

# Crossover Learning is an Innovative Strategy for Environmental Education

Bindu Joseph<sup>1\*</sup>, Alice Joseph<sup>1</sup>, Anu Cleetus<sup>1</sup>, Liz Kuriakose<sup>2</sup>, Sam Thomas Joy<sup>3</sup>,  
Sindhu S<sup>4</sup>

<sup>1</sup> St .Joseph College of Teacher Education for Women ,Ernakulam

<sup>2</sup> Mount Carmel College of Teacher Education for Women,Kottayam

<sup>3</sup>Titus II Teachers College ,Thiruvalla

<sup>4</sup>NSS Training College , Changanassery

## Abstract

In this study the investigators tried to test the effectiveness of crossover learning for enhancing environmental education among secondary school students .The major objectives of the study were to prepare lesson transcript based on crossover learning strategy for enhancing environmental awareness and to test the efficacy of crossover learning strategy for enhancing environmental awareness .For these objectives two hypothesis were formulated ie,there will be significant difference in Analysis of Variance between experimental group (cross over learning group) and Control group (Activity method group )in Pre-test scores and there will be significant difference in Analysis of Co-Variance between experimental group (cross over learning group) and Control group (Activity method group )in Post -test scores .The tool used was environmental awareness test .The study revealed that crossover learning is an effective strategy for enhancing environmental education

**Keywords:** Crossover Learning , Environmental Education.

## 1. Introduction

The 2015 Innovating Pedagogy report highlights ‘*crossover learning*’ as one of ten innovations that are on the brink of having a profound influence on education . The key concept of crossover learning refers to a comprehensive understanding of learning that connect formal and informal learning situations . Over the next 2-5 years, the authors expect that traditional learning settings (school, university, professional development) will increasingly support learners in linking diverse learning events that connect the classroom with informal and incidental learning: “*These connections work in both directions. Learning in schools and colleges can be enriched by experiences from everyday life; informal learning can be deepened by adding questions and knowledge from the classroom. These*

*connected experiences spark further interest and motivation to learn*”. ((*Crossover Learning | 8 | Connect Formal and Informal Learning | Sharpl, n.d.*)).

## 2.Need and Significance of the Study

An effective way for crossover learning involves educator insisting a question or problem in the classroom to be solved in natural environmental setting . Children can learn by collecting photos, taking down notes, or asking other people for their own thoughts. They are presenting what they learned back in the classroom to further illuminate the given problem.(Panke, 2017) Being able to learn outside of formal schooling supports the development of a child’s skills in a variety of topics and subjects, while also helping them do better in their school requirements and activities.

On the flipside, bringing informal learning into the classrooms can enrich textbook knowledge with personal experience. Crossover learning creates space for students in the formal curriculum to pursue individual interests and themes related to the subject.(Panke, 2017)

Cross over learning provide direct experience to the students . For giving environmental awareness this type of strategy is effective than present methods . Students are learning through direct experience with nature and they will easily be acquaint with nature and its virtues .

**Srinivasa,Kurni and Sarita** (2022)published a paper entitled Crossover learning in Learning, Teaching, and Assessment Methods for Contemporary Learners .The theme of the article is that effective learning takes place in the informal settings such as museums, clubs etc. this type of learning will deepens the understanding of the concepts and value system of the learner .This is a reliable method for students to take advantages of learning opportunities

### **3.Objectives of the study**

- (1) To prepare lesson transcript based on crossover learning strategy for enhancing environmental awareness
- (2) To test the efficacy of crossover learning strategy for enhancing environmental awareness

### **4.Hypothesis of the study**

**H(1)** There will be significant difference in Analysis of Variance between experimental group (cross over learning group) and Control group (Activity method group )in Pre-test scores

**H(2)** There will be significant difference in Analysis of Co-Variance between experimental group (cross over learning

group) and Control group (Activity method group )in Post -test scores

### **5.Method adopted**

Experimental Method was adopted for the study

### **6.Sample selected for the study**

The sample selected for the study was 60 secondary school students of Std.IX from a school in Ernakulam district

### **7.Tool used for the study**

(1)Environmental Awareness Test  
(Prepared and refined by the investigators )

### **8. Procedure**

#### **Phase 1 –Preparation of Learning Material**

Preparation of Lesson Transcript on Environmental Science based on Cross over Learning principals for enhancing Environmental Awareness .The following steps were used in the Lesson Transcript

- (1)Introducing the topic
- (2)Connecting content with environmental situations/places /issues
- (3)Instructions to collect informations from the environmental settings (photos, evidences ,documentaries etc.)
- (4)Presentations of students on collected data
- (5)Open discussions
- (6)Consolidation by the teacher

#### **Phase II-** Preparation of Environmental Awareness Test

Environmental Awareness test was prepared and refined by the investigators.50 multiple choice items were included in the test each item carries one mark .(The same test was used as pre test and post test )

#### **Phase III- Selection of the Sample**

Sample of the study were selected from a secondary school in Eranakulam district,

Kerala state .30 Students were selected as Experimental group and another 30 were selected as Control group. Sample students were standard IX students following SCERT Syllabus of Kerala State

#### Phase IV –Experimental Procedure

##### (a)Administration of pre-test

Environmental Awareness test was administered to experimental group and control group as Pre test .Scores were tabulated

##### (b)Experimental Treatment

Experimental group was exposed to treatment using cross over learning strategy .Control Group was treated with activity method.

##### (c) Administration of post-test

Environmental Awareness test was administered to experimental group and control group as Post test .Scores were tabulated

##### Phase V- Analysis of the data

Collected data were analysed using Analysis of Covariance

##### Phase VI- Discussions and Conclusions

From the analysis Discussions and Conclusions were made accordingly

#### 9. Analysis and Interpretations of Data

The analysis of Variance (ANOVA)for the pre and post scores of the Experimental and Control groups are given in Table

**Table 1**

**Summary of Analysis of Variance of Pre and Post Scores: Experimental and Control Group**

Source of variation	df	SSx	SSy	MSx	MSy
Among means	1	0.02	5133.8	0.02	5200.50
Within Groups	58	-329.17	-8532.7	-5.68	75.59
Total	59	-329.15	-3399.0	-	-

$F_x=0.00$

$F_y=-34.90$

From table F,for df 1/58

F at 0.05=3.90

F at 0.01=6.81

The F-ratios for the Pre and Post scores were tested for significance. The  $F_x$  value obtained is 0 ( $F_x=0:P>0.05$ ) and is very low.  $F_x$  value obtained revealed that , there is no significant difference between the pre test scores of the experimental and control groups . The two groups are more or less equal with regard to pre-test scores The  $F_y$

value obtained is 34.90( $F_y=96.78;P<0.01$ ) is very high . This indicates that,there is significant difference between the post test scores of experimental and control group . The analysis of Co-Variance (ANCOVA)for the pre and post scores of the Experimental and Control groups are given in Table 2

**Table 2****Summary of Analysis of Co-Variance of Pre test and Post test Scores: Experimental group and control Group**

Source of variation	df	SSx	SSy	SSx.y	SSy.x	MSy.x	SDy.x	Fy.x
Among Means	<b>1</b>	<b>0.02</b>	<b>5133.8</b>	<b>-9.25</b>	<b>5200.50</b>	<b>5200.50</b>	<b>8.69</b>	<b>68.80</b>
<b>Within groups</b>	<b>57</b>	<b>-329.17</b>	<b>8532.7</b>	<b>-1179.20</b>	<b>-4308.39</b>	<b>75.59</b>		
<b>Total</b>	<b>58</b>	<b>-329.15</b>	<b>-3399.0</b>					

From table ,for  $df=1/57$

F at 0.05 level=3.96

F at 0.01 level=6.96

The obtained F ratio was tested for significance and found that it is significant at .0.01 level ( $F_{yx}=68.80, p<0.01$ ). It is clear from the result that the final means of the treatment groups differ significantly after they have been adjusted for initial differences in post-test .

The adjusted means of post test scores (Y – means)of secondary school students of Experimental and Control Group were computed . The difference between the adjusted Y-means was tested for significance. the data for adjusted means of Post –Test scores of the secondary school students in the Experimental and Control Groups are given in Table 3

**Adjusted means of post test scores of crossover learning treatment groups**

Groups	N	Mx	My	My.x(adjusted )	SEm	CR
Experimental	30	<b>23.03</b>	<b>43.7</b>	<b>43.79</b>	<b>2.24</b>	<b>8.29</b>
Control	30	<b>23.07</b>	<b>25.2</b>	<b>25.17</b>		
		<b>23.05</b>	<b>34.48</b>			

$P<0.01$

CR=8.29

t at 0.05 level=1.96

From table ,for  $df=1/57$

t at 0.01 level =2.56

From table it is clear that the calculated value of critical ratio (CR=8.29, $p<.01$ )is significant at .0.01 level of significance . It indicates that the students at Std . 9 of experimental and control groups differ significantly in their post test scores of crossover learning in Malayalam as they were adjusted to pre-test scores. It is also

clear that the mean scores of post-test of experimental group (M= 43.79) is significantly higher than that of the control group (M=25.17). It leads to the major inference that crossover learning is effective than activity method in enhancing environmental awareness

### Tenability of Hypotheses

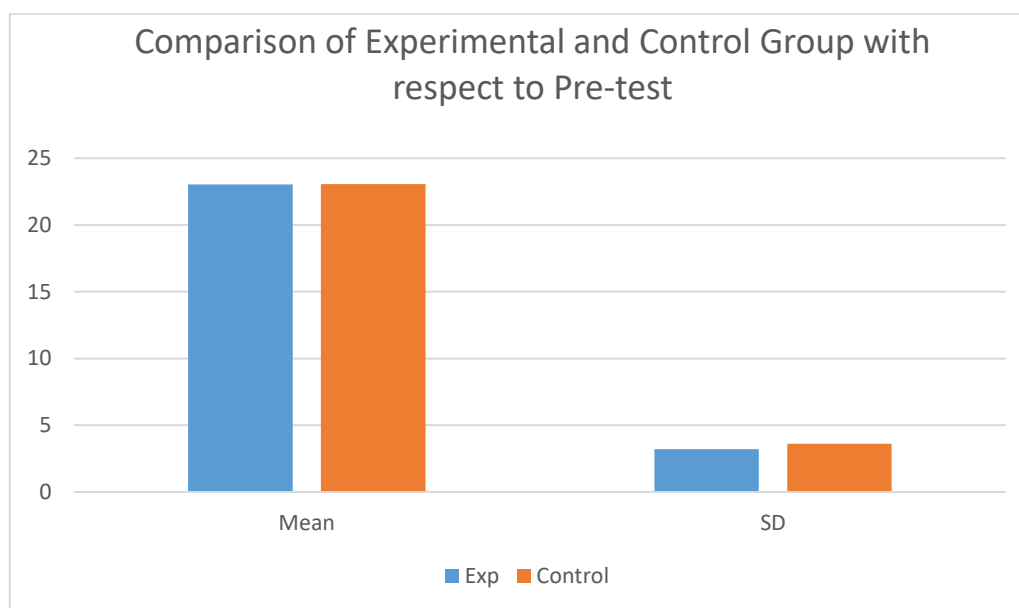
1. Analysis of Variance between the Experimental and Control groups revealed that, the two groups do not differ significantly with respect to pre test scores. Hence the Hypothesis formulated in this context viz., There will be significant difference in Analysis of Co-Variance between experimental group (cross over learning group) and Control group (Activity method group) in Post -test scores is rejected.

2. The test of significance between the means of experimental and control group revealed that there is significant difference in the ANCOVA between the experimental and control group with regard to post test scores and hence the hypothesis; There will be significant difference in Analysis of Co-Variance between experimental group (cross over learning group) and Control group (Activity method group) in Post -test scores is accepted.

### Graphical representation of Comparison of Experimental and Control Group with respect to pretest

	Exp	Control
<b>Mean</b>	<b>23.03</b>	<b>23.07</b>
<b>SD</b>	3.196	3.618

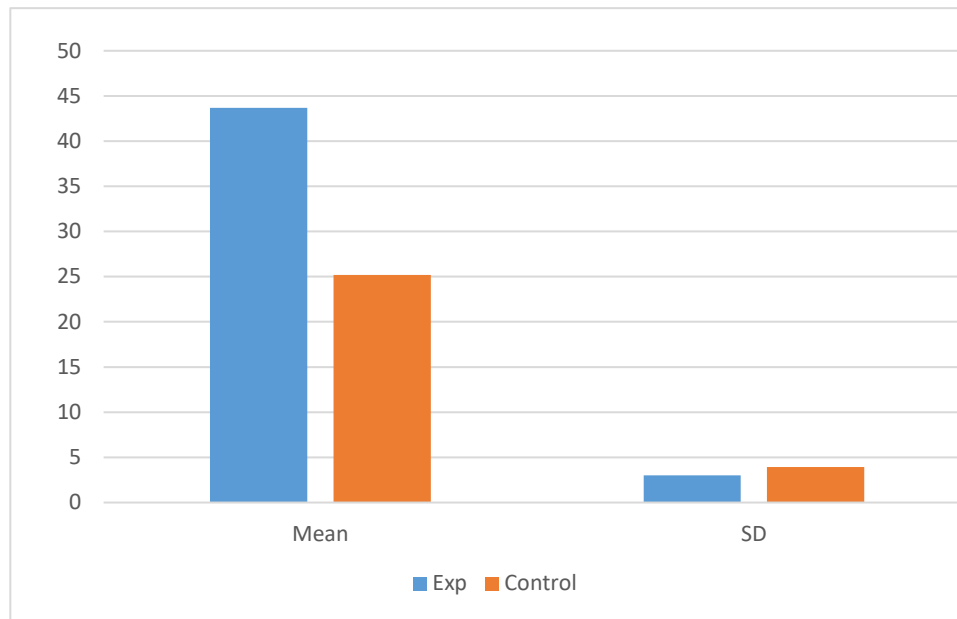
Pre-test



*Figure 1 Comparison of Experimental and Control Group with respect to pretest*

### Graphical representation of Comparison of Experimental and Control Group with respect to post test

	Experimental group	Control group
<b>Mean</b>	<b>43.7</b>	<b>25.2</b>
<b>SD</b>	3.015	3.914



**Figure 2 Comparison of Experimental and Control Group with respect to post-test**

## 10. Findings and Discussions

This study aimed to test the efficacy of crossover learning for enhancing environmental awareness of school students. Crossover learning can provide a platform for direct learning and experimentation. Environmental Education will be effective only if it is given through direct experience. This study revealed that crossover learning can enhance environmental awareness among school children. The instructional phases of crossover learning is also flexible to provide suitable situations for environmental study. Teachers can adopt ways and means which is convenient to their learning climate for implementing crossover learning.

## 11. Conclusion

Crossover learning combines the strengths of both formal and informal learning environments, and aims to provide students with the best of both. TeachThought describes the result as more authentic and

engaging opportunities for learning. (*Why Crossover Learning Is Working in the Classroom*, n.d.) Thinking outside the bounds of formal education requires a certain amount of creativity. Giving students freedom to explore, to make mistakes and to fully understand, allow them to build not only competence, but also confidence in themselves.

## References

- Crossover learning | 8 | Connect formal and informal learning | Sharpl.* (n.d.). Taylor & Francis. Retrieved January 15, 2023, from <https://www.taylorfrancis.com/chapters/mono/10.4324/9780429485534-8/crossover-learning-sharpl-mike>
- Panke, S. (2017, July 7). *Crossover Learning*. AACE. <https://www.aace.org/review/crossover-learning/>
- Why Crossover Learning is Working in the Classroom*. (n.d.). Bored Teachers.

Retrieved January 15, 2023, from  
<https://boredteachers.com/post/cross-over-learning>

[https://link.springer.com/chapter/10.1007/978-981-19-6734-4\\_2](https://link.springer.com/chapter/10.1007/978-981-19-6734-4_2)