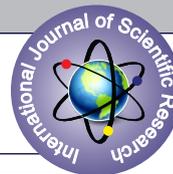# ENHANCING PROBLEM SOLVING SKILLS OF HIGHER SECONDARY STUDENTS THROUGH INTERACTIVE MULTIMEDIA COURSEWARE

**EDUCATION**

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## ABSTRACT

This study attempts to find the effectiveness of interactive multimedia courseware in enhancing the problem solving skill of Higher Secondary students. Parallel group experiment design was adopted as the method of study. A sample of 60 XI standard students from a reputed Higher secondary school of Puducherry region was selected for the present study. Enhancement of problem solving skill was attempted in normal lecture method for the control group and for treatment group through interactive multimedia CD. The acquisition of problem solving skill was assessed by comparing the students' achievement score in the pre-test and post-test analysis. The statistical analysis of the collected data reveals that the treatment group achieved significantly higher achievement scores than the control group in posttest. The outcome of the study indicates greater enhancement of problem solving skill in the treatment group students versus that of the control group students

## KEYWORDS:

Problem solving skills, Interactive Multimedia Courseware (CD), Higher Secondary Students

## INTRODUCTION

Problem solving is the process of overcoming difficulties that appear to interfere with the attainment of a goal. A problem is a task for which Problem–solving may be a purely mental difficulty or it may be physical and involve manipulation of data. The person confronting it wants or needs to find a solution because the person has no readily available procedure for finding the solution. The person must make an attempt to find a solution. Problem solving is the act of defining a problem; determining the cause of the problem; identifying, prioritizing and selecting alternatives for a solution; and implementing a solution.

John Bransford and Barry Stein (1984) advocated five steps that are basically associated with the task of problem-solving. They referred to these steps as "IDEAL" thinking and arranged them in the following order.

I – Identifying the problem
D – Defining and representing the problem
E – Exploring possible strategies
A – Acting on the strategies
L – Looking back and evaluating the effects of one's activities.

Nowadays we can't speak about high quality learning environment, when we speak about using paper, books and pencils. If we want to create high learning environment we have to include term "multimedia" in it. In today's information age, multimedia has the potential to create high quality learning environments for everyone. The key elements of multiple media, user control over the delivery of information, and interactivity can be used to enhance the learning process through creating integrated learning environments. When something is explained, we can combine the explanation with illustrative examples, we can give feedback to the online assignments and the user can be provided with opportunities to practice and experiment. A range of media elements can be used to convey a given message and the user can study at a time and place convenient to them, taking as long or as little as they need (Cairncross & Mannion *sine anno*).

## NEED FOR THE STUDY

The students thinking on problem and their understanding of the science behind it is based on common sense. It does not start from textual knowledge. Rather it proceeds from experiencing to gradually forming concepts through books at later stage. It is a process from practice to theory not vice versa. Knowledge here is not a goal but a natural outcome of working on tasks. Students live in the real world and like to deal with concrete things where they can touch, feel, manipulate things then the method is useful in igniting the process of science learning. Commerce being so much related with day to day affairs, developing of problem solving skill among these students

becomes essential to face the real world as an entrepreneur. Creating more opportunities for them to learn from real-life situations rather than just in the classroom develops problem solving skill in them. In the present scenario, shift from "memorization-focused education" to "problem-solving-focused education," is emphasized. The experience students get from having an idea, taking initiative, and learning from both their successes and their failures is invaluable. The aim of the study is to help student make problem solving into a habit, one that empowers them to solve not only their own problems, but the challenges of their schools, businesses, communities — and maybe even the world. In this aspect the study gains its significance.

### Objectives:

1. To compare the mean pretest scores of experimental and control groups
2. To compare the mean post test scores of Experimental and Control groups.
3. To compare the mean gain score of Experimental and Control groups.
4. To study the effectiveness of interactive multimedia courseware in enhancing the problem solving skill among higher secondary students.

### Hypotheses:

The present study was designed to test the following hypothesis.
1. There will be no significant difference in the mean scores of the Experimental and Control groups at the pretesting condition.
2. There will be significant difference in the mean scores of the Experimental and Control groups at the post testing condition.
3. There will be significant difference in the mean gain scores of the Experimental and Control groups.

### METHOD OF STUDY

Parallel group experimental design was used as the method of study. 60 out of 98 XI standard students (includes both gender) from a reputed Higher secondary school of Puducherry region were selected through purposive sampling technique for the study. The sample was selected based on the quarterly exam achievement score in Commerce. The sixty students of average mark scores (50-59%) were pooled and equaled into two groups. The control group (30 students) and the treatment group (30 students) were equated with equal level of students with respect to their academic achievement scores in Commerce, which was designed to test their knowledge about the "Salesmanship" concept. An interactive multimedia CD was designed for the concept "Salesmanship". The CD contained 20 slides of the concept followed by a questionnaire to elicit the problem solving skill of students. The whole experiment lasted for 15 working days. The terminal behavior was tested in the form of posttest. 20 different multiple choice questions were used separately for both the pretest and posttest to assess the knowledge of both the groups of students on

"Salesmanship" concept. Each question carries one mark for correct response and zero for wrong response. The pretest and posttest scores of control and treatment groups were compared and analyzed using suitable statistical methods.

### Tool
Self structured questionnaire was used as the tool for the present study. The tool consists of 20 test items relating to a problem situation say how to increase sales. Each test items have 4 multiple choices, of which, one is the correct answer and three are distracters.

### Scoring Procedure
The scoring procedure was simple. For each right answer, one mark was awarded and no mark was given for the wrong response. The aggregate score of an individual reflect his/her level of problem solving skill towards "Salesmanship".

### Reliability
The reliability of the tool was calculated using test retest method. The reliability co efficient of the tool was found to be 0.82. This high reliability score ensures high validity.

### DELIMITATIONS:
1. Higher Secondary students from commerce stream alone were taken for the study.
2. The sample was drawn using purposive sampling technique.
3. "Salesmanship" is the content selected for the present study.

### ANALYSIS OF THE COLLECTED DATA
The collected data was analyzed statistically using SPSS ver-20 and the results were presented in table 1, 2 and 3.

**Table 1: Comparison of the mean pre test scores of the experimental and control groups**

|  | M | SD | N | t-value | Level of Significance |
|---|---|---|---|---|---|
| Experimental Group | 3.118 | 1.388 | 30 | 0.54 | NS |
| Control Group | 2.94 | 1.155 | 30 |  |  |

The obtained t-value is below the limit set for 0.05 level of significant difference is found in the pre test scores of Experimental and Control groups. The performance of the Experimental and Control groups are similar.

**Table 2: Comparison of the mean post test scores of the experimental and control groups**

|  | M | SD | N | t-value | Level of Significance |
|---|---|---|---|---|---|
| Experimental Group | 17.176 | 4.573 | 30 | 6.01 | 0.01 |
| Control Group | 10.79 | 4.185 | 30 |  |  |

The obtained t-value is above the limit set for level of significance. So there exists a significant difference in the mean post test scores of the Experimental and Control groups.

**Table 3:Test of significance of the Mean scores of Gain Scores between Experimental and Control groups**

|  | M | SD | N | t-value | Level of Significance |
|---|---|---|---|---|---|
| Experimental Group | 14.033 | 3.46 | 30 | 8.155 | 0.01 |
| Control Group | 7.583 | 2.745 | 30 |  |  |

The obtained t-value for the mean gain scores is greater than the tabulated value required for significance at 0.01 levels. This states that there is significant difference in the mean gain scores of the experimental and control groups.

It can be inferred from the result that multimedia teaching differentiates the experimental and control groups. From the comparison the advantage of the experimental group is evident.

### DISCUSSION:
The feedback cum discussion session held with the treatment group of XI standard students after the experimentation period revealed that the interactive multimedia courseware learning helped them to broaden their level of understanding by easily integrating a wide range of information related to the content either in the form of a picture, animated real videos, graphic representation of the required data from

a spreadsheet or PDF text format and teacher annotations on these concepts within fraction of seconds. This amenity facilitated the learners to learn easily and rapidly in real time. The interactive multimedia courseware mediated learning acted as a motivational agent thereby allowing the learners to take up group discussion that enhanced the knowledge of the learners to absorb the information in a mere sophisticated manner. Hence the interactive multimedia courseware acts as a true ICT tool for enhancing problem solving skill among higher secondary students. The marked improvement of students' in enhancing various skills due to the impact of multimedia package was also evident from the work of Dr. Santhosh Areekkuzhiyil (2017).

### EDUCATIONAL IMPLICATIONS
* Teachers must encourage students to adopt a reasonable risk taking attitude while solving problems.
* The school should make determined efforts to the development of problem solving ability among the students.
* Along with "speed and accuracy" in solving problems students should be trained in "originality" and "flexibility".
* Teachers should motivate the students to make creative effort while solving problems without any fear.
* Teachers can be trained to prepare learning materials which are whole brain compatible using interactive multimedia courseware.

### CONCLUSION
Problem solving is a fixture in life. We should know how 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 or 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. By developing problem solving skill, teachers prepare students for the real world environment. To be successful citizens, students must learn to solve problems. Multimedia can bring a number of advantages to the education. It can help learners come to a deeper understanding through supporting materials when new material is being presented. It involves the learner actively into the learning process and promotes internal reflection. Also, the dialogue between teacher and student can be supported through combining interactive multimedia with communications technology.

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