



# International Journal of Innovative Research in Science Engineering and Technology (IJIRSET)

*(A Monthly, Peer Reviewed, Refereed, Scholarly Indexed, Open Access Journal)*



**Impact Factor: 8.524**

**Volume 14, Issue 1, January 2025**

# Higher Order Thinking and Participatory Learning Program: An Experimental Study among Secondary School Students

Dr. Sheenu G S\*, Prof. (Dr.) Issac Paul\*\*

Assistant Professor, Kerala University College of Teacher Education, Kollam, India\*

Professor, GCTE, Thycaud, Thiruvananthapuram, Kerala, India\*\*

**ABSTRACT:** Participatory method is very important in the process of teaching and learning in this era because it helps in discovering different talents of students, foster life skills and enables them to be more creative and confident. It makes students work harder. Students who regularly participate in class are constantly involved with the material and are more likely to remember a greater portion of information. Active classroom participation improves critical and higher-level thinking skills. The present investigation was a quasi- experimental approach with pre-test post-test non-equivalent comparison group design. The sample comprised of 60 secondary school students studying in standard IX. Academic Achievement Test based on Higher Order Thinking (HOT) and Lesson Templates based on Participatory Learning Program were the major tools used for the study. Data obtained were analyzed by using ANOVA and ANCOVA. The results showed there is significant difference in the means of experimental and control groups with respect to Higher Order Thinking.

## I. INTRODUCTION

Participatory learning describes the stance of an active, engaged learner within a responsive, flexible curriculum or learning context. The aim of participatory learning is to provoke the thinking process, catalyzes consultation and promotes involvement in the issue or intervention. Participatory learning program is a set of participatory learning techniques in which the learner is the active participant in the learning situation. Participatory method is very important in the process of teaching and learning in this era because it helps in discovering different talents of students, foster life skills and enables them to be more creative and confident (NEP, 2020 p12). In the context of the present investigation, Participatory Learning Program is a set of structured and organized instructional practices and learning techniques proceeds through the phases of Sensitization, Conceptualization and Application. Most of the studies have shown that participatory approach produced a better result in the academic achievement of the learner (Mohmud et al.,1998; Pai, 2010; Shahla Dastyar, 2019; Chinelo (2010); Shen Jia et al., 2004; Nurwalidah, 2018; Godfrey et al.,2011). Academic Achievement is the knowledge obtained or Skills developed in the school subjects usually designed by test scores or marks assign by the teacher (Good, 2009). In the present investigation, the achievement test is based on the higher order thinking objectives Analyzing and Evaluating as per the Revised Bloom's Taxonomy (Anderson & Krathwohl 2001).

## II. OBJECTIVE OF THE STUDY

The objective of the present study is

To test the effectiveness of Participatory Learning Program for enhancing Higher Order Thinking (Analyzing, Evaluating) among Secondary School Students

### Hypothesis of the Study

Participatory Learning Program is effective in enhancing Higher Order Thinking (Analyzing, Evaluating) among Secondary School Students

### III. METHODOLOGY IN BRIEF

The present investigation was designed as a Quasi- Experimental study, using the Pre-test-Post –test Non-equivalent Comparison Group Design. In the experimentation phase pre-test post-test non-equivalent group design was adopted to assess the effectiveness of Participatory learning program. The random sample of 60 Secondary School students of Kollam District, Kerala was categorized as one experimental group and one control group. The experimental group was treated with Participatory learning program and control group with the prevailing activity-oriented modes of curriculum transaction. A test in Academic Achievement based on Higher Order Thinking was administered as pre-test post-test before and after the treatment of independent variables. The experiment was conducted during normal hours at the select institution. The scores synthesized through the pre-test and post-test were inquest quantitatively to ascertain the effectiveness of Participatory learning program.

#### Major Tools used in the study

- Academic Achievement Test based on Higher Order Thinking (HOT)
- Lesson Templates based on Participatory Learning Program

#### Statistical Techniques of the Study

- Inferential statistics like Independent sample t-test to determine the significance of the difference between the students' perception.
- Analysis of variance (ANOVA) to determine whether there is a significant difference between the experimental group and control group, Participatory Learning Program over prevailing activity oriented mode for the Communication Skill scores (Pre-test, Post-test and gain scores).
- Analysis of Covariance (ANCOVA) used to test the comparative effectiveness of the Participatory Learning Program over prevailing activity mode for Communication Skill post-test scores with pre-test scores as covariance.

### IV. ANALYSIS AND INTERPRETATION

Analysis of the collected Data to find out the Effectiveness of Participatory Learning Program on Higher Order Thinking (Analyzing, Evaluating) among Secondary School Students

Inferential Analysis

**Test of significant difference between the Means of pre-test scores on Higher Order Thinking in the whole sample**

Variable	Treatment Groups	N	Mean	S.D	t value	Level of Significance
HOT	Experimental	30	9.80	4.36		
	Control	30	8.43	5.52	1.06	Ns

#### ns- not significant

The t values obtained ( $t = 1.06, p > .05$ ) for the Means of pre-test scores of HOT of Experimental and Control group are not significant since it is less than the table value (1.96) required for significance at .05 level. This reveals that there is no significant difference in the Means of the pre-test scores on Higher Order Thinking of Experimental and Control groups.

**Test of Significant Difference Between the Means of Post-test Scores on Higher Order Thinking in the Whole Sample**

Variable	Treatment Groups	N	Mean	S.D	t value	Level of Significance
HOT	Experimental	30	15.90	6.14		
	Control	30	10.56	5.48	3.54*	$p < 0.05$

The t values obtained ( $t = 3.54, p < 0.05$ ) for the Means of post-test scores of Experimental and Control are significant since it is greater than the table value (1.96) required for significance at .05 level. This reveals that there is significant difference in the Means of the post-test scores on Higher Order Thinking of Experimental and Control groups. This clearly proved that the Experimental treatment using Participatory Learning Program was effective in enhancing the Higher Order Thinking among secondary school students.

**Comparison of Gain scores of students in Experimental and Control group regarding Higher Order Thinking [HOT]**

Variable	Treatment Groups	N	Mean	S.D	t value	Level of Significance	Effect Size	Cohen's category
HOT	Experimental	30	6.10	2.96				
	Control	30	2.13	1.47	6.55*	$p < 0.05$	1.30	Large

The t values obtained ( $t = 6.55, p < 0.05$ ) for Means of gain scores of HOTA of Experimental and Control groups. This reveals that there is significant difference in the Means of gain scores of the post-test scores on Higher Order Thinking of Experimental and Control groups. Cohen's d Effect size is calculated to test the performance of Experimental Group over Control Group. Cohen (1988) proposed rules of thumb for interpreting effect sizes as small effect size is 0.20, a medium effect size is 0.50 and large effect size is 0.80. The calculated effect size obtained was 1.30 for HOTA which is greater than 0.80, the limit set by Cohen's category was large. This means Participatory Learning Program had a large effect in enhancing HOTA when compared to Activity Based Instruction.

**Summary of One-Way Analysis of Variances of the pre-test and post-test scores on the Higher Order Thinking**

Sample	Source of Variation	df	SSx	SSy	MSx(Vx)	MSy(Vy)	Fx	Fy
	Between Groups	1	28.017	426.66	28.017	426.66	1.13	12.58
HOT	Within Groups	58	1438.16	1966.06	24.79	33.89		
	Total	59	1466.18	2392.73				

The values of ( $F_x = 1.13$  with  $df (1,58)$ ) are not significant at .05 level of significance since these values are less than the table value required. The values of ( $F_y = 12.58$  with  $df (1, 58)$ ) are significant at .05 level of significance since these values are greater than the table value required. This shows that the mean score of HOTA does not differ significantly among the two groups before the experiment and differ significantly among the two groups after the experiment.

**Summary of Analysis of Co-Variances of the pre-test and post-test scores on the Higher Order Thinking [HOT] of Experimental and Control group: whole sample**

Sample	Source of Variation	df	SSx	SSy	MSx(Vx)	MSy(Vy)	Fyx
	Between Groups	1	28.017	426.66	220.02	220.02	40.3
HOT	Within Groups	57	1438.16	1966.06	310.52	5.44	

	Total	58	1466.18	2392.73			
--	-------	----	---------	---------	--	--	--

From the table it is observed that the  $F_{yx}$  ratio is significant for the Higher Order Thinking [HOT] for the total sample ( $F_{yx}=40.3$ ,  $df(1,57)$ ,  $p<.05$ ). There exists a significant difference in the mean score of Higher Order Learning Outcomes [HOT] of Experimental and Control group after the treatment.

**Comparison of the scores on HOT of the Experimental groups and Control group using Adjusted Means**

The adjusted Means for the post-test scores of the students in the Experimental and Control groups were compared and the difference between adjusted ‘y’ means was tested for significance. The data for adjusted Means of post-test scores of students in the Experimental group are compared and given in the Table

**Data for Adjusted Means of post test scores on Higher Order Thinking of Experimental and Control group**

Variable	Treatment Groups	n	Mx	My	Mxy	SEm	t value	Level of Significance
HOT	Experimental	30	9.80	15.90	15.16	.42	9.19*	p<.05
	Control	30	8.43	10.56	11.30	.42		

\*significant at 0.05 level

The obtained t value 19.31 ( $p<0.05$ ) reveals that there is significant difference in the adjusted means scores on Higher Order Thinking [HOLT] of Experimental and Control group.

**V. FINDINGS AND CONCLUSIONS**

Findings revealed that there were significant differences between the mean post test scores of Experimental and Control group with respect to the Higher Order Thinking [HOLT]. The mean post test scores of Experimental group were significantly higher than that of the mean pre-test scores of the Control group. This clearly proved that the Experimental treatment using Participatory Learning Program was effective in enhancing the Higher Order Thinking-Analysing and Evaluating among Secondary School Students. Hence the hypothesis is substantiated.

**EDUCATIONAL IMPLICATIONS OF THE STUDY**

The Participatory Learning Program materials to classroom teaching promote good social and intellectual habits and bring a change in the attitude and outlook of the learner. The developed Participatory Learning Program provide ample opportunity for the learner to think critically, logically, and reflectively for the group and for themselves. Participatory Learning Program provide students with opportunities to share, care, respect and accept the opinion of others in learning group and outside the group. The developed Participatory Learning Program create an active self-paced and self-directed learning environment. The learners developed an ability to analyse information and experiences in an objective manner. The learner with critical thinking can think all the information that can receive from so many different sources. The Participatory Learning Program provide ample opportunity to think critically and to become careful and responsible thinkers who make good decision and solve problems.

**REFERENCES**

1. Anderson, L. W., & Krathwohl, D. R. (2001). A Taxonomy for Learning, Teaching and Assessing: A Revision of Bloom’s Taxonomy of Educational Objectives.
2. Baker, W. J., & King, H. (2013). Participatory learning walks: reflective practice for the conductor-music educator. Australian Journal of Music Education, (2), 35-45.
3. Boonmun, W. (2007). Effects of Participatory Learning Program on Sexual Communication Between Fathers and Adolescent Sons (Doctoral dissertation, Mahidol University).

4. Chinelo,Duze.O. (2010). Effects of participatory learning technique on achievement and attitude of B. Ed. Students in educational research methods. *Journal of Social Sciences*, 22(3), 185-189.
5. Gorla et al.(2023) A Participatory pedagogical model for online distance learning: ideation and implementation. *Erick: EJ1375873 V24n1 Article 9 p145-161*
6. Kucukaydin et al., (2012) participatory learning in formal adult education contexts *International journal of adult vocational education and technology v3n1Article 1 p1-12.ERIC:EJ1155152*
7. Pai,R.P.(2010). Effects of Participatory Learning Techniques on Attitude Towards and Achievement in Educational Statistics of B.Ed. Students. *Edutracks*, 10(3),32-35.
8. Reilly, E. (2011). Participatory learning environments and collective meaning making practice. *Journal of Media Literacy Education*, 3(1), 4
9. Robson,F., Forster,G., & Powell,L. (2016). Participatory Learning in Presidential Weekends: Benefit or Barrier to Learning for the International Student? *Innovations in Education and Teaching International*, V53, n3, p274-284. <https://iopscience.iop.org/article/10.108>
10. Vaniya, Ritesha. (2015) enhancement Creative Writing Ability of Standard IX Students in English through Participatory Approach Climate [Doctoral Dissertation, Universityof Maharaja Sayajirao, University of Baroda]. *Shodhganga @ INFLIBNET*.<http://hdl.handle.net/10603/91370>
11. Yilmaz,A.(2021). The Effect of Technology Integration in Education on Prospective Teachers' Critical and Creative Thinking, Multi dimensional 21st Century Skills and Academic Achievement. *Participatory, Educational, Research*, 8(2),163-199



INTERNATIONAL  
STANDARD  
SERIAL  
NUMBER  
INDIA



# INTERNATIONAL JOURNAL OF INNOVATIVE RESEARCH

IN SCIENCE | ENGINEERING | TECHNOLOGY

 9940 572 462  6381 907 438  [ijirset@gmail.com](mailto:ijirset@gmail.com)



[www.ijirset.com](http://www.ijirset.com)

Scan to save the contact details