



## Creative Problem Solving Model for Promoting Achievement among Higher Secondary School Geography Students

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### ABSTRACT

*The CPS frame of reference has evolved through more than five decades of work and has revised and remodeled. The present study determines the effectiveness of Creative Problem Solving Model for Promoting Achievement among Higher Secondary School Geography Students. For that the investigator used Osborn-Parness model of Creative Problem Solving. A quasi-experimental method with pre-test post-test two group design was adopted. The sample consisted of 269 XI<sup>th</sup> standard students from five different schools from Kottayam and Ernakulam district. Tools used are lesson design based on Osborn-Parness model of Creative Problem Solving, lesson design based on prevailing activity oriented approach, and achievement test in Geography. The result concludes that the select model is effective for promoting achievement among higher secondary school Geography students. Creative Problem Solving frame of reference elicit thoughtful, deliberate preference in which problem solvers choose and apply the method and tools that will be most applicable and advantageous for their learning task.*

**Key Words:** Creative Problem Solving, Creativity, Achievement, Geography

### I. INTRODUCTION

Geography is the study of places on earth and their relationship with each other, how people interact with the environment and with each other from place to place and they classify the earth into regions in order to draw generalisations about the complex world in which people live. Geographers engage in a range of activities related to space, place, and the dynamic interactions of agents within and across spaces and places (Baerwald, 2010; NRC, 1997). The discipline focuses on a similar set of core ideas: spatiality, human-environment interaction, interconnections between places, and place-based and regional analysis (Abler, 1987; Baerwald, 2010).

National Research Council report (1997) characterizes geography as being forward thinking and essential to society for key issues including sustainability, economic stability, national security, and response to environmental change. Geography is a structured way of exploring, analyzing and understanding the characteristics of the places that make up our world, using the concepts of place, space, environment, interconnection, sustainability, scale and change. (Maude, 2013)

In the occasion of global uneasiness and multitasking generations it is momentous that all members of society be conditioned to make judgments about ethnic and religious collision, growing populations in poverty, increasing contest for finite natural resources, and degradation of the natural environment and is observed that since the last section of the 20<sup>th</sup> century the earth as the 'home of human race' is undergoing unconventional changes due to human exercise. Geography education assists and groom people for these tasks.

In the present study Creative Problem Solving Model for Promoting Achievement among Higher Secondary School Geography Students, the investigator used Osborn-Parness model of Creative Problem Solving. The CPS frame of reference has evolved through more than five decades of work (Isaksen&Treffinger, 2004) and has revised and remodeled in many categories since its origin and negotiated that problem solving style is a very important facet of creative productivity. CPS frame of reference elicit thoughtful, deliberate preference in which problem solvers choose and apply the method and tools that will be most applicable and advantageous for their learning task. Treffinger and Selby (2004) define problem solving styles as consistent individual differences in the ways people prefer to plan and carry out generating and focusing, in order to gain clarity, produce ideas, or prepare for action when solving problems or managing change.

Steps of Osborn-Parness five stage creative problem solving model are: objective finding, fact finding, problem finding, idea finding, solution finding and acceptance finding. (Isaksen and Treffinger, 2004). In every

step, people repeated the brainstorm and choose process, emphasizing on divergent thinking, followed by convergent thinking, with every step framing the creative footing for the next step.

### 1.1. OBJECTIVES

The present inquiry intends to achieve the following objectives:

- To compare the mean pre-test achievement scores of experimental group and control group
- To compare the mean post-test achievement scores of experimental group and control group
- To find out the significance of gain in achievement scores of experimental group and control group

### 1.2. HYPOTHESES

On the basis of objectives of the study, the following hypotheses were formulated:

- Statistically significant difference exists between the mean pre-test achievement scores of experimental group and control group
- Statistically significant difference exists between the mean post-test achievement scores of experimental group and control group
- Statistically significant gain in achievement scores exist in the pre-test and post-test of the experimental and control group

### 1.3. METHODOLOGY

Since the main objective of the present study was to test the effectiveness of Creative Problem Solving Model for Promoting Achievement among Higher Secondary School Geography Students, a quasi-experimental method with pre-test post-test two group design was adopted. The study was conducted on a sample of 269 XI<sup>th</sup> standard students from five different schools from Kottayam and Ernakulam district. Tools used are lesson design based on Osborn-Parness model of Creative Problem Solving, lesson design based on prevailing activity oriented approach, and achievement test in Geography. The statistical techniques used are descriptive statistics, paired sample t-test, ANOVA and ANCOVA.

## 2. RESULTS AND DISCUSSION

### 2.1. Descriptive statistics of pre test and post test scores based on achievement in control and experimental groups

The data on pre test and post test scores on achievement of participants from control and experimental groups were collected and calculated the basic descriptive statistics. The details are given in Table 1

Table 1: Descriptive statistics of pre test and post test scores on achievement in control and experimental groups

Scores	Groups	N	AM	SD	SE	LCL	UCL
Pretest	Control	136	35.16	8.09	0.69	33.79	36.53
	Experimental	133	35.59	8.60	0.75	34.11	37.06
Posttest	Control	136	35.10	8.12	0.70	33.72	36.47
	Experimental	133	83.08	8.55	0.74	81.61	84.54

From Table 1, it is seen that for control group the mean of pre test score for achievement is 35.16 with SD 8.09 and SE 0.69. The 95% confidence interval for the mean achievement of pre test scores of the population varies from 33.79 to 36.53. For the experimental group, the mean of pre test score for achievement is 35.59 with SD 8.60 and SE 0.75. The 95% confidence interval for the mean achievement of pre test scores ranges from 34.11 to 37.06.

Similarly, it is seen that for control group the mean of post test score for achievement is 35.10 with SD 8.12 and SE 0.70. The 95% confidence interval for the mean achievement of post test scores ranges from 33.72 to 36.47. For experimental group, the mean of post test score for achievement is 83.08 with SD 8.55 and SE 0.74. The 95% confidence interval for the average achievement of post test scores ranges from 81.61 to 84.54.

The low SE values indicate that the arithmetic mean to estimate the average achievement scores is a reliable and precise estimator. Thus there is an observed difference in mean pre test and post test scores on achievement of participants in control and experimental groups. These observed mean differences were tested for statistical significance using ANOVA.

### 2.2. Comparison of pre test and post test achievement scores of experimental and control group using ANOVA.

Table 2. Summary of ANOVA of achievement scores of experimental and control group

SDI	Source of Variation	SS	df	MSS	F ratio	P value
Pretest	Between Groups	12.13	1	12.13	0.17	0.677ns

	Within Groups	18610.70	267	69.70		
	Total	18622.83	268			
	Between Groups	154793.07	1	154793.07		
Posttest	Within Groups	18543.01	267	69.45	2228.86	0.000**
	Total	173336.07	268			

\*\* : significant at 1% level (P<0.01), ns: not significant (P>0.05)

From Table 2, it is seen that the calculated F ratio for pre test scores on achievement is 0.17 with P >0.05. The inference is that the groups do not differ significantly in their mean pre test scores on achievement. Again, the calculated F ratio for post test scores on achievement is 2228.86 with P < 0.01. The inference is that the groups differ significantly in their mean post test scores on achievement.

**2.3. Comparison of pre-to-post test Mean differences in achievement scores of experimental and control group using paired sample ‘t’ test.**

Table 3. Data and the result of comparison of pre-to-post test achievement scores of experimental and control group

Group	SDI	AM	N	SD	t	df	P
Control	Pretest	35.16	136	8.09	0.773	135	0.441ns
	Posttest	35.10	136	8.12			
Experimental	Pretest	35.59	133	8.60	43.220	132	0.000**
	Posttest	83.08	133	8.55			

\*\* : significant at 1% level (P<0.01), ns: not significant (P>0.05)

From Table 3, it is observed that, in the control group there do not exist statistically significant differences in the pre-to-post test mean achievement scores (t= 0.773, P>0.05). In the experimental group, there exist statistically significant differences in the pre-to-post test mean achievement scores (t= 43.220, P<0.01). Experimental group reported higher gain in achievement scores as compared to the control group.

**2.4. Genuineness of post test mean differences based on achievement in control and experimental groups**

From the above tables, it is seen that the pre test mean of scores on achievement in control and experimental groups showed observed differences. Hence the two groups cannot be compared for their final post test scores on achievement, unless the effect due to their initial pre test scores is eliminated. Hence the technique of ANCOVA has to be adopted.

Table 4. ANCOVA of adjusted post test scores of experimental and control groups.

SDI	Source of Variation	SS	df	MSS	F ratio	P value
Adj. Post-test	Between Groups	153530.18	1	153530.18		
	Within Groups	15179.33	266	57.07	2690.44	0.000**
	Total	168709.52	267			

\*\* : significant at 1% level (P<0.01)

From Table 4, it is seen that the calculated F ratio is 2690.44 which is statistically significant also (P < 0.01). Because of the presence of the covariate, one degree of freedom is reduced from within group variation and also from the total variation. The inference is that, the two groups differ significantly in their post test mean achievement scores after the effect due to initial pre test scores is eliminated. The adjusted post test means of control and experimental groups are given in Table 5

Table 5: Adjusted post test means of scores of experimental and control groups.

Group	Adj.AM	SE	LCL	UCL
Control	35.18	0.65	33.91	36.46
Experimental	82.98	0.66	81.69	84.27

From Table 5, it is observed that, if the effect due to initial pre test scores on achievement were eliminated, the adjusted post test mean of control group is 35.18 with SE of 0.65. The 95% confidence interval for adjusted post test mean of achievement scores ranges from 33.91 to 36.46. The adjusted post test mean achievement scores of experimental group is 82.98with SE of 0.66. The 95% confidence interval for adjusted post test mean of achievement scores ranges from 81.69 to 84.27. Hence the adjusted post test achievement scores of experimental group is much higher as compared to the control group.

**3. MAJOR FINDINGS**

The major conclusions drawn from the study are placed below.

- Comparison of pre-test and post-test achievement scores of experimental and control group using ANOVA shows that the experimental group differ significantly in their post-test achievement scores in Geography among higher secondary school students. The obtained 'F' value is 2228.86 which is significant at .01 level ( $P < .01$ ).
- Comparison of pre-test and post-test achievement scores of experimental and control group using paired sample 't' test reveals that experimental group reported higher gain in achievement scores as compared to the control group. (Control  $t = 0.773$ ,  $P > .05$ ; Experimental  $t = 43.220$ ,  $P < .01$ )
- The Analysis of Covariance on achievement scores of experimental and control group shows that the two groups differ significantly in their post test mean achievement scores after the effect due to initial pre test scores is eliminated. The calculated F ratio is 2690.44 which is statistically significant at 0.01 level. ( $P < .01$ )
- The adjusted post test achievement scores of experimental group is much higher as compared to the control group.

#### **4. CONCLUSION**

The study divulge that the present model is more effective than the activity oriented method for ascertaining the objectives of learning Geography among higher secondary school students. This will encourage students to be more innovative and creative in planning and solving complicated, open-ended problems and makes learning more natural, flexible dynamic and meaningful .Each of the stages and components of the model provides opportunities for geography learners to become effective in accordance with the demands of the new world. Creative Problem Solving is an instructional expedient that prepares learners to identify worthwhile controversial problems for further exploration and is useful for the development of critical and creative thinking about complex, real-life problems, and is consociated with an attitude that fosters inquiry and the ability to carry out learning systematically.

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