

# Environmental literacy and environmental ethics among the adolescent learners from the high schools of Kerala State

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**Abstract:** Environmental education aims to develop man power with knowledge, attitude, skills and motivation required to resolve the environmental problems. According to Finland National Commission for UNESCO (1974), environmental education is a way of implementing the goals of environmental protection. It is not a separate branch of science or field of study in society. It should be carried out adhering to the principles of lifelong integral education. Environmental education should be able to fulfill the objectives; it envisions imparting environmental literacy and making children aware about the ethics related to environment. In addition to those objectives there are some sub objectives which will also have to be transacted through environmental education such as the interpersonal relationship between human beings, inculcation of human and social values etc. environmental education consists of two components such as environmental literacy and environmental ethics. The present study intended to find out the level of environmental literacy and environmental ethics and their relationship with respect to gender, type of institution and locale among the adolescent learners from the high schools of Kerala state.

**Key Words:** Environmental literacy, Environmental Ethics and adolescent learners.

## 1. INTRODUCTION:

The words 'environment' and 'education' do not appear to have been used in conjunction with each other until the mid-1960s, the evolution of environmental education has incorporated the influential views of some of the great eighteenth and nineteenth century thinkers, writers and educators notably Goethe, Rousseau, Humboldt, Haeckel, Froebel, Dewey and Montessori. While such influential pioneers clearly contributed to environmental thought and practice, many writers attribute the founding of environmental education discipline to be in the United Kingdom. The first recorded use of the term 'environmental education' in Britain may be traced to a conference held in 1965 at Keele University, Staffordshire (Joy A. Palmer; 1998).

International Union for the Conservation of Nature and Natural Resources (1970) defined environmental education as the process of recognizing values and clarifying concepts in order to develop skills and attitudes necessary to understand and appreciate the inter-relatedness among man, his culture, and his biophysical surroundings. Environmental education also entails practice in decision making and self-formulation of a code of behavior about issues concerning environmental quality.

The ultimate goal of environmental education is the development of environmental literacy and environmental ethics in students for the purpose of protection of our environment.

Environmentally literate students possess the knowledge, intellectual skills, attitudes, experiences and motivation to take up and act up on responsible environmental decisions. Environmentally literate students understand environmental processes and systems, including human systems. They are able to analyze global, social, cultural, political, economic and environmental relationships and weigh various sides of environmental issues to make responsible decisions as individuals, as members of their communities and as citizens of the world (Adapted from Maryland partnership for children in nature; April 2009). H. Spinola (2015) conducted a study related to environmental literacy and says that environmental education is to improve environmental literacy including not just more knowledge but also a better attitude toward the environment and a higher prevalence of pro-environmental behavior. According to Disinger JF and Roth (1992) the creation of an environmentally literate citizenry is an important aim of environmental education.

Environmental ethics is a new sub-discipline of philosophy that deals with the ethical problems surrounding environmental protection. It aims to provide ethical justification and moral motivation for the cause of global environmental protection (Tongjin Yang; 2006). Ultimately environmental literacy and environmental ethics of an individual or an adolescent learner determines his attitude towards nature, interaction with other living things and interaction among family and society. By this research investigator is trying to reveal the extent of environmental literacy and environmental ethics present in adolescent children and the relationship between them also.

The above researchers pointed out the importance of environmental literacy and environmental education. But there is no studies regarding the relationship between environmental literacy and environmental ethics among adolescent learners. A study of this type will throw light into the issues associated with environment. It will also help the investigator to understand what the adolescent learners believe they know and what is actually true.

## **2. HYPOTHESES OF THE STUDY**

- There is significant relationship between environmental literacy and environmental ethics among adolescent learners.
- There is significant difference in the mean scores of environmental literacy based on :
  - i) gender
  - ii) type of management of institution
  - iii) locale
- There is significant difference in the mean scores of environmental ethics based on :
  - i) gender
  - ii) type of management of institution
  - iii) locale

## **3. OBJECTIVES OF THE STUDY**

- To find out the level of environmental literacy among adolescent learners.
- To find out the level of environmental ethics among adolescent learners.
- To find out the contribution of each component in percentage to environmental literacy and environmental ethics.
- To find out whether there exist any relationship between environmental literacy and environmental ethics among adolescent learners.
- To compare the level of environmental literacy of adolescent learners based on (1) gender (2) types of management (3) locale.
- To compare the level of environmental ethics of adolescent learners based on (1) gender (2) types of management (3) locale.

## **4. METHODOLOGY IN BRIEF:**

Normative survey method was adopted for the present study.

### **a. Population**

Population of the study comprises of all the adolescent learners studying in ninth, tenth, plus one and plus two classes in Kerala.

### **b. Sample**

The total sample of 480 adolescent learners was selected for the collection of data.

### **c. Sampling technique**

Stratified random sampling technique.

### **d. Tools used for the study**

Environmental Literacy Scale for Adolescent Learners (**ELSAL**) was used for this study. The items in the literacy scale were categorized under six heads, (a) Awareness on environmental issues (b) ecological knowledge (c) agricultural knowledge (d) awareness on environmental laws (e) awareness on disaster management (f) sociological knowledge. The items were designed so as to measure the different dimensions of knowledge related to environment.

Environmental Ethics Scale for Adolescent Learners (**EESAL**) was used for this study. The items in the ethics scale were categorized into three components such as stewardship, compassion and love for environment and build sustainable society. The items were designed to measure the level of ethics in adolescent learners.

## **Statistical techniques used for the study**

- Percentage analysis

- Test of significance for difference between means (Z test)
- ANOVA
- Scheffe’s post hoc test
- Fisher's LSD post hoc test

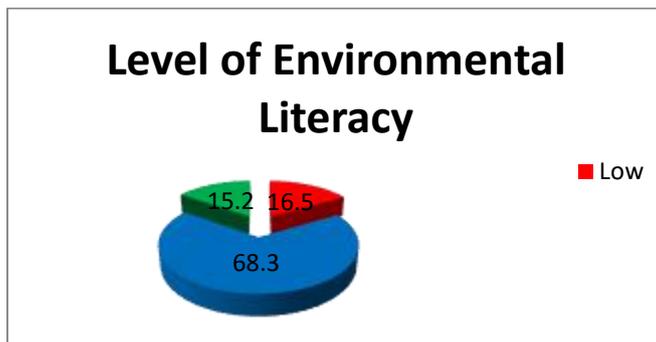
**5. ANALYSIS AND INTERPRETATION OF THE DATA:**

**Table 1. Level of Environmental Literacy among adolescent learnersA**

Level of environmental Literacy	Frequency	Percentage	Cumulative Percent
Low level	79	16.5	16.5
Intermediate level	328	68.3	84.8
High level	73	15.2	100.0
Total	480	100.0	

From the table it is clear that most of the students have intermediate level (intermediate order) of environmental literacy (68.3%). 16.5% of students have low level (low order) of environmental literacy and 15.2% of students have high level (high order) of environmental literacy.

**Graph 1. Level of Environmental Literacy among adolescent learners**

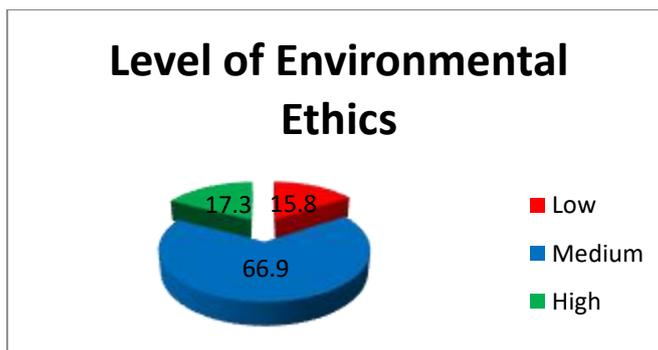


**Table 2. Level of Environmental Ethics among adolescent learners**

Level of environmental Ethics	Frequency	Percent	Cumulative Percent
Low level	76	15.8	15.8
Intermediate level	321	66.9	82.7
High level	83	17.3	100.0
Total	480	100.0	

From the table it is clear that most of the students have intermediate level (intermediate order) of environmental ethics (66.9%). 17.3% of students have high level (high order) of environmental ethics and 15.8% of students have low level (low order) of environmental ethics.

**Graph 2. Level of Environmental Ethics among adolescent learners**

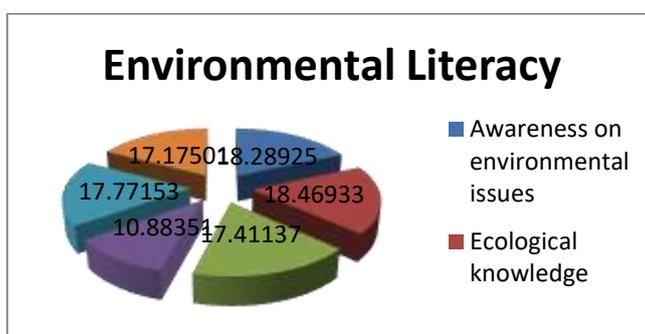


**Table 3. Contribution of components to Environmental Literacy**

Components of Environmental Literacy	Percentage of contribution
Awareness on environmental issues	18.28925
Ecological knowledge	18.46933
Agricultural knowledge	17.41137
Awareness on environmental laws	10.88351
Awareness on disaster management	17.77153
Sociological knowledge	17.17501

From the table it is clear that the component Ecological knowledge has the highest contribution to Environmental literacy (18.46933%). It is followed by Awareness on environmental issues (18.28925%); Awareness on disaster management (17.77153%); Agricultural knowledge (17.41137%); Sociological knowledge (17.17501%); Awareness on environmental laws (10.88351%).

**Graph 3. Contribution of components to Environmental Literacy**

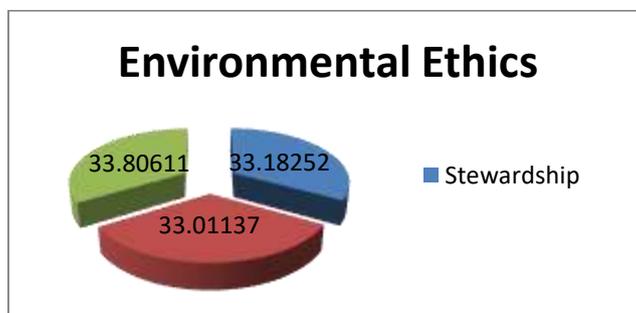


**Table 4. Contribution of components to Environmental Ethics**

Components of Environmental Ethics	Percentage of contribution
Stewardship	33.18252
Compassion and love for environment	33.01137
Build sustainable society	33.80611

From the table it is clear that the component Build sustainable society has the highest contribution to Environmental ethics (33.80611%). It is followed by Stewardship (33.18252%) and Compassion and love for environment (33.01137%).

**Graph 4. Contribution of components to Environmental Ethics**

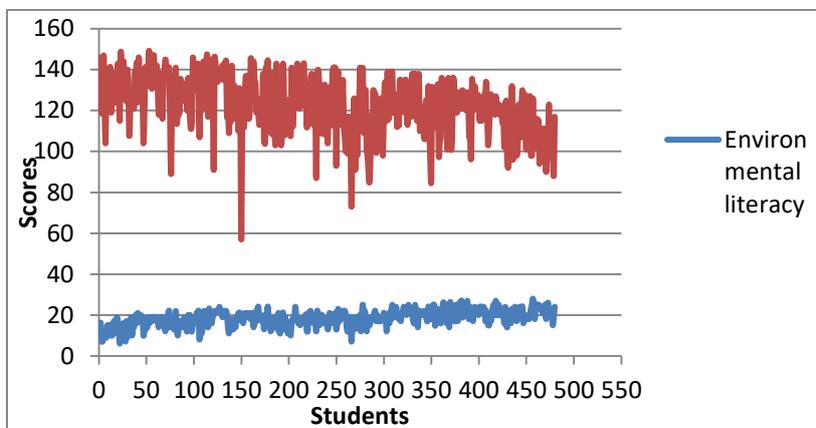


**Table 5. Correlation between Environmental literacy and Environmental Ethics among adolescent learners**

Variable	N	Mean	Standard deviation	Coefficient of correlation (r)	Level of significance
Environmental Literacy	480	18.51	3.973	0.057	N.S.
Environmental Ethics	480	122.94	14.142		

The calculated value of  $r = 0.057$  and is not significant at 0.05 level. ( $r = 0.057$ ;  $p > 0.05$ ). Hence it can be concluded that there is no significant relationship between Environmental Literacy and Environmental Ethics among adolescent learners.

**Graph 5. Distribution of Environmental literacy and Environmental Ethics among adolescent learners**



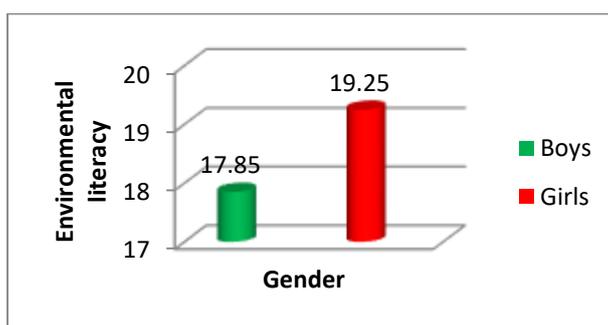
The test of significance of correlation between Environmental literacy and Environmental ethics among adolescent learners revealed that there is no significant relationship between Environmental Literacy and Environmental Ethics among adolescent learners.

**Table6. Test of significance for difference between means of Environmental Literacy of boys and girls**

Variable	Category	N	Mean	Standard deviation	C.R.	Level of significance
Environmental Literacy	Boys	253	17.85	4.229	3.902	0.01
	Girls	227	19.25	3.533		

The calculated value of C.R. is 3.902 and is significant at 0.01 level (C.R. = 3.902:  $p < 0.01$ ). Since the mean scores of the girls are significantly greater than that of the boys, girls have more environmental literacy compared to boys.

**Graph 6. Comparison of means of Environmental Literacy of boys and girls**



**Test of significance for difference between means of Environmental Literacy of sub samples based on type of school management**

**Table 7. DESCRIPTIVES**

Type of school management	N	Mean	Std. Deviation	Std. Error
Govt.	235	19.37	4.141	.270
Aided	176	17.18	3.569	.269
Unaided	69	18.99	3.462	.417
Total	480	18.51	3.973	.181

Table 8. ANOVA

Source of variation	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	502.631	2	251.316	16.986	.000
Within Groups	7057.317	477	14.795		
Total	7559.948	479			

The calculated value of F is 16.986 and is significant at 0.01 level ( $F = 16.986; p < 0.01$ ). Therefore Environmental Literacy is significantly different for sub samples based on type of school management. To find which pairs of sub samples differ significantly, Scheffe's post hoc test is used.

Table 9. Scheffe's post hoc test for Environmental Literacy of sub samples based on type of school management

(I) TSM	(J) TSM	Mean Difference (I-J)	Std. Error	Sig.
Govt.	Aided	2.194**	.383	.000
	Unaided	.385	.527	.766
Aided	Govt.	-2.194**	.383	.000
	Unaided	-1.809**	.546	.004
Unaided	Govt.	-.385	.527	.766
	Aided	1.809**	.546	.004

\*\* The mean difference is significant at the 0.01 level.

From Scheffe's post hoc test the following results are obtained.

- Govt. and Aided school students differ significantly in Environmental Literacy at 0.01 level. Since the mean scores of the Govt. school students is significantly greater than that of the Aided school students, Govt. school students have more environmental literacy compared to Aided school students.
- Govt. and Unaided school students do not differ significantly in Environmental Literacy at 0.05 level.
- Aided and Unaided school students differ significantly in Environmental literacy at 0.01 level. Since the mean scores of the Unaided school students is significantly greater than that of the Aided school students, Unaided school students have more environmental literacy compared to Aided school students.

Graph 7. Comparison of means of Environmental Literacy of sub samples based on type of school management

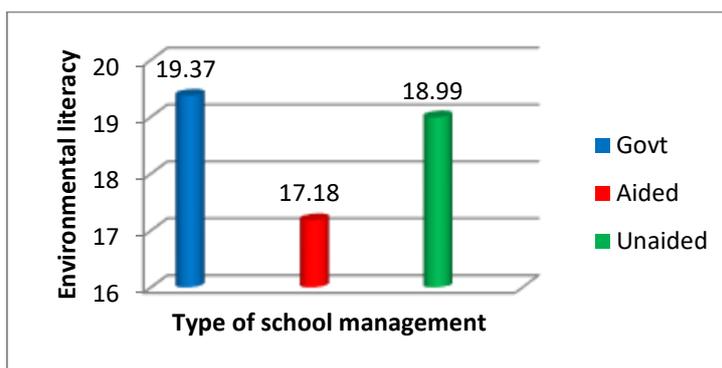
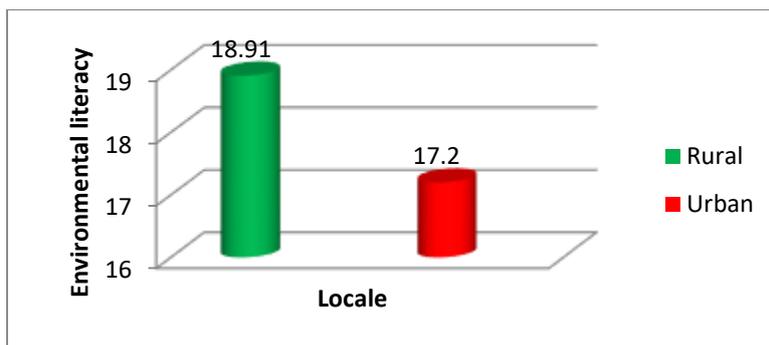


Table 10. Test of significance for difference between means of Environmental Literacy of Rural and Urban students

Variable	Category	N	Mean	Standard deviation	C.R.	Level of significance
Environmental Literacy	Rural	369	18.91	3.825	4.035	0.01
	Urban	111	17.20	4.186		

The calculated value of C.R. is 4.035 and is significant at 0.01 level ( $C.R. = 4.035; p < 0.01$ ). Since the mean of the rural students is significantly greater than that of the urban students, rural students have more environmental Literacy compared to urban students.

**Graph 8. Comparison of means of Environmental Literacy of rural and urban students**

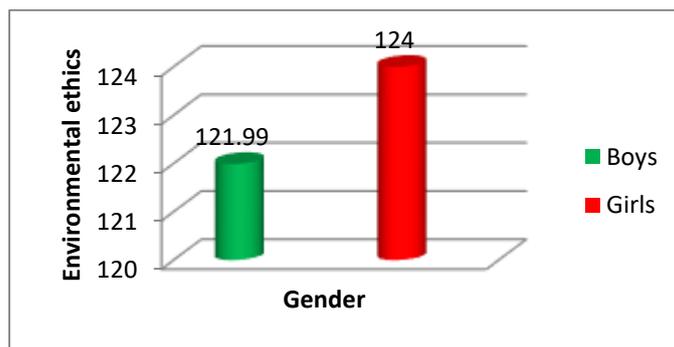


**Table 11. Test of significance for difference between means of Environmental Ethics of boys and girls**

Variable	Category	N	Mean	Standard deviation	C.R.	Level of significance
Environmental Ethics	Boys	253	121.99	14.302	1.558	N.S.
	Girls	227	124.00	13.916		

The calculated value of C.R. is 1.558 and is not significant at 0.05 level (C.R. = 1.558:  $p > 0.05$ ). Since the mean scores of the boys and girls do not differ significantly, girls and boys are more or less equal in environmental Ethics.

**Graph 9. Comparison of means of Environmental ethics of boys and girls**



**Test of significance for difference between means of Environmental Ethics of sub samples based on type of school management**

**Table 12. Descriptives**

Type of school management	N	Mean	Std. Deviation	Std. Error
Govt.	235	122.32	14.000	.913
Aided	176	122.25	14.896	1.123
Unaided	69	126.84	12.053	1.451
Total	480	122.94	14.142	.645

**Table 13. ANOVA**

Source of variation	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	1224.171	2	612.086	3.087	0.047
Within Groups	94575.310	477	198.271		
Total	95799.481	479			

The calculated value of F is 3.087 and is significant at 0.05 level (F = 3.087:  $p < 0.05$ ). Therefore Environmental Ethics is significantly different for sub samples based on type of school management. To find which pairs of sub samples differ significantly, Fisher's LSD post hoc test is used.

**Table 14. Fisher's LSD post hoc test for Environmental Ethics of sub samples based on type of school management**

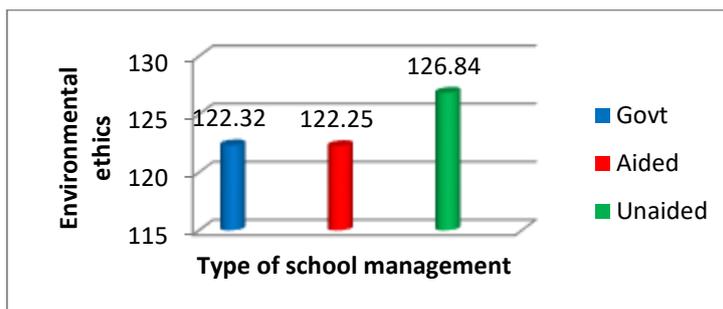
(I) TSM	(J) TSM	Mean Difference (I-J)	Std. Error	Sig.
Govt.	Aided	.069	1.404	.961
	Unaided	-4.521*	1.928	.019
Aided	Govt.	-.069	1.404	.961
	Unaided	-4.591*	2.000	.022
Unaided	Govt.	4.521*	1.928	.019
	Aided	4.591*	2.000	.022

\*The mean difference is significant at the 0.05 level.

From Fisher's LSD post hoc test the following results are obtained.

- Govt. and Aided school students do not differ significantly in Environmental Ethics at 0.05level.
- Govt. and Unaided school students differ significantly in Environmental ethics at 0.05 level. Since the mean score of the Unaided school students is significantly greater than that of the Govt. school students, Unaided school students have more environmental Ethics compared to Govt. school students.
- Aided and Unaided school students differ significantly in Environmental Ethics at 0.05level. Since the mean score of the Unaided school students is significantly greater than that of the Aided school students, Unaided school students have more environmental Ethics compared to Aided school students.

**Graph 10. Comparison of means of Environmental Ethics of sub samples based on type of school management**

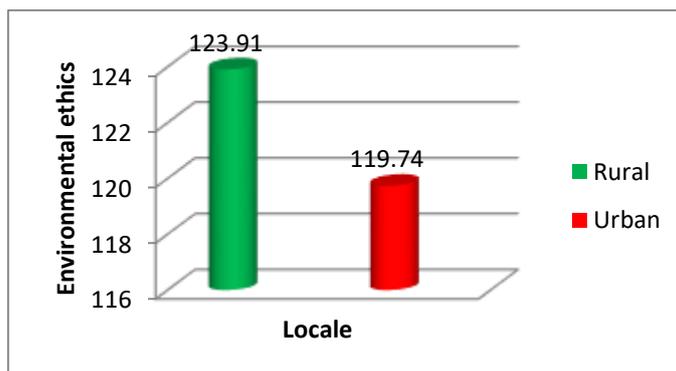


**Table 15. Test of significance for difference between means of Environmental Ethics of Rural and Urban students**

Variable	Category	N	Mean	Standard deviation	C.R.	Level of significance
Environmental Ethics	Rural	369	123.91	13.826	2.741	0.01
	Urban	111	119.74	14.762		

The calculated value of C.R. is 2.741 and is significant at 0.01 level (C.R. = 2.741;  $p < 0.01$ ). Since the mean of the rural students is significantly greater than that of the urban students, rural students have more environmental Ethics compared to urban students.

**Graph 5.11 Comparison of means of Environmental Ethics of rural and urban students**



## 6. Discussion and Conclusion of the study:

By this study investigator emphasize that there is no significant relationship between environmental literacy and environmental ethics among adolescent learners. Adolescent learners are having satisfactory environmental literacy. But that is not converted into the moral attitude towards nature, i.e.; environmental ethics.

It has been proved by the test of correlation between Environmental literacy and Environmental ethics among adolescent learners. The calculated value of  $r = 0.057$  and is not significant at 0.05 level. ( $r = 0.057$ ;  $p > 0.05$ ). Hence it can be concluded that there is no significant relationship between Environmental literacy and Environmental ethics among adolescent learners.

More over the above statistical assumption, absence of significant relationship between environmental literacy and ethics can be confirmed by the analysis of 1. Comparison of means of Environmental literacy and environmental ethics of boys and girls (Girl students have high environmental literacy than boys. But in the case of environmental ethics, both genders are more or less equal). 2. Test of significance for difference between means of Environmental literacy and environmental ethics of sub samples based on type of school management. (Govt. school students have high environmental literacy than unaided and aided school students. But in the case of environmental ethics which is high in unaided school students than govt. and aided school students).

From the above results investigator observed that, a gap is present between environmental literacy and environmental ethics of adolescent learners as a result of the improper way in which the curriculum is transacted in our classrooms. Investigator felt the need to redesign the curriculum as there is a gap between environmental literacy and environmental ethics.

- ✓ Lack of experiential environmental education in different levels of formal schooling.
- ✓ Value deterioration of the current society in all aspects.

Another important observation of statistical analysis is that there is no gap found between environmental literacy and environmental ethics among rural students. Rural students have high environmental literacy and environmental ethics compared to urban students. This may be because of the availability of more opportunities for rural children to interact with the nature than urban children. These opportunities are not the result of current practices of environmental education by formal schooling other than the lifestyle of rural area.

On the basis of this observation, investigator suggests experiential environmental education in different levels of formal schooling and it may be effective for filling the gap between environmental literacy and environmental ethics.

## REFERENCES:

1. Disinger, J.F. and Roth, C.E. (1992). Environmental Education Research News. The Environmentalist, 12:165-168.
2. Elder (2003). A field guide to environmental literacy: Making strategic investments in environmental education. Washington DC: Environmental education coalition.
3. Joy A. Palmer (1998). Environmental education in the 21<sup>st</sup> century- Theory and practice, progress and promise. London: Ratledge, 11 new fether Lone.
4. Spinola, H (2015). Environmental Literacy comparison between students taught in eco- schools and ordinary schools in the Madeira Island of Portugal. Science Education International, Vol.26, Issue.3, 395-416.
5. Tongjin Yang (2006). Towards an egalitarian global environmental ethics; Environmental ethics and environmental policy. UNESCO.