

Evaluation of Cognitive and Effective Domain of Environmental Education in School Curriculum

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Abstract

The Education has been considered a tool to bring a desired social change in the society, and to achieve this goal Curriculum is the right instrument. This research study was conducted to assess integrated environmental education principles within the school curricula. This study's main objective was to analyze the four basic components of the curricula: aims, material, teaching methods and assessment. This research was delimited to the region of Punjab and Islamabad and Class 1-10 high school level. A sample of 370 teacher and 3550 students was selected using Stratified random sampling technique. The researcher personally visited the local areas of Islamabad, Attock Mianwali and Sheikhpura to collect the data. Descriptive statistics were used to analyze the collected data. The statistical analysis of the test revealed that cognitive domain of the students and the teachers had shown significant improvement, however there was no significant difference in the attitudinal domain.

Key Words:

Cognitive domain,
Effective domain,

Introduction

The word “environment” was unfamiliar to people of Pakistan even after promulgation of the 1983 Environmental Protection Ordinance. Pakistan Environmental Protection Council-an Environmental Policy approval body that first met after 9 years of the enforcement of the Ordinance. Increased environmental concerns mean that educators see environmental education as a response to the environmental crisis. Environmental education offers students the opportunity to address the complex environmental issues and to promote a

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sustainable behaviour, knowledge and environmental motivation (Pizmony-Levy 2011). The Pakistan School Curriculum does not include environmental education in the same way as humanities that have a certain degree of acceptance in their school curriculums (Blyth 1998). It is included in the many divisions of the curriculum in an underlying area called General Studies (GS), which is the key learning factor of the curriculum.

Environmental education has been one of the most debatable and appealing topics in recent times due to the dramatic environmental changes. One ultimate aim of environmental education (EE) is to create a citizen with environmental knowledge, who can engage effectively in solving environmental problems. (Hungerford & Peyton, 1976; Roth, 1992; UNESCO, 1980) Such actions are termed “responsible environmental behavior” (REB) or “environmental action” (Hungerford & Peyton, 1976 as cited in Jang Hsu, 2010).

In view of global development, environmental degradation is becoming important issue to be addressed. We have started to neglect the significance of the ecosystem that must be conserved and maintained in the age of technological advances. Population development, industrialization, changing patterns of consumption and deprivation are the main causes of environmental degradation. Such issues threaten the equilibrium between humans and ecosystems. Sustainable development of Environmental Education is a key strategy to solve these problems in order to allow the students to preserve and protect the natural environment in schools. Environmental awareness not only encourages the conservation of environment and a responsible citizenry, but also prevents a "de-natured" and highly unhealthy community today (Verma, Dhull, 2017).

In various electronic and print media, the discussion on EE in the general masses has been a continuous practice. Today magazines and other media do their utmost to sensitize the people. Yet students in schools must be made more aware as they are the most important individuals. Although EE is incorporated into several curriculums, especially science and social sciences, this content does not fully empower the students to acquire environmental comporment (Alam, 2017). As Bashiruddin (2002) found, the teachers find it challenging to teach the environmental concepts. Similarly, without finding their know-how and desires, teachers are assigned subjects so that the poorer environmental behaviors of the teachers and the students cannot achieve the objectives of incorporating EE into different syllabi. Studies performed by Alam (2012) underline the consequences of teaching through the participatory approach to various interventions and

delegate the tasks to teachers after their willingness to engage in various actions. Alam (2012).

Due to the restricted class time (Hassan and Ismail 2011) and the lack of support from school administrators, as well as other stakeholders, such as parents and the education sector, numerous barriers to the incorporation of environmental education with school curricula have been found (Rahman et al . 2018). Teachers and schools should be provided with the appropriate content related to the environmental education which deals with both theoretical and practical approaches. According to Michael Littledyke (2008) Cognitive and affective domains need to be specifically incorporated in an eco-friendly curriculum as a sense of connection is central to environmentally sustainable treatment and meaningful action Teachers aiming at the goals of environmental education must note the interrelationships between the categories of the cognitive domain and of the affective domain. The overlap between the two domains is especially obvious in the higher levels. The cognitive activities of the analysis and synthesis are required before one can do the affective act of organizing his values into a system (Stronck, 1974). Although environmental education seeks to form a new culture with new attitudes, it does not contradict our democratic ideals. The ultimate goal is simply the development of a well-informed, aware society, which will intelligently plan its future. Certainly this ultimate goal is reasonably acceptable.

Pakistan's participation in environmental conservation research is just 0.2%, which is very small. Environmental education requires learning about the natural systems that support life and the manner in which human behavior impacts those systems. Environmental awareness sensitizes the public to the effects of our decisions on the environment. A broad range of curriculum models, curriculum packages and materials and theoretical recommendations have been developed by many educators as well as environmentalists. Both these initiatives have emphasized the value of education in the development and conservation of the environment. (Ijaz, 2015). So keeping in view the importance of Environmental Education (EE) the education boards of Pakistan set specific objectives for Environmental Education (EE) in different levels of education:

Specific Objectives of Environmental Education at Primary Level

- To impart habit of cleanliness
- To give information what is environment and Eco-system

- To help the students to diagnose the different causes of Environmental pollution and to suggest remedial measure

Specific Objective of the Environmental Education at Elementary Level

- To create awareness amongst the students about the Environment, natural resources (renewable and non-renewable) and their role in National Development
 - To make students able to identify factors contributing to the deterioration of environment
 - To develop positive attitude towards the protection of environment

Specific Objectives of Environmental Education at Secondary Level

- To make the students to understand that unwise exploitation of Natural resources adversely effects the ecological balance
- To create awareness amongst the students regarding responsibility and commitment of individual and communities in protecting the environment and improving the quality of life (Govt. of Pakistan, 1995).

Research Methodology

Design

Descriptive Method of Research was adopted to conduct this research. Survey Technique was used to areas cognitive affective domain of students.

Population

Curriculum experts, school teachers and students in Islamabad and Punjab constituted the population of this research study.

Sample and Sampling Technique

Curriculum Experts: Thirty environmental education curriculum experts have been chosen using the random stratified sampling methodology. The following criteria were adopted to select these experts.

- In charge of the Projects (UNESCO)
- JEA, Deputy Educational Advisors, Assistant Educational Advisors in Federal and Punjab Curriculum Bureau attached with the programs of Environmental Education.
- Master trainers who have imparted the training to the teachers in the area of Environmental Education.
- University Professors, Deans who have supervised the researches about Environmental Education.

Teachers: Lists of trained teachers were obtained from Federal Curriculum Bureau, Ministry of Education Islamabad. The teachers were chosen using the stratified random sampling technique. The researcher personally visited schools of districts Attock, Sheikhpura, Mianwali and Islamabad to collect the responses. Whereas two hundred mailed questionnaires were sent to the teachers of each District Jheng, Vehari, Bahawalpur and D.G. Khan to collect the data.

Students: An achievement test was developed and administered in Islamabad and Punjab to judge the knowledge and attitudes level of students about Environmental Education. The selection of the 3550 students was based on a random method of systematic sampling.

Research Instrumentation

Questionnaires for curriculum experts and teachers were developed to collect their responses. An achievement test for the students was also developed and administered to judge their knowledge and attitudes towards Environmental education.

Achievement Tests: To evaluate the students of Primary, Middle and Secondary Level, textbooks published by Punjab Textbook Board were used to develop achievement tests; these achievement tests were designed to judge their knowledge and attitude towards environment.

Pilot Testing: The researcher selected key staff for pilot testing of the questionnaire for curriculum experts as Deans of Universities, Research Officers of International Organizations in the development of curriculum and teacher

training projects in environmental education. Some useful amendments have been made, following discussions with these experts. Similarly, questionnaire for the teachers and achievement tests of the students were also twice administered in rural and urban areas of Islamabad to judge their validity and reliability. After the discussion with the supervisor, members of committee and test experts made several changes and achievement test were finalized.

Data Collection: The researcher traveled personally through Islamabad, Attock, Mianwali and Sheikhpura those are target area, in order to administer teacher's questionnaire and achievement tests of students. Due to time constraints, researcher opted mailed questionnaire method to collect data from Jheng, Vehari, and D.G. Khan and Bahawalpur districts. The researcher met personally with curricula experts in the field of environmental education in the offices of UNESCO, the Federal Curriculum Bureau and the Punjab Curriculum Bureau collected the answers from curricula experts.

Documentary Analysis: Text Books developed by Punjab Text Book Board were analyzed to examine the cognitive and behavioral objective statements. School content, question papers of Intermediate and Secondary Educational Boards, Research Reports and Universities researches about in Environment Education were also analyzed.

Data Analysis: The use of numerous statistical methods has turned raw data into usable data. The data must be modified, classified and tabulated in such a way as to serve useful purposes. In order to draw conclusions, the data collected was analyzed and presented in a table form. To analyses the data percentage, Z-Test techniques of statistics were used.

For the comparison of trained and untrained teachers. Students of both groups, Z test was used to find significant difference between these two groups.

Results

Table 1. Percentage of environmental education in school content.

Class	Eng	Urdu	Isl.	S.St./P. St	Maths	Scn./G. Scn	Phy	Che	Bio	Agg
1 st	0	2.86	8.86	6.21	0	0.16	-	-	-	3
2 nd	0.47	6.24	0	1.8	0	0	-	-	-	1.4

3 rd	0.09	3.12	0.77	0	0.85	1.93	-	-	-	1.13
4 th	6.1	1.61	2.64	4.91	0	17.1	-	-	-	5.39
5 th	1.48	1.17	1.33	3.66	0	4.51	-	-	-	2.03
6 th	2.27	6.55	1.11	0.69	0	6.45	-	-	-	2.85
7 th	0.59	0.14	1.54	0.34	0	15.8	-	-	-	3.06
8 th	0.36	3.32	3.47	2.81	0.64	0.93	-	-	-	1.92
9 th and 10 th	3.38	7.05	0.63	1.02	0	12	0.5	3.8	2.3	3.4
Agg.	0.96	3.21	2.26	0.94	0.15	5.89	0.6	3.8	2.3	2.43

Table 1 gives the clear picture about the environment education content in school education. Horizontal rows give the class wise analysis and vertical columns show the subject wise analysis. Aggregate analysis shows that environment education 2.43 percent were infused. Class fourth has highest percentage 5.39 of environment education. Results were totally agreed with the previous researches conducted by Govt. of Pakistan (1998), (1999) and (1992) that objectives of environment education were practically translated in school curriculum.

Table 2. Analysis of activities of environment education in school content

Class	Eng.	Urdu	Isl	S.St./P.St	Mat hs	Scn./G. Scn	Phy.	Che	Bio	Agg
1 st	-	2	-	1	-	-	-	-	-	3
2 nd	1	11	1	1	-	-	-	-	-	14
3 rd	1	2	-	-	-	1	-	-	-	4
4 th	-	2	-	2	-	5	-	-	-	9
5 th	1	3	-	-	-	2	-	-	-	6
6 th	1	-	1	1	-	6	-	-	-	9
7 th	1	1	1	-	1	2	-	-	-	6
8 th	1	1	1	-	1	10	-	-	-	14
9 th and 10 th	3	-	-	-	-	6	-	-	7	16
Agg.	9	12	4	5	2	32	0	0	7	71

Table 2 gives the clear picture about the activities of environmental education incorporated in school content. Horizontal rows give the class wise analysis and

vertical columns show the subject wise analysis. Aggregate analysis shows that seventy-one (71) activities about environmental education are included in school curriculum from class one (1) to class (10) ten. 8th class has fourteen activities about environment education. However, Murray (1993) criteria of integration were not properly followed.

Table 3. Analysis of pictures of environmental education in school content

Class	Eng.	Urdu	Isl.	S.St./P.St	Maths	Scn./G. Scn	Phy.	Che	Bio	Agg
1 st	-	-	-	-	-	3	-	-	-	3
2 nd	-	2	-	-	-	-	-	-	-	2
3 rd	-	-	-	-	-	8	-	-	-	8
4 th	-	-	-	-	-	4	-	-	-	4
5 th	-	-	-	-	-	2	-	-	-	2
6 th	-	-	-	-	-	13	-	-	-	13
7 th	-	-	-	-	-	8	-	-	-	8
8 th	-	-	-	1	-	7	-	-	-	8
9 th and 10 th	1	-	-	-	-	-	-	-	12	13
Aggr.	1	2	-	1	-	45	-	-	12	61

Table 3 gives the clear view about the pictures of environmental education incorporated in school content. Horizontal rows give the class wise analysis and vertical columns show the subject wise analysis. Aggregate analysis shows that sixty-one pictures related to Environmental education are included in school content. Class sixth, ninth and tenth have thirty pictures about environment education. Analysis shows that Murray (1993) criteria of integration was not properly followed.

Table 4. Class wise analysis of Infusion Approach.

Class	1 st	2 nd	3 rd	4 th	5 th	6 th	7 th	8 th	9 th and 10 th	Agg.
ENVED	0	12	9	16	14	11	11	11	10	99

Table 5. Subject wise analysis of Infusion Approach.

Class	Urdu	Isl.	Eng.	Pak. St.	Sci	Maths	Phy	Che	Bio	Agg.
ENV ED	30	10	13	16	23	5	2	-	-	99

Table 6. Class wise analysis of Sub-unit Approach

Class	1 st	2 nd	3 rd	4 th	5 th	6 th	7 th	8 th	9 th and 10 th	Agg.
ENVED	0	0	0	4	3	4	0	3	17	31

Table 7. Subject wise analysis of Sub-unit Approach.

Class	Urdu	Isl.	Eng.	Pak. St.	Sci	Maths	Phy	Ch	Bio	Agg.
ENVED	0	1	6	12	0	0	2	6	4	31

Table 8. Class wise analysis of Separate Unit Approach.

Class	1 st	2 nd	3 rd	4 th	5 th	6 th	7 th	8 th	9 th and 10 th	Agg.
ENVED	2	3	1	0	2	2	3	1	7	20

Table 9. Subject wise analysis of Separate Unit Approach.

Class	Urdu	Isl.	Eng.	Pak. St.	Sci	Maths	Phy	Ch	Bio	Agg.
ENVED	9	2	2	3	0	3	0	1	1	20

Table 4-9 give the detailed picture of the integrated approaches used for environmental education in school content. Horizontal rows give the detailed analysis of classes and subjects in which these approaches were used. Analysis of content shows, that all three approaches were used to integrate the concepts of the Environment. Integrated concepts of Environment were found appropriate.

Data of these table and figures shows that infusion approach was commonly used in all subjects and classes which was found least effective as compared to sub unit and separate unit approaches.

Analysis of these tables and figures was totally agreed with the findings of Abbasi (1995) that infusion approach is best approach to integrate the required concepts but finding of Winther and Austin (1999) and Sall and Amadou (1999) that projected the importance of Sub-unit and separate unit approaches in their researches was ignored.

Table 10. Comparison of knowledge and attitudes of teachers in experimental and control group.

Concepts	Nature	Group	A+	A	B	C	D	E	F	Total	SD	\bar{X}	Z-Value		Hypothesis
													Calculated	Tabulated	
ENVED	Knowledge	Exp.	4	29	54	108	82	57	36	370	31.3	3.51	0.05	1.96	Accepted (0.05 level)
		Cont	6	20	55	100	81	68	40	370	29.8	3.39			
	Attitude	Exp.	0	2	45	122	88	78	35	370	32.1	3.19	0.03	1.96	
		Cont	0	0	43	109	105	77	36	370	31.1	3.12			

Hypothesis: There is no significant difference between the experimental and control group of the students in the achievement level of cognitive and affective domain.

Analysis of table 10 revealed that there was significant difference in the achievements level of the students in cognitive domain of ENVED. But there was no significant difference in the affective domain of Environmental Education.

The main objective of these integrated concepts was not only to create awareness but also the positive change in behavior of teachers and their active participation to solve these problems. Analysis of table 10 show the discouraging results. Analysis shows that only cognitive domain of teachers has been

improved but there is no sign of positive response about the effective domain. These findings were also supported by the both researches conducted by Ahmed (1999) and Bukhari (1997) that there was only cognitive awareness but there was no sign of positive change in the behavior of the teachers.

Findings of researches conducted by Govt. of Pakistan in (1998b) and (1999c) were supported at the findings of cognitive awareness but findings about the effective domain were not in the line with Government of Pakistan findings.

Table 11. Comparison of knowledge and attitudes of students in Experimental and Control Group.

Concepts	Nature	Group	A+	A	B	C	D	E	F	Total	SD	X	Z-Value		Hypothesis
													Calculated	Tabulated	
ENVED	Knowledge	Exp.	45	137	441	937	838	563	589	3550	88.2	30.6	1.47	1.96	Accepted (0.05 level)
		Cont	0	55	363	811	940	628	753	3550	82.3	27.6			
	Attitude	Exp.	17	67	238	502	810	937	979	3550	61.1	24.3	0.52	1.96	
		Cont	2	26	225	559	775	872	1091	3550	67	23.5			

Analysis of table 11 revealed that there was significant difference in the achievement levels of the student in cognitive domain ENVED, but there was no significant difference in the affective domain of ENVED.

The main objective of these integrated concepts was not only to create awareness but also a positive change in the behavior of the teachers and their active participation to solve these problems. Analysis of table 11 shows the discouraging results. Analysis shows that only cognitive domain of the students is improved but there is no sign of positive response about the effective domain.

These findings were also supported by the researches both conducted by Ahmed (1999) and Bukhari (1997) that there was only cognitive awareness but there was no sign of positive change in behavior of teachers.

Findings of researches conducted by Govt. of Pakistan in (1998b) and (1999c) were supported to the findings of cognitive awareness but findings about the effective domain were totally opposite.

Conclusions

From the findings of this research study, the following conclusions were drawn:

1. Integrated approaches: Infusion, sub unit and separate unit approaches were used to integrate the concepts of environmental education. Infusion approach was the leading one whereas separate unit approach was the least among the integration of Environment concepts.
2. Number of pictures, activities and daily life examples in school content were discouraging which are very essential to create interest among the students.
3. The significant change in knowledge was observed amongst students whereas attitude domains did not improve.
4. The significant change in the knowledge of teachers was observed whereas attitude domain remains stagnant.

Recommendations

1. In Pakistan, only cognitive domain is protected by the school content. Bloom's taxonomy should be followed to include affective and psychomotor fields when formulating goals and designing the material.
2. At the primary level, the infusion and subunit approach shall be adopted to provide a strong base for the secondary level.

3. Pictures, activities and examples of daily life were essential to generate interest among the students. In order to strengthen the attitude domain, their magnitude is increased to a fixed and approved standard.
4. At elementary and secondary level, separate unit was found most significant as compared to other approaches. There were chances to skip these integrated concepts by the teachers as well as students.

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