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Evaluating Environmental Awareness in Context to Environmental Cognition: A Study of Primary Schools in Central Himalayan Region of India

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Abstract

The key role of environmental education is to create awareness and sensitise the students towards environmental concerns. It is important that being a teacher we should develop environmental values and ethics among students through scholastic and co-scholastic activities in order to make environmental education more joyful and goal oriented. The aim of the proposed study was to evaluate the environmental awareness in context to environmental cognition among students studying in grade fourth and fifth in Government Primary School (GPS) of Bhimtal Block, Nainital, Uttarakhand. An Environment Awareness Test (EAT) was administered on 122 students; (Grade 4^{th} – 73 and 5^{th} – 49 in orders to evaluate environmental cognition. Independent Sample T Test and Path Analysis were used to analyse the data.

The findings of the study reveal the facts related to environmental awareness and its relationship with environmental cognition. The study suggests that by practising practical and theoretical approaches in teaching environmental studies, we can develop the sense of caring and consciousness in children towards their local surroundings. The study is highly original; innovative especially it is an effort to evaluate environmental awareness through environmental cognition.

Key Words: Environment Education, Awareness, Cognition, Central Himalayas

Introduction

The goal of environmental education is to produce citizens who are knowledge about the biophysical environment and its problems, aware of strategies that can be used to deal with those problems and actively engaged in towards their solution (Stappe et al. 1969). The emphasis on environmental awareness began with Tbilisi Declaration of 1977, which described awareness of the local environment as a necessary precursor to environment stewardship (Global Development Research Declaration, 2002). Environmental education in primary schools should be introduced as a multidisciplinary theme (UNESCO-UNEP, 1983) i.e. it should permeate all subjects in the curriculum.

The education system in India had incorporated certain aspects of environment in school curricula in early 1930. The Kothari Commission (1964-66) also suggested that basic education had to offer environmental education and relate it to life needs and aspirations of the people and the nation. The first aggressive thrust for environmental education at school level came in NCF 1986 and the document Plan of Action (POA) 1992. Many state boards and CBSE emphasised on the need to educate children about our environment. NCF 2000 and NCF 2005 had laid enormous emphasis on environmental education to the extent and projected it as an important subject in school

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curriculum. Thus we can say that environmental education is an essential part of every pupil's learning, it helps to encourage awareness of their environment and their active participation in resolving environmental problems.

Key Terms:

Environmental Education -

A process of developing a world population that is aware of and concerned about the total environment and its associated problems and which has the knowledge, skills, attitude, motivation and commitment to work individually and collectively towards solutions of current problems and the prevention of new ones (UNESCO-UNEP , 1976, Athman and Monroe, 2000. p.38)

Awareness -

Awareness as one's ability to notice things, as a state of being fully conscious of what one knows or what one has learned?

Cognition-

Cognition is "the mental action or process of acquiring knowledge and understanding through thought, experience, and the senses".

Central Himalayas-

Physically the Himalayas form three parallel zones: 1. The Great Himalayas 2. The Inner Himalayas also known as Middle Himalayas and 3. Sub-Himalayan foothills. The Inner or Middle Himalayan region contains several hill stations; Nainital in Kumaon Himalaya is one of them which is located at the height of about 6837 feet. Nainital is located between coordinate 29.38^0 N to 79.45^0 E.

Operational Definition:

Environmental Awareness Evaluation

Evaluating the environment as a subject follows understanding and application of basic concepts or principles of environment, the extent of environmental awareness ability is to solve and make judgements on environmental problems. The evaluation of environmental awareness of the students, focussed on student's cognitive aspects.

Role of Environmental Education in Primary Schooling

Environmental education plays a vital role in promoting environmental awareness and developing understanding between theoretical and practical aspects of environment in order to make our society more eco-friendly. Effective environmental education allows children to transfer environmental attitudes and behaviours from school to home, helping to create a wider community of environmental practices in the short term and moving society towards an enhanced environmental rationality in the long term (Loff 1994; Mercer 2000; UNCED 1992). Children's have an innate curiosity and ability to learn from their surroundings through their sensorial experiences, if they come closer to the nature they bond with it by all means and it develops environmental values in them, for this environmental education plays a generic role and fulfil the objectives of awareness, knowledge, attitude, skills and participation..

Relationship between Cognition and Awareness

It is quite interesting to note that notion of awareness is akin to the notion of "cognitive perspective", as was put forward by British philosopher of education Richard Peters. "Cognitive Perspective" according to Peters (1977,p.29) is about the acquisition of " differentiated modes of awareness" (i.e. mathematical, scientific, moral, interpersonal, hierarchical, aesthetic, religious, philosophical), leading tom a kind of understanding that is related to the student's ability to see the place of knowledge" in a coherent pattern of life" (Peters, 1966, p.45)

In light of the notion of "cognitive perspective" as awareness that enables one to see the place of knowledge in relation to one's life, the difference between knowledge as representative of reality and 'awareness' as the ability that enables one to think about how knowledge affect one's own life can be more easily understood. "The notion of cognitive perspective is related to the idea of wholeness", (Scheffler, 1996, p.84).

Although one can know many things about environment, it is likely that such knowledge doesn't make any difference to one's life. Menze 2010, environmental awareness is directly linked to environmental knowledge, attitudes and actions or to knowledge which can have an effect on student's attitudes, Dimopoulos et al., 2009. Apparently it is the awareness and not just knowledge that enables one to change one's perception about environment and do something for the conserving the environment.

Statement of the Problem

The statement of the problem is to evaluate environmental awareness through environmental cognition, of the students studying in Government Primary Schools of Bhimtal Block, Nainital, Uttarakhand. Environmental Cognition includes Knowledge, Comprehension, Skill, Analysis and Evaluation as an important domain in order to evaluate environmental awareness among primary students. Environmental Awareness Test (EAT) was administered on primary students, to evaluate various perspectives of environmental cognition.

Need & Significance of the Study

The textbooks lay emphasis on raising awareness levels and sensitising children about environmental concern. The NCERT textbooks for environmental studies generally take a comprehensive view of the natural, physical, social and cultural environment. It is quite visible that the textbooks commensurate with the age and developmental level of children in order to provide necessary understanding about their current environment. There is vast scope of inclusion of diversified activities for enable primary children to reflect their environmental awareness into their effective behavioural action.

The NCERT based textbooks for teaching environmental studies are presently running in government primary schools of Uttarakhand. The under-study in its preliminary stage in order to collect data related to environmental awareness among primary students studying in government schools (Grade IV and V) have administered Environmental Awareness Test (EAT) on students.

The study is an intensive attempt to explore facts related to environmental awareness level among students studying in government primary schools of Uttarakhand as well as the effectiveness of NCERT textbook, environmental education curriculum and its delivery to students. The proposed work will be significant as it explore the facts related to student's environmental cognition on the basis of sex and grade, it provide the suggestions how we can develop environmental awareness among students in context to environmental conservation and protection.

Review of Literature

Review of literature enlightens the path of the researcher regarding previous studies and highlighted the gap made by the previous one. It guides the investigator how to carry their research work in proper way. Some of the selected studies are:

Christopher Taylor (1998), "Environmental Education in Primary Education: Status and Trends im Southern and Eastern Africa". The study examined the status of environmental education in primary education in 10 Southern and Eastern African countries. The study was based on secondary analysis of existing status of environmental education in formal education. The study considered the provision of environmental education at government level. The analysis of documentation reflected that in almost all the African countries, environmental education in in-service teachers training was not included, except Namibia whereas in Uganda and Kenya limited to < 10% of teachers. The study discussed the problems in developing environmental education in primary education as: implementation framework, lack of materials, lack of environmental education in teacher training, lack of inter-ministry co-operation and pedagogical methods. It suggested for the further development of environmental education in primary education in the region is the inclusion of environmental education in education policy, supported by an implementing framework.

Ikerne Aguirre- Bielschowsky, Claire Freeman and Eva Vass (2102), "Influences on Children's Environmental Cognition: A Comparative Analysis of New Zealand and Mexico".

The purpose of the study was to investigate the Mexican and New Zealand children's conception of the environment and their awareness of environmental problems. The study selected two Pacific Coastal cities; Dunedin in New Zealand and Ensenada in North-West Mexico. Three schools from each city were included in the study. The schools were chosen from different socio-economic backgrounds; low, medium and high. The socio-economic background of the school was assessed through the interviews with teachers and principals.

In Dunedin two schools were enviroschools where as one Montessori school in Ensenada had a strong environmental focus in its curriculum, in each school, 10 children from Year 5 (Age 9-11 years) their teacher and principal were interviewed. The Dunedin schools and the Ensenada Montessori school had a smaller number of children in each class (10-20) therefore all students were interviewed. The interviews were semi-structured conducted face to face and audio recorded. Hierarchical cluster analysis and its graphical representation as a dendogram were used to examine children's understandings of the environment.

The analysis of the children's interviews showed that their understanding of the environment was strongly influence by personal experience, cultural context and their school's environmental education pedagogy and practices. The study revealed that environmental programme running in these schools were more effective and by participating in environmental activities children were transferring these experiences to their home context.

Kaisa Korhonen and Anu Lappalainen (2004), "Examining the Environmental Awareness of Children and Adolescents in the Ranomafana Region, Madagascar". The paper examines children's and adolescent's environmental awareness in rural Madagascar. The study used two types of school survey. Survey I was carried out in 16 schools in 6 villages. The primary school pupils taking part in this survey were from grade III-V (8-15 years old) and the middle school pupils from grade VII-IX (12-19 years old). Six villgaes in Survey I were divided into two groups forested and deforested.

Survey II consisted of open questionnaire in **two** secondary schools of the area. The secondary schools selected for the study were the only secondary schools in the area. Students participated in the survey were 15-21 years of age. Thirty-two complete questionnaires were collected, 17 were from **Ifanadiana** and 15 from **Ambohimahasoa** secondary school. 84% of the children from deforested area responded that local environment deteriorated whereas 74% children from forested areas responded that local environment deteriorated (Forested

Area N= 42, and Deforested Area N= 170; Total N= 212) Children residing in forested and deforested area responded to the items related to the problems like, Lack of Water, Erosion, Landslides, Forest Destruction and Soil infertility.

Responding to the item; *What should be done to conserve the environment?*

Most of the children responded that we can conserve the forest by; Planting trees, Stop practising Tavy and Stop destroying the forest. The study supported that environmental education should be taught both theoretically as well practically.

Lianne Fisman (2005), "The Effects of Local Learning on Environmental Awareness: An Empirical Investigation". The paper studies the effects of an urban environmental education program on children's awareness. The study selected 3rd and 5th grade students in the *Open Spaces as Learning Place Program* in New Haven, Connecticut public school. The study had used three different forms of data; questionnaire, mapping and interview, before and after participation in the program. The results were drawn on the basis of 49 schools who had completed both pre and post program, 47 of 49 students who had completed the mapping also completed both knowledge tests. The study used paired t-test to assess whether the student's maps and test scores had changed significantly. The results suggest that these were significant changes on the student's maps for four of the five variables. To examine the relationship between the SES of a child's neighbourhood and development of environmental awareness, the study used mean household income by census track. The study suggested that service learning component will increase elementary students' environmental awareness with their own neighbourhood. Action oriented learning will be more effective in reaching children living in economically depressed neighbourhood.

Zaara Kidwai (2108), "Role of Wildlife and Environmental Awareness in Developing Conservation Aptitude among Students around Corbett National Park, Uttarakhand, India".

The study was carried out to estimate improved awareness of students across schools of Ramnagar. Five government schools and five private schools were selected from different forest divisors around Corbett National Park (CNP).The study was conducted between August2012- December 2015. Pre awareness questionnaire survey was conducted in all schools to obtain basic information about the current awareness level. Later on series of awareness programs were conducted throughout the year, after that post awareness questionnaire was conducted with the similar methodology to avoid biasedness. Students from class 6th – 12th were selected for the study. Stratified random sampling was selected; every 3rd student was given a questionnaire of 20 items to solve. Chi-square test was carried out to estimates the difference in knowledge level of both male and female students. Chi-square test and simple linear regression with software R was carried out for analysis. The result reveals the facts that there is change in the knowledge of both male and female after awareness programs. Landmark changes in students as well as in schools were seen through this study, it paves the path for others to work out in this direction.

Objectives of the Study

Major Objective: To study the environmental awareness through environmental cognition.

Specific Objectives are:

i. To study the Environmental Awareness of the students studying in grade fourth and fifth

ii. To study the Environmental Awareness of the students on the basis of gender; boys and girls

iii. To study the model; reflecting relationship between various cognitive domain to environmental cognition and environmental awareness

iv. To study the responses of the students towards specific environmental issues

Hypothesis

The following hypotheses are formulated and tested at 95% level of significance.

i. There is statistically no-significant difference between grade fourth and fifth student's environmental awareness level

ii. There is statistically no-significant difference between boy's and girl's environmental awareness level

iii. There is statistically no-relationship exists between environmental cognition and environmental awareness reflecting through environmental awareness model

(***** Environmental Awareness level evaluated on the basis of score attained by students in EAT)

Research Methodology

Research Methodology is the systematic procedure by which the research starts from the identification of the problem to its final conclusion.

Area of Study

The area for the proposed study was Government Primary School falls under Bhimtal Block District Nainital, Uttarakhand.

Schedule of the Study

Environmental Awareness Test (EAT) was administered between October 2018- January 2019 on the students studying in Government Primary School (Grade 4th and 5th) in Bhimtal Block, district Nainital, Uttarakhand.

Population

All the students of Grade IV and V studying in Government Primary School, Bhimtal Block, district Nainital comes under population of the study. According to BRC, Bhimtal June 2018 report there were **146** schools running in which **1087** students enrolled in concerned grades.

Sample & Sampling Techniques

The proposed study had selected only those schools which were located around Bhimtal Block. The study has used stratified random sampling for selecting **15 schools** for understudy. **Three** schools were selected from each direction; North, South, East, West and Central part of Bhimtal Block, total **131** students enrolled in these schools out of which **122 students** were present at the time of test administration.

Table 1: Selected Sample

GRADE	BOYS	GIRLS	TOTAL
IV	33	40	73
V	25	24	49
TOTAL	58	64	122

Variables

The proposed study explores the facts related to environmental awareness in the terms of environmental cognition.

Dependent Variables-

Environmental Awareness Test Score (EAT)

Independent Variables-

Students of Grade IV and V and Boys and Girls consider as independent variable whose effect on dependent variable has to be studied.

Controlled Variables-

Duration of test, Subject Content, IQ Level of students studying in particular grade and Classroom environment considered as constant variables.

Tool

Environmental Awareness Test **(EAT)** was administered on primary students studying in Grade fourth and fifth. EAT contains **10** items; multiple choice as well as open ended question in order to collect varied responses from the students, time allotted for it was One hour and maximum marks 50 which was converted into 100 for the ease of analysis. The test includes item from; knowledge, comprehension, skill, analysis and evaluation domain in perspective of evaluating environmental awareness.

EAT was developed from NCERT Grade IV and V Text Books; Environmental Studies-*"Looking Around"*, **पर्यावरण अध्ययन – आसपा स)**

Analysis

SPSS 21 and AMOS were used for analysis, Independent t- test, and Path Analysis was used for testing the hypothesis and model fitting.

Results & Discussions

I. Ho: There is statistically no significant difference between grade fourth and fifth student's environment awareness level

Group Statistics

	Grade	N	Mean	Std. Deviation	Std. Error Mean
Total Marks Attained in EAT	GRDAE IV	73	70.3836	16.92683	1.98114
	GRADE V	49	73.7143	14.77611	2.11087

Independent Samples Test

	Levene's Test for Equality of Variances		t-test for Equality of Means					
	F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference

									Lower	Upper
Total Marks Attained in EAT	Equal variances assumed	1.869	.174	-1.120	120	.265	-3.33072	2.97355	-9.21814	2.55669
	Equal variances not assumed			-1.151	111.915	.252	-3.33072	2.89494	-9.06672	2.40528

Mean score of EAT of Grade V is little bit more than Grade IV which reflects that Grade V students are more environmental conscious than Grade IV students. The value of t= - 1.120 it reflects that sample mean is 1.12 times less than hypothesised mean. Since p value= 0.265 which is greater than 0.05 it reflects that there is no significant difference between groups. Hence the Null Hypothesis is accepted.

II. Ho: There is statistically no significant difference between boy's and girl's environmental awareness level

Group Statistics

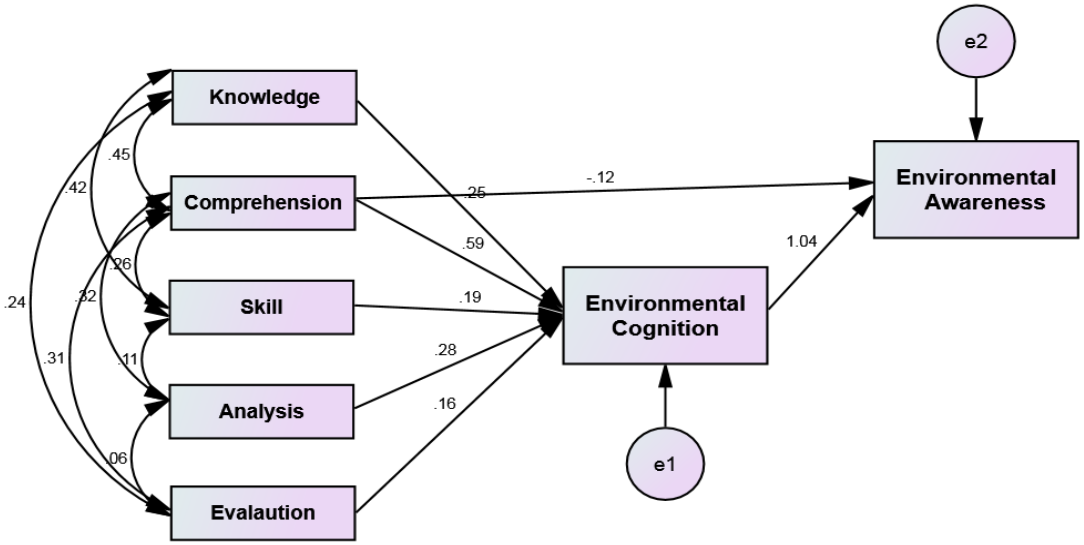
	Sex of Students	N	Mean	Std. Deviation	Std. Error Mean
Total Marks Attained in EAT	BOY	58	72.6897	16.84002	2.21120
	GIRL	64	70.8438	15.51571	1.93946

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
Total Marks Attained in EAT	Equal variances assumed	.316	.575	.630	120	.530	1.84591	2.92935	-3.95401	7.64582
	Equal variances not assumed			.628	116.209	.532	1.84591	2.94125	-3.97949	7.67131

Mean score of EAT, Boys is more than Girls which reflects that boys are slightly more environmental conscious than girls. The value of t= 0.530 it reflects that sample mean is 0.53 times more than hypothesised mean. Since p value= 0.530 which is greater than 0.05 it reflects that there is no significant difference between groups. Hence the Null Hypothesis is accepted.

III. Mediation Model



The proposed study used mediation model to examine the effect of knowledge, comprehension, skill, analysis and evaluation as exogenous variables on environmental awareness flows through environmental cognition (mediating variable). Environmental Cognition is the mediating variable between exogenous variables and endogenous variable (Environmental Awareness). The direct effect running from comprehension to environmental awareness is specified as partial mediation.

Table 2: Model Fit Index

Indicators	Observed Value	Recommended Value
CMIN	7.001	-
p value	0.321	Greater than 0.05
GFI	0.984	Greater than 0.90
NFI Delta 1	0.992	Greater than 0.90
AGFI	0.927	Greater than 0.90
TLI rho 2	0.996	Greater than 0.90
CFI	0.999	Greater than 0.90
RMSEA	0.037	Less than 0.05

On the basis of above table CMIN or Chi-square value is7.001 whereas p-value is 0.321, since p-value is greater than 0.05 which reflects Chi-square test of goodness fit. Therefore it reflects that there is no significant difference, it suggests that there is no difference between default model and saturated i.e. perfect model. AGFI,

GFI, NFI, and CFI all the values are above 0.90 which suggest good model fit. TLI seems to be 1 which reflects that model is well fitted. RMSEA is 0.037 which is less than 0.05, significant, therefore it suggest good model fit.

Path Coefficient:

Table 3: Regression Weights: (Group number 1 - Default model)

			Estimate	S.E.	C.R.	P	Label
EC	<---	Knowledge	.927	.058	16.036	***	
EC	<---	Comprehension	1.020	.027	38.155	***	
EC	<---	Skill	1.118	.080	13.908	***	
EC	<---	Analysis	.913	.044	20.889	***	
EC	<---	Evaluation	.928	.077	12.058	***	
EA	<---	EC	.056	.004	14.492	***	
EA	<---	Comprehension	-.011	.007	-1.624	.104	

(**EC**- Environmental Cognition and **EA**- Environmental Awareness)

The above table shows standardised path coefficients. EC <---Knowledge is 0.927; when knowledge goes up by 1 EC goes up by 0.927, it is statistically significant. EC <---Comprehension is 1.020; when comprehension goes up by 1 EC goes up by 1.020, it is statistically significant. EC <---Skill is 1.118; when skill goes up by 1 EC goes up by 1.118, it is statistically significant. EC <---Analysis is 0.913; when analysis goes up by 1 EC goes up by 0.913, it is statistically significant. EC <---Evaluation is 0.928; when evaluation goes up by 1 EC goes up by 0.928, it is statistically significant. EA <---EC is 0.056; when EC goes up by 1 EA goes up by 0.056, it is pretty statistically significant. The partial path coefficient between EA <---Comprehension is -0.011; when comprehension goes up by 1 EA goes down by 0.011, it is statistically non –significant.

EA <---EC = 0.056, the total effects (direct and indirect) of EC on EA is 0.056 that is due to both direct and indirect effects of EC on EA, when EC goes up by 1, EA goes up by 0.056. The above result reveals that it is not necessary that if someone has sound knowledge and understanding of environment but if they don't have a right attitude towards environment it means they are not environmentally aware.

Delimitations & Suggestions

The major delimitations of the present study is that, it is restricted to study the environmental awareness of the students studying in Grade fourth and fifth in government primary schools of Bhimtal Block, district Nainital, Uttarakhand.

The suggestions for increasing environmental awareness among students at primary level are:

- Environmental curriculum should be revised and it should be activity based rather than theoretical so that students at primary level enrich their environmental experience through practical work.
- Government should establish ***'Enviro School'*** firstly at primary level in every block at initial stage which focussed towards environmental studies and its infrastructure also designed in eco-friendly manner.
- Environmental activities should be designed on weekly basis in primary schools like; cleaning the campus and surroundings, sapling, drawing the pictures screening various environmental issues etc.
- ***"Enviro Awareness Programs"*** should be organise at block level on the basis of student's interest and teacher recommendations from every school at the end of such program student should get certificate which will be useful and valuable throughout their academic life.
- School should open a ***Reference Section*** in their premises which includes materials as; newspaper, magazines, articles, literary writings, arts, audio-visual program, photographs, illustrations, charts, maps related to environmental issues. These materials are issued to the students so that they leisurely read and think seriously about environmental and ecological related problems.

The above suggestions are focussed towards induced participation of the primary students in environmental activities and their sensitivity towards environmental issues.

Conclusion

Children should aware of their local environment which has been affected by human activities.

The results of the study reflect that may be students have a sound knowledge and understanding of environmental issues but it doesn't guarantee that they are environmentally aware. The marks obtained in EAT highlighted only one aspects of environmental awareness i.e. environmental cognition, it requires that one is environmentally aware if they have right attitude ,sentiments and emotions for environmental concern. This can be developed through theoretical and practical aspects of environmental education.

The study advocates that environmental education appeared to be more efficient if it is offered hand on experience together with classroom activities, it will develop the feelings of biophilia among students.

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