



ISSN Print: 2394-7500  
ISSN Online: 2394-5869  
Impact Factor: 5.2  
IJAR 2015; 1(7): 127-131  
www.allresearchjournal.com  
Received: 18-04-2015  
Accepted: 16-05-2015

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## **Problem solving ability of higher secondary students in relation to their learning styles**

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#### **Abstract**

The aim of the study was to assess the relationship between problem solving ability and learning styles. Problem solving is the frame- work or pattern within which creative thinking and reasoning take place. It is the ability to thing and reason on given levels of complicity. People who have learned effective problem solving techniques are able to solve problems and higher levels of complicity than more intelligence people who have no such training. Problem solving is the process of overcoming difficulties that appear to interfere with the attainment of a goal. Simple problems can well be solved by instinctive and habitual behaviors. Learning styles information stand be shared with highlights the importance of learning techniques (rather the teaching process) and it thereby raises questions concerning the ideal distribution of power and control among teachers and learners. This research study is an attempt to study the problem solving ability and the learning styles of higher secondary students. The objective of the study is to find out the level of problem solving ability and their learning style of higher secondary school students. The samples selected for the study are higher secondary school students from different schools in Pondicherry. The sample size 300 was drawn from various schools. The tool used to collect data is Problem solving ability test standardized by L.N. Dubey and Styles of learning and thinking tool standardized by D. Venkatraman. The study shows that Problem solving ability of higher secondary students is average in nature. It was found that problem-solving ability had a positive relationship with learning.

**Keywords:** Problem Solving Ability, Learning Styles and Higher Secondary Students

#### **Introduction**

In the present study problem-solving ability and the learning style of higher secondary school students was taken to study. A problem refers to a situation, condition, or issue that is unresolved or undesired. Usually, the nature of a problem is such that an answer or solution is needed. In such cases, problem-solving is used to understand important aspects of the problem so that an answer or solution can be found. The source of a problem can be the gap between the present and ideal situation. Problem solving can be an amazing process, but it is up to you to make it that way instead of just something you do because you have to. You have the ability to become a great problem solver, but you have to begin looking at it as an art. Problem solving is a fixture in life. You have to be able to solve problems. Problems pop up every day. Sometimes they are small and sometimes they are large. Sometimes solving a problem is a matter of life and death and other times it is merely a matter of keeping your sanity. Regardless of why you need problem solving, you cannot deny that you need it.

One of the important processes that shape our lives is learning. A person's behavior changes by their learning style. In this process, individuals adopt themselves to a new environment. Learning can be defined as the permanent changes in the behavior of a person. There are behavioral, cognitive, and information-processing approaches to explain learning. More recent studies show that every person's learning capacity, speed, and types are different from each other. Learning styles are different ways that a person can learn. It's commonly believed that most people favor some particular method of interacting with, taking in, and processing stimulus and information at the time of learning. Psychologists have proposed several complementary taxonomies of learning styles. One of most influential of these taxonomies is based on the Kolb's experiential learning theory.

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On analysis of Higher Secondary School students indicates that there is a need for identifying certain areas, which can contribute significantly to the present educational system. One of the prime areas is problem solving ability and learning style is always united together, especially in the field of education. Problem solving ability is a vital force, which is in combination with mental setup and interest towards a fruitful education. Learning style depends on each individual who desires to make education fruitful. Learning styles can be examined at numerous levels including perception preferences, information processing, social interaction, multiple intelligences, personality and instructional methods.

All learning is a cycle of being introduced to new information, organizing this information and understanding its real world applications, and finally integrating the material into our memory for future decision making. Higher Secondary School students are at present developing their own problem solving ability and learning style.

It has been found that persons having higher intelligence and learning capacity can solve the complex problems quickly. Therefore, it is necessary for developing better learning style on one hand and also on the other hand developing problem solving ability through proper education and training.

Research work is need in the area like whether there is any correlation between the problem solving ability and learning style. In this study attempt has been made to, study the problem solving ability of higher secondary students in relation to their learning styles.

**Objectives of the Study**

The following are the objectives of the study:

1. To find out the level of problem solving ability of higher secondary school students.
2. To find out the level of learning style of higher secondary school students.
3. To find out whether there is a significant difference between the problem solving ability scores of higher secondary students with respect to different sub-samples.
4. To find out whether there is a significant difference between the learning style scores of higher secondary students with respect to different sub-samples.
5. To find out whether there is a significant relationship between problem solving ability and learning style of higher secondary students.
6. To find out whether there is a significant relationship between problem solving ability and learning style of higher secondary students with respect to different sub-samples.

**Hypotheses of the Study**

Based on the above objectives the following research hypotheses have been formulated:

1. Problem solving ability of higher secondary students is high.
2. Learning style of higher secondary students is high.
3. There is a significant difference between the mean problem solving ability scores of male and female students.
4. There is a significant difference between the mean problem solving ability scores of students studying in private and government schools.
5. There is a significant difference between the mean

problem solving ability scores of students belong to arts and science group.

6. There is a significant difference between the mean problem solving ability scores of students residing in urban and rural areas
7. There is a significant difference between the mean learning style scores of male and female students.
8. There is a significant difference between the mean learning style scores of students belonging to arts and science group.
9. There is a significant difference between the mean learning style scores of students studying in private and government schools.
10. There is a significant difference between the mean learning style scores of student residing in urban and rural areas.
11. There is a significant relationship between problem solving ability and learning style of higher secondary students.

**Methodology of the Study**

Normative survey method is used for the present investigation. The survey describes and interprets what is. It is concerned with conditions and relationship that exist, opinions that are held, processes that are going on, effects that are evident, or trends that are developing. It is primarily concerned with the present, although it often considers past events and influences as they relate to current condition.

**Sample of the Study**

The investigator in the present study has selected the sample using the random sampling technique. The samples selected for the study are higher secondary school students from different schools in Puducherry. The sample size 300 was drawn from various schools, in Puducherry.

**Tools and Techniques Used**

The following tools have been used for collecting data

1. Problem solving ability test standardized by L.N. Dubey.
2. Styles of learning and thinking tool standardized by D. Venkatraman.

**Statistical Techniques Used**

The data of the study involving 300 students studying in higher secondary school have been subjected to Descriptive analysis, Differential analysis, and Correlation analysis.

**Results and Interpretation of Data**

**Hypothesis 1:** Problem solving ability of higher secondary students is high.

**Table1:** the table shows the Problem solving ability of higher secondary students.

Factor area	Description	Range of Raw score	
		Number	Percentage
Problem solving ability	High	47	15
	Average	148	50.6
	Low	105	34.3

From the above table it is clear that the problem solving ability of secondary students is average in nature. Hence the above stated the hypothesis is rejected, indicating that the problem solving ability of secondary students is average in nature.

**Findings:** Problem solving ability of secondary students is average in nature.

**Hypothesis 2,** Learning style of higher secondary students is high

**Table 2:** the table shows learning style of higher secondary students

Factor area	Description	Range of Raw score	
		Number	Percentage
Learning Style	High	35	12
	Average	194	64
	Low	71	24

From the above table it is clear that the learning style of secondary students is average in nature. Hence the above stated the hypothesis is rejected, indicating that the learning style of secondary students is average in nature.

**Findings:** Learning style of higher secondary students is average in nature

**Hypothesis 3,** there is a significant difference between the mean problem solving ability scores of male and female students

**Table 4:** The table shows the significant difference between the mean problem solving ability scores of students studying in private and government schools.

Type of school	N	Mean	Standard Deviation	't' value	Level of significance	Significant /Not Significant
Government	151	7.95	7.130	0.712	0.05	NS
Private	149	8.39	2.898			

The above table reveals that the calculated 't' value 0.712, is lesser than the table value 1.96 at 0.05 level. Hence, thereby the hypothesis is rejected indicating that type of school have no significant influence on the problem solving ability of higher secondary students.

**Table 3:** the table shows the significant difference between the mean problem solving scores of male and female students.

Gender	N	Mean	Standard Deviation	't' value	Level of significance	Significant /Not Significant
Male	149	8.99	7.148	2.608	0.05	S
Female	151	7.35	2.713			

The above table reveals that the calculated 't' value 2.608 is higher than the table value 1.96 at 0.05 level. Hence, thereby the hypothesis is accepted, indicating that gender has significant influence on the problem solving ability of higher secondary students.

**Findings:** The male and female students studying in higher secondary schools differ significantly in their problem solving ability.

**Hypothesis 4.** There is a significant difference between the mean problem solving ability scores of students studying in private and government schools.

**Findings:** Students studying in government and private schools do not differ significantly in their problem solving ability.

**Hypothesis 5.** There is a significant difference between the mean problem solving ability scores of students belong to arts and science.

**Table 5:** The table shows the significant difference between the mean problem solving ability scores of students belong to arts and science.

Subject	N	Mean	Standard Deviation	't' value	Level of significance	Significant /Not Significant
Arts	140	8.27	2.906	0.327	0.05	NS
Science	160	8.08	6.943			

The above table reveals that the calculated 't' value 0.327, is lesser than the table value 1.96 at 0.05 level. Hence, thereby the hypothesis is rejected, indicating that subject has no significant influence on the problem solving ability of higher secondary students.

**Findings:** Arts and science students studying in higher secondary schools do not differ significantly in their problem solving ability.

**Hypothesis 6.** There is a significant difference between the mean problem solving ability scores of students residing in urban and rural areas.

**Table 6:** The table shows the significant difference between the mean problem solving ability scores of students residing at urban and rural areas.

Locality	N	Mean	Standard Deviation	't' value	Level of significance	Significant /Not Significant
Rural	152	8.30	2.741	0.419	0.05	NS
Urban	148	8.04	7.154			

The above table reveals that the calculated 't' value 0.419, is lesser than the table value 1.96 at 0.05 level. Hence, thereby the hypothesis is rejected, indicating that locality has no significant influence on the problem solving ability of higher secondary students.

**Findings:** Students residing at rural and urban schools do not differ significantly in their problem solving ability.

**Hypothesis 7.** There is a significant difference between the mean learning style scores of male and female students.

**Table 7:** The table shows the significant difference between the mean learning style scores of male and female students.

Gender	N	Mean	Standard Deviation	't' value	Level of significance	Significant /Not Significant
Male	149	24.36	2.113	0.907	0.05	NS
Female	151	24.56	1.425			

The above table reveals that the calculated 't' value 0.907, is lesser than the table value 1.96 at 0.05 level. Hence, thereby the hypothesis is rejected, indicating that gender has no

significant influence on the learning style of higher secondary students.

**Findings**

The male and female students studying in higher secondary schools do not differ significantly in their learning style.

**Table 8:** The table shows the significant difference between the mean learning style scores of students belonging to arts and science group.

Subject	N	Mean	Standard Deviation	't' value	Level of significance	Significant /Not Significant
Arts	140	24.18	2.015	2.281	0.05	S
Science	160	24.70	1.614			

The above table reveals that the calculated 't' value 2.281 is higher than the table value 1.96 at 0.05 level. Hence, thereby the hypothesis is accepted, indicating that subject has significant influence on the learning style of higher secondary students.

**Findings:** Arts and science students studying in higher secondary schools differ significantly in their learning.

**Hypothesis 9.** There is a significant difference between the mean learning style scores of students studying in private and government schools.

**Table 9:** The table shows the significant difference between the mean learning style scores of students studying in private and government schools.

Types of School	N	Mean	Standard Deviation	't' value	Level of significance	Significant/Not Significant
Government	151	24.64	1.658	1.714	0.05	NS
Private	149	24.27	1.862			

The above table reveals that the calculated 't' value 1.714 is lesser than the table value 1.96 at 0.05 level. Hence, thereby the hypothesis is rejected, indicating that type of school has no significant influence on the learning style of higher secondary students.

**Findings:** The higher secondary students studying in government and private schools do not differ significant in their learning style.

**Hypothesis 10.** There is a significant difference between the mean learning style scores of student residing in urban and rural areas.

**Table 10:** The table shows the significant difference between the mean learning style scores of student residing in urban and rural areas.

Locality	N	Mean	Standard Deviation	't' value	Level of significance	Significant /Not Significant
Rural	152	24.37	1.413	0.791	0.05	NS
Urban	148	24.54	2.221			

The above table reveals that the calculated 't' value 0.791 is lesser than the table value 1.96 at 0.05 level. Hence, thereby the hypothesis is rejected, indicating that locality has significant influence on the learning style of higher secondary students.

**Findings:** Students studying in rural and urban area do not differ significantly in their learning style.

**Hypothesis 11.** There is a significant relationship between problem solving ability and learning style of higher secondary students.

**Table 11:** The table shows the significant relationship between problem solving ability and learning style of higher secondary students.

Variable	Mean	Standard Deviation	Correlation	Significant /Not Significant
Problem solving Ability	8.17	5.430	0.319	S
Learning Styles	24.46	1.769		

The co-efficient of correlation between problem solving ability and learning style has been determined. The co-efficient of correlation is found to be 0.319 and it is significant at 0.01 level. Hence, the hypothesis that there is significant relationship between problem solving ability and learning style at 0.01 levels and it concluded that there exist

a positive relationship between problem solving ability and learning style. Hence, the research hypothesis is accepted.

**Findings:** There is a significant positive relationship between problem solving ability and learning style of higher secondary students.

### Major Findings

1. Problem solving ability of higher secondary students is average in nature.
2. Learning style of higher secondary students is average in nature.
3. The male and female students studying in higher secondary schools differ significantly in their problem solving ability.
4. Students studying in government and private schools do not differ significantly in their problem solving ability.
5. Arts and science students studying in higher secondary schools do not differ significantly in their problem solving ability.
6. Students residing at rural and urban schools do not differ significantly in their problem solving ability.
7. The male and female students studying in higher secondary schools do not differ significantly in their learning style.
8. Arts and science students studying in higher secondary schools differ significantly in their learning.
9. The higher secondary students studying in government and private schools do not differ significant in their learning style.
10. Students studying at rural and urban area do not differ significantly in their learning style.
11. There is a significant positive relationship between problem solving ability and learning style.

### Discussion

The learning styles of the students differ with respect to subject matter in high school and types of university entrance exam scores. There are some resemblances as it is in the case of our research work.

There are some studies supporting our results, there is no significant relation between gender and learning styles. Another research shows there is a significant relationship between learning styles and their locality. Earlier studies show that the learning styles of pre-service teachers or teacher education students. Research works shows higher secondary students studying in government and private schools do not differ significant in their learning style. Which shows that the research work coincides with the above said. They found that differences between learning styles of Black and White pre-service teachers; and also differences in high and low achievers in learning styles.

### Educational Implications of the Study

Teacher must encourage students to adopt a reasonable risk taking attitude while solving problems. Risk-taking attitude leads the students to overcome mental fixation in solving problems. The school should make determined efforts to the development of problem solving ability among the students. Teachers should motivate the students to make creative effort while solving problems without any fear. Along with “speed and accuracy” in solving problems students should be trained in “originality” and “flexibility”. The teachers can be given training on problem solving ability and learning style based teaching. The teachers can be trained to prepare learning materials which are whole brain compatible.

### Recommendations

The following recommendations based on the investigations are offered for the development of problem solving ability. The parents play a very vital and crucial role in the

development of problem solving ability. When parents are educated and ambitious, children also imitate and possess a high degree of problem solving ability. Strong and supportive parents contribute to the growth of strong problem solving ability in their children. The new technique should be adopted in methods of teaching and learning process to improve the problem solving ability and learning style. Students should be trained in the tasks of “divergent production” in solving problems. The teachers can be trained in operating computer system, so that they could create power point slides and use flash movie maker for better learning and information gathering. The students may be trained to use different styles of learning.

### Conclusion

The present study showed that the higher secondary students have positive relationship between problem solving ability and learning style. Different teaching techniques and methodology can be adopted to influence the problem solving ability and learning style. Research suggests that individuals develop and use markedly different styles of learning and problem solving in relation to the problems and challenges they face. This also indicates that there is a need for wider studies in this field. The teaching programs at primary and secondary level can be re-designed by taking learning styles and problem-solving skills into consideration.

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