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Appraising Ecoliteracy for Decoding the Learning Experiences Modelled by Natural Provenance to Heed Sustainability

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ABSTRACT: The universal call for heeding sustainability has been deep rooted in almost all walks of human life. The materialisation of the global agenda of creating a sustainable world has witnessed several epoch making educational policies, procedures and programmes being formulated and implemented at global, national and regional levels. Creating environmentally literate citizens or ecoliterates have been one of the major objectives of Education for Sustainability (EfS). The paper examines how far the learning experiences have contributed in fostering Ecoliteracy among the students of higher education. For comprehending this, a survey was conducted by selecting a representative sample of 125 undergraduate students. It was found that female students tend to have more sensitivity towards the environment when compared to their male counterparts. It was also found that the educational efforts have been able to create only mediocre or citizens with only moderate level of Ecoliteracy. This calls for the vital need to organize and implement more creative and fruitful plans and policies for fostering Ecoliteracy in Higher Education without any disciplinary boundaries. This will pave way for developing ecoliterate citizens with high levels of morale in contributing exuberantly towards the harmony of society and the nation as a whole.

Keywords: Education for Sustainability (EfS), Ecoliteracy, Ecoliterates, Sustainability, Higher Education.

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I. INTRODUCTION

The surge of environmental catastrophes in the past few decades has alarmingly been devastating. This has raised the cardinal question – Are the humans sufficiently aware or knowledgeable about the intricate relationships that exist between the humans and the environment? One of the best ways to address this question is by fostering ecoliteracy among the citizens especially the students of higher education as they are the future transformers of the society (Thapa, 1999). Proper comprehension of the interconnectedness of humanity and nature is considered to be vital from time immemorial. Creating environmentally literate citizens or ecoliterates have been one of the major objectives of Education for Sustainability (EfS). This will pave way for developing ecoliterate citizens with high levels of morale in contributing exuberantly towards the harmony of society and the nation as a whole.

Several global initiatives and declarations like the Stockholm Declaration of 1992, the Tbilisi The United Nations Educational, Scientific and Cultural Organization (UNESCO) Conference on Environmental Education of 1977, the Brundtland Report of 1987, the United Nations Conference on Environment and Development of 1992, the World summit on Sustainable Development of 2002 and the UN Conference on Sustainable Development of 2012 have all significantly pointed out the need for sustainable development along with poverty alleviation and ensuring the social well being of the society. As a result of this, education has been identified as one of the effective means for achieving this ultimate goal of sustainable development. This need has been reaffirmed by the declaration of the Decade of Education for Sustainable Development (DESD 2005-14) by the UN envisaging the opportunity for all to acquire the knowledge, skills, attitudes, values and behaviours for addressing the issues of SD and at the same time adorning sustainable lifestyles or building a sustainable planet.

The materialisation of the global agenda of creating a sustainable world has witnessed several epoch making educational policies, procedures and programmes being formulated and implemented at global, national and regional levels. However, the situations prevailing on the planet earth have always posed questions regarding human developmental activities that always seemed to cross the limits. This in turn has challenged the efficacy of the sustainability policies and programmes that were framed to address the issue. Education being one of the most significant means for bringing about transformations has also been an area of concern with respect to this. According to Hoody (1995), there is a vital need for restructuring the educational system by

making provisions for learning opportunities modelled by Environmental Education involving innovative and collaborative methods. This paper intends to evaluate how far the DESD 2005-14 have been able to create ecoliterates who are knowledgeable, sensitive and capacitated to act responsibly for environmental stewardship.

II. NEED AND SIGNIFICANCE

The lack of knowledge about the environment has often resulted in the exploitation and destruction of natural resources resulting in loss of biodiversity (Leather & Quicke, 2009). The rate of environmental degradation demands a concerted effort through cooperative and committed involvement of all the stakeholders concerned as the only way to curb the issues related to sustainability. Most of all there has been an increasing disconnect between humans and the nature (Jack, 2008). This calls for developing the citizens who are competent with regard to cognitive, affective and conative domains for solving the problems of sustainability. Since developing the right attitude is cardinal to taking responsible actions, the institutions of higher learning have an integral role to play towards this. The theoretical model of environmental education proposed by Hungerford and Volk (1990) and Palmer et al. (1998) suggests that the individual must possess adequate knowledge related to environment and skills for action oriented behaviours for developing the right attitude towards the environment. However, this knowledge, skills and attitude becomes valuable only if the individual applies these in their lives.

The upcoming demand for an intense planetary sustainability can be evidenced from the multifaceted ways of developing and adopting new modes of counterculture and morality through education for safeguarding the precious resources bestowed by nature. Apart from this, adoption of new technologies, methods and techniques in various fields of work have also been revolutionising in preserving the nature and environment. For example, the educational institutions can make use of the Geographic Information Systems (GIS) that allows mapping information about the planet earth, helping the learners to develop a deeper understanding about the environment. Legislative environmental reforms with candid rules, laws and regulations have also provided impetus to revolutionising environmental protection activities. The important National Policies of Education has emphasised the vital need for infusing environmental education both as a separate subject of study as well as on an interdisciplinary, multidisciplinary and transdisciplinary basis across the curriculum at all levels of education.

Several educational initiatives in the form of formal and non formal education have been steering the self-awareness of individuals making them ecoliterates who could realise the aim of conserving and preserving nature for sustainability. Unfortunately, over the years, environmental education has been considered as being a forte of natural sciences with tit bits of its contents being imparted through humanities and other disciplines, apparently very little of its contributions are seen from scholars of education (Kahn & Nocella 2012). In the contemporary education scenario, the integration of such content across educational programmes rarely meet these requirements of proper integration of the environmental study in either teacher training or educational leadership. This lack of attention provided in creating ecoliterate teachers also impede the imparting of relevant knowledge to students (Blanchet-Cohen & Elliot, 2011; Davis, 2009).

Higher education has the specific responsibility to serve the purpose since it has the autonomy to act accordingly and responsibility to directly affect change in the community in distinctive ways. Although there have been several pedagogical accomplishments in this field, such ventures that creates a dialectical relationship between the lifestyles and the dominant social structure involving critical knowledge is crucial. What prominent role can Higher Education Institutions (HEIs) play in fostering environmentally responsible citizens through Efs? How significant is the recurring discussions on the themes of ecological principles in sustaining the web of life? How crucial is this knowledge essential for creating a sustainable community ensuring quality of life on earth? How far the educational endeavours have succeeded in meeting the goals of education for sustainable development? These questions are of grave concern for a nation like India which is essentially an emerging economy heading towards becoming a fully developed nation.

According to Goleman *et al.* (2012) teachers must take efforts to nurture the empathy that naturally exist in students towards other forms of life that enables them to develop the vital insight about the interconnectedness and interdependence among the elements of ecosystem. For this, teachers need to be authentic by adopting a holistic approach with multiple perspectives emphasising the nature-human connectedness (Gradle & Bickel, 2010). Awareness about the degrading environment must foster thinking, feeling and acting cooperatively towards the environment for sustainability. Teachers can also prepare students for the unintended consequences of human developmental activities resulting in environmental crises. This may effectively be dealt with appropriate strategies in order to build a resilient community. Above all it is an imperative to be an ecoliterate for developing activities that are more life-affirming to develop a better comprehension about how nature sustains life.

The learners at tertiary level of education assume more environmental responsibility as they are at a stage where they need to assume greater responsibilities and take crucial decisions regarding oneself and others in a determined manner. Only through a knowledgeable erudite community, any changes can be brought about

in the affective domain which would in turn foster action oriented behaviours among the individuals. At this point, it becomes obligatory to evaluate how far the EfS at tertiary level have succeeded in fostering ecoliterate citizens? Therefore, the study intends to find out the level of Ecoliteracy of undergraduate students. The paper also gives an insight on the differences in Ecoliteracy of undergraduate students on the basis of gender, type of management and locale of institution.

III. OBJECTIVES

The objectives of the study are as follows:

1. To find out the level of Ecoliteracy of students based on gender, type of management and locale of the institution.
2. To find out whether there exists any significant difference in the mean scores of Ecoliteracy of students based on gender, type of management and locale of the institution.

IV. METHOD

The method adopted for the study is given below.

4.1 Sample

The population of the study constitute undergraduate students attending Degree courses in the aided and government colleges of Kerala. A representative sample of the population was selected for the study which consisted of 125 undergraduate students attending B.Com Degree course in aided and government colleges of Kerala. The sample for the study was selected by stratified random sampling technique by giving due representation to gender, type of management and locale of the institution.

4.2 Tool

Data was collected by administering an Inventory with self reported statements for assessing Ecoliteracy of the students.

4.3 Statistical Techniques

The collected data was statistically analysed to derive at valid generalisable conclusions. The data analysis was carried out using the SPSS 20 which is a statistical Package for Social Sciences. The following statistical techniques were used for analysing data:

- i. Percentage Analysis
- ii. Mean Difference Analysis

V. DATA ANALYSIS AND RESULTS

Preliminary analysis of the data was conducted to determine the nature of data. this constituted computation of the important statistical constants like mean (M), median, mode, Standard Deviation (SD), skewness and kurtosis.

Table 1 shows the statistical constants of the variable Ecoliteracy for the total sample.

Table 1: Statistical Constants of Ecoliteracy for the Total Sample

Variable	No.	Mean	Median	Mode	SD	Skewness	Kurtosis
Ecoliteracy	150	136.28	135.50	133	12.02	0.150	-0.223

Table 1 reveals that the mean, median and mode of the score Ecoliteracy for the total sample are almost equal. The standard deviation value that indicates the spread of scores above and below the mean is not large (SD=12.009) which indicates that the data are clustered closely around the mean. The skewness which indicates the measure of asymmetry is 0.198 which shows that the distribution of data is positively skewed. The value of kurtosis is -.218 which shows that the distribution is platy kurtic. From the descriptive statistic values, it can be inferred that the distribution is approximately normal.

5.1 Percentage Analysis

Percentage analysis was conducted to determine the level of Ecoliteracy among the students based on gender, type of management and locale of institution. As the first step, the means and standard deviations were computed. Then the scores were categorised into three groups by computing the formula $M \pm 1SD$. The students whose scores of Ecoliteracy was greater than or equal to $M+1SD$ were categorised as highly ecoliterate; the students whose scores of Ecoliteracy was less than or equal to $M-1SD$ was categorised as low ecoliterate and those students whose scores of Ecoliteracy was between $M+1SD$ and $M-1SD$ were categorised as moderately ecoliterate.

Table 2 shows the level of Ecoliteracy of students based on gender, type of management and locale of institution.

Table 2 : Percentage Analysis of the Levels of Ecoliteracy

Sl. No.	Sub Sample		Ecoliteracy		
			High (%)	Moderate (%)	Low (%)
1	Gender	Male	16	68	16
		Female	19	66	15
2	Type of Management	Government	18	62	20
		Aided	19	65	16
3	Locale of Institution	Urban	18	64	18
		Rural	19	68	13

Table 2 reveals that majority of (68% males and 66% females) have only a moderate level of Ecoliteracy. The gender wise comparison also shows that only 16% of males and 19% of females are high ecoliterates, while 16% of males and 15% of females have a low level of Ecoliteracy. With regard to the Ecoliteracy of students belonging to government and aided colleges, 62% and 65% shows a moderate level of Ecoliteracy. Only 18% of students belonging to government colleges are highly ecoliterate when compared to their counterparts which is 19%, while 20% and 16% of students belonging to government and aided colleges have low level of Ecoliteracy. Considering the locale of institution to which the students belong, 64% of students from colleges belonging to urban area have moderate level of Ecoliteracy, while those from rural area are 68%. Students who are high ecoliterates from colleges in urban and rural area constitutes to only 18% and 19% respectively, while 18% and 13% of students from such colleges have low levels of Ecoliteracy.

5.1.1 Discussion

From the result of analysis it is evident that the efforts of Education for Sustainability (EfS) have been able to create only mediocre or citizens with only moderate level of Ecoliteracy. While it is a fact that in order to develop highly responsible environmentally oriented citizens, a moderate level of Ecoliteracy is not sufficient. More creative and fruitful plans and policies need to be organized and implemented for including environmental component in the curriculum without any disciplinary boundaries.

5.2 Mean Difference Analysis

Test of significance of differences between mean scores of Ecoliteracy were determined to find out the differences in Ecoliteracy of students based on gender (Male/Female), type of management (Government/Aided) and locale of institution (Urban/Rural) respectively. The Critical Ratio (CR) for all the sub samples was computed to test the level of significance. A CR ≥ 1.96 was considered to be significant at .05 level and a CR ≥ 2.58 was considered to be significant at .01 level of significance.

5.2.1 Differences in Ecoliteracy Based on Gender

The test of significance of differences between mean scores of Ecoliteracy based on gender of students was computed to find out any differences based on gender (Male/Female) in Ecoliteracy among students. Table 3 shows the data and result of gender differences in Ecoliteracy.

Table 3: Data and Result of Mean Difference Analysis of Ecoliteracy Based on Gender of Students

Variable	Male			Female			Critical Ratio	Level of Significance
	N ₁	M ₁	SD ₁	N ₂	M ₂	SD ₂		
Ecoliteracy	70	133.94	10.96	80	138.33	12.59	2.26	p < .05*

*Significant at .05 level

Table 3 reveals that there exists significant gender difference in Ecoliteracy of students. The critical ratio 2.26 reveals that it is significant at .05 level. The mean value of female students is 138.33 which is high when compared to their counterparts which is 133.94. This shows that females are more ecoliterates than male students.

5.2.2 Differences in Ecoliteracy Based on Locale of Institution

Test of significance of differences in the mean scores of Ecoliteracy of students based on the locality of the educational institution (Urban/Rural) were computed to find out the differences in Ecoliteracy of students from colleges in urban and rural areas.

Table 4 shows the differences in Ecoliteracy of students studying in colleges of urban and rural areas.

Table 4: Data and Result of Mean Difference Analysis based on Locale of Institution

Variable	Urban			Rural			Critical Ratio	Level of Significance
	N ₁	M ₁	SD ₁	N ₂	M ₂	SD ₂		
Ecoliteracy	72	136.36	12.55	78	136.21	11.60	.08	NS

NS- Not Significant

Table 4 reveals that there does not exist any significant gender difference in Ecoliteracy of students studying in colleges of urban and rural areas. The critical ratio .08 reveals that the difference is not significant at .05 or .01 levels.

5.2.3 Differences in Ecoliteracy Based on Type of Management of Institution

The test of significance of differences in the mean scores of Ecoliteracy of students based on the type of management of institution (Govt. /Aided) were computed to find out the differences in Ecoliteracy of students studying in government and aided colleges.

Table 5 shows the differences in Ecoliteracy of students studying in government and aided colleges.

Table 5: Data and Result of Mean Difference Analysis based on Type of Management of Institution

Variable	Government			Aided			Critical Ratio	Level of Significance
	N ₁	M ₁	SD ₁	N ₂	M ₂	SD ₂		
Ecoliteracy	65	138.11	10.50	85	134.88	12.96	1.64	NS

NS- Not significant

Table 5 reveals that there does not exist any significant difference in Ecoliteracy of students studying in government and aided colleges. The critical ratio 1.64 reveals that the difference is not significant at .05 or .01 levels.

VI. EDUCATIONAL IMPLICATIONS

1. Infusing environmental literacy in the curriculum in a coherent manner is essential in order to enrich the knowledge of students for clearly comprehending the interconnectedness of humans with nature for survival and sustenance.
2. Teachers should acquire adequate knowledge, skills and dispositions so as to be competent enough to provide rich learning experiences to learners covering all the aspects of learning for sustainability inducing desirable behavioural changes in learners for environmental stewardship.
3. Students should be exposed to relevant aspects of sustainability through blended approach to get world class experiences to develop the core competencies of Ecoliteracy in the cognitive, affective and conative domains of learning.
4. Education for environmental stewardship should aim at enhancing the habits of minds of learners by focusing on the affective and spiritual domains of learning in order to develop clear values, concerns and appreciation for nature which would in turn develop qualities like equity, justice and connectedness with nature.
5. The essentiality of human-environment relationship should be nurtured with a variety of teaching and learning strategies giving opportunities for hands on experiences, conducting reflective and thoughtful discourses, participating in interdisciplinary academic pursuits through innovations and collaborations.
6. Community participation should be encouraged at HE level by collaborating with local people, organisations, institutions and local government for joining hands for solving environment related problems and for creating and shaping a better future for improving the quality of life.
7. A transdisciplinary approach to teaching and learning that not only goes between and across disciplines, but that which goes beyond disciplines is the need of the hour to develop world class capacities and cognizance for adorning sustainable lifestyles.
8. Academic programmes like seminar, conferences, workshops and symposiums may be organised in institutions of higher learning to keep the teaching learning community informed about the recent developments in this area for developing a cadre of environmentally responsible citizens.

VII. CONCLUSION

A vision of sustainable growth in all spheres of human life and development can only be endured through a concerted effort by all the stakeholders in order to heighten effective social response to current problems. Although individual concern for the environment is pertinent, action oriented behaviour is not evident as such. Despite several programmes for environmental protection had been endured during the past and several

still on anvil, the differences in attitude and behaviour of the learners are still sidelined. Research findings have also shown a consistent result concerning the awareness of people regarding environment. Several studies have confirmed that raising awareness paves way for developing the right attitude which in turn fosters action oriented behaviours. This reaffirms the need for proper integration of environmental aspects in teaching and learning for augmenting Ecoliteracy. For getting a better output, it is very essential to address the theory – practice gap which is one of the important reasons found for low Ecoliteracy. The findings of the study is a wakeup call for reorienting education by integrating environmental aspects in all possible ways through specific subject study and through effective integration so as to heighten the quality of individuals as ecoliterates.

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