the Total Sample*

Variables	r values	P values	Interpretation
Social Competence Problem Solving Ability in Physics	0.31**	.000	Low relationship

\*\* indicates significance at 0.01 level

The coefficient of correlation between Social Competence and Problem Solving Ability in Physics for the total sample of Higher Secondary School Students was 0.31 which shows significance at 0.01 level. The result shows a low relationship between Social Competence and Problem Solving Ability in Physics for the total sample of Higher Secondary School Students.

**The difference in Correlation between the correlation between Social Competence and Problem Solving Ability in Physics based on Gender**

The difference in correlation between Social Competence and Problem Solving Ability in Physics with respect to gender was estimated using the 'z' test. The table below shows the results of the test of the significance of the difference in the relationship between Social Competence and Problem Solving Ability in Physics

**Table 4**  
*Data and Results of the Test of Significance of Difference in the Relationship between Social Competence and Problem Solving Ability in Physics among Male and Female Higher Secondary School Students*

Variables	Gender	N	r	Z	t	P value
Problem Solving Ability	Male	354	0.32	0.32	1.11	p>.05
	Female	427	0.38	0.40		

The table above points out that the obtained t value for the difference in the relationship between Social Competence and Problem Solving Ability in Physics for Higher Secondary School Students based on gender is 1.11. This indicates no significant difference exists in the relationship between Social Competence with Problem Solving Ability in Physics between male and female Higher Secondary School Students.

#### **Tenability of Hypotheses**

The first hypothesis states no significant relationship exists *between Social Competence and Problem Solving Ability in Physics among Higher Secondary School Students for the total sample*. Results of the statistical analysis revealed that there existed a significant relationship between Social Competence and Problem Solving Ability in Physics of Higher Secondary School Students for the total sample. So, the first hypothesis regarding the correlation between Social Competence and Problem Solving Ability in Physics was rejected.

The second hypothesis states no significant difference exists *in the relationship between Social Competence and Problem Solving Ability in Physics among Higher Secondary School Students for the sub-sample gender*. Results of the statistical analysis revealed that there existed no significant difference in the relationship between Social Competence and Problem Solving Ability in Physics among Higher Secondary School Students based on gender. So the second hypothesis was accepted.

#### **Major findings of the study**

- There exists a significant positive relationship between Social Competence and Problem Solving Ability in Physics for the total sample of Higher Secondary School Students.
- No significant difference in correlation between Social Competence and Problem Solving Ability in Physics was found in the case of male and female Higher Secondary School Students

#### **Conclusion**

One of the major life skills of the twenty-first century is Problem Solving Ability and it is referred to as an important educational goal to be achieved. Problem Solving Ability helps in achieving distant and tough goals with determination and persistence. All these depend on the nature of the person facing problems. Persons who are socially competent when confronted with problems come up with divergent and creative solutions to the problem. This is because they are constantly being challenged with problems from the environment. For them, Problem Solving is an interesting thing to acquire more divergent solutions. They consider Problem Solving as a way to self-development. This study highlights the positive correlation between social competence and Problem Solving Ability and demands the practice of Problem Solving Ability to a great extent in the classrooms through various activities which help students collaborate with teachers and students. Further, the study recommends this for both boys and girls as there was no difference in the correlation between social competence and Problem Solving Ability.

#### **References**

1. Kuhn, D. (2010). What is scientific thinking and how does it develop? In U. Goswami. (Ed.), *Handbook of Childhood Cognitive Development* (Blackwell). Teachers College Columbia University.
2. Jonassen, D.H. (2011). *Learning to solve problems: A handbook for designing Problem Solving learning environments*. New York: Routledge.
3. Mayer, R. E. (1998). Cognitive, metacognitive, and motivational aspects of problem-Solving. *Instructional Science*, 26, 49–63.
4. Mayer, R. E., & Wittrock, M. C. (2006). problemsolving. *Handbook of Educational Psychology*, 2, 287-303.
5. Praveen, M.G. (2006). *Effect of mastery learning strategy on problem solving ability in Physics of secondary school students*. (Ph.D. Thesis, Department of Adult and Continuing Education and Extension Services, University of Calicut).
6. Smitha, R (2019). *Influence of select cognitive and non-cognitive variables on problem solving ability in Physics among higher secondary school students*. (Ph.D. Thesis, Farook Training College, Calicut, University of Calicut).