

An Explorative Study on Environmental Literacy among the Secondary Level Students in Bangladesh

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Abstract : This study was intended to explore the environmental literacy among the secondary level students of Bangladesh. Specifically, it was designed to: i) determine environmental knowledge of the secondary students, ii) explore their environmental attitude, iii) find out their environment related practices, and iv) explore school's environment-friendly practices. The study found a deficiency in environmental knowledge of the students, specially, the girl students were lagging behind the boy students in this regard. Both the boy and the girl students had a positive environmental attitude. Girl students had significantly better environmental attitude than boy students. The study also revealed that students in the urban and rural areas had good environment related practices. However, school's environment-friendly practices were found not enough to flourish environmental literacy of their students; particularly, the rural schools were lagging behind in this regard.

1. Background

During recent decades the earth has faced the combined threats of climatic change instanced by ozone depletion, the warming of the earth's surface and desertification. Human activities are largely responsible for creating all these threats to life support systems both locally and globally (Ara, 2001). Tbilisi declaration also discussed this fact. In the opening words of this declaration, it was told: "In the last few decades, man has, through his power to transform his environment, worked accelerative changes in the balance of nature. The result is frequent exposure of living species to dangers which may prove irreversible" (UNESCO, 1978). To make the earth sustainable for living, there is an urgent need to understand all these issues and their interrelationships. And consequently, environment has become one of the most important issues of our time and will continue to be well into the future. Warren and Goldsmith (1974) cited in Muttaqi (1983), described the need for environmental awareness in this way: "Today many facets of our environment - population, pollution, natural resources, natural balance, wild life, etc. are widely recognized to be in need of urgent attention. Their long-term management has become very important both in the developed as well as in the developing countries of the world".

In Bangladesh we see that to create environmental awareness among people, various programs like environmental health control campaigns, environmental conservation program, environmental education drives tree plantation and celebration of 'environmental week' in

every year are organized by government and NGOs. All of these activities are truly aimed to create a generation which is environment concerned. Richard (1992) emphasized public concern for the resolution of environmental problems in the future. Relating this purpose, three mechanisms are mentioned: political pressure, legal steps and individual actions. The environmental literacy of the general public depends upon all the three ways; but the most effective route for individuals is through their own decision. Richard argues for individual decisions by saying:

“... decisions that we all individually make: the speed at which we drive, the type of transport we use, the product we buy, our demand for blemish free fruit, the temperature we maintain in our houses and offices, and even such simple actions as turning out lights when not needed. Through all these, however small, we influence the course of global events”.

So, all of us, being in our own position, can contribute to prevent the environmental degradation. The required knowledge, attitudes, skills and encouragement can be achieved through environmental literacy. Thus by budding environmental literate mass, the Earth can remain worth living and we can hope for a sustainable future. That's why environmental literacy is significant for all. It may be much important for a head of state or a policy maker; but it should not be an insignificant concern to a secondary level student also. The critical importance of environmental literacy is, not only to the society, but also to the environment itself. Thus, it is essential that our education system develops and nurture environmentally literate citizens.

The abovementioned discussion proves the need for environmental literacy. Now, the question is whether the secondary students of Bangladesh possess sufficient level of environmental literacy or not. The present study was designed to find out this answer.

2. Objectives

The objectives of the study were to:

- a. determine environmental knowledge of the secondary level students,
- b. explore environmental attitude of the secondary level students,
- c. find out the secondary level student's practices and actions towards the environment, and
- d. explore schools' environment-friendly practices to flourish environmental literacy among the secondary level students.

3. Methodology

Five urban and five rural schools in two districts (Natore and Manikganj) were purposively selected for this study. Twenty students from each school, ten students from each grade (grade IX and X), were selected randomly. Thus, total 20 schools and 400 students were selected. Equal number of boys (200) and girls (200) were selected for gender balance.

Three tools were used to explore student's environmental literacy. MCQ test with twenty-five items (Appendix 1), an attitude scale based on five point Likert scale (Appendix 2) and a questionnaire (Appendix 3) were developed to investigate students' environmental knowledge, attitudes and practices respectively. The attitude scale consisted fifteen statements of which eight indicates positive attitude and the rest seven indicates negative attitude. Moreover, an observation schedule was developed to investigate environment-friendly practice

of the schools. Ten items were selected to explore whether the school's environment is encouraging to flourish environmental literacy or not.

Both descriptive (e.g., mean, standard deviation, frequency, percentage) and inferential (e.g., z test) statistics were applied to analyze the data. For performing inferential statistics confidence level was set at 95%.

4. Results

4-1. Environmental knowledge between urban and rural secondary students.

A strong base of environmental knowledge is necessary for environmental literacy because every official definition of environmental literacy starts with a competent level of knowledge. Table 1 draws a comparison of students' environmental knowledge according to the gender and location.

Table 1 Comparison of Student's Environmental Knowledge

Location	Boys			Girls			Total		
	Mean	SD	N	Mean	SD	N	Mean	SD	N
Urban	18.7	4.0	100	18.0	3.2	100	18.3	3.6	200
Rural	16.2	2.6	100	14.8	3.7	100	15.5	3.1	200
z value	3.34*			4.52*			3.78*		

* $P < 0.05$

The maximum mean score of student's environmental knowledge was 18.7 (SD = 3.98) out of a total possible score of 25, which is 74.9%; where the minimum mean score was 14.8 (SD = 3.7), which was 59.1%. The overall mean score was 16.9 (67.7%). The data also reveals that the rural students lag significantly behind the urban students regarding environmental knowledge ($z=3.7$, $p < 0.05$).

4-2. Environmental Attitudes of the secondary student between urban and rural secondary students.

Table 2 represents a comparison of students' environmental attitude according to their sex and location. The maximum mean score of students' environmental attitude was 61.38 (SD = 7.16) out of a total possible score of 75, which is 81.84%; where as the minimum mean score was 52.54 (SD = 6.52), which is 70.05%. The overall mean score was 56.9 (75.86%) that indicate the positive environmental attitude of the students.

Table 2 Environmental Attitudes of the Urban and Rural Students

Location	Boys			Girls			Total		
	Mean	SD	N	Mean	SD	N	Mean	SD	N
Urban	55.7	8.0	100	57.9	7.8	100	56.8	7.9	200
Rural	52.5	6.5	100	61.4	7.2	100	57.0	6.8	200
z value	2.18*			2.29*			0.11		

* $P < 0.05$

In comparison, environmental attitude of the rural students was slightly better than that of the urban students. The difference was not significant at 95% confidence level.

4-3. Comparison between secondary boy and girl students regarding environmental knowledge and attitude

From Table 1, environmental knowledge of the urban boy students was better than that of the rural boy students ($z=3.34$, $P<0.05$). Similarly, regarding environmental knowledge, the rural girl students were lagging behind the urban girl students ($z=4.52$, $p<0.05$).

From table 2, environmental attitude of the urban boy students was better than that of the rural boy students. But, environmental attitude of the urban girl students was lagging behind the rural girl students. In both cases the differences were significant ($p<0.05$).

Figure 1 show a comparative picture of the status of environmental knowledge and attitude between boy and girl students. Here, all the mean scores are converted into out of 100. Boy students were found better in environmental knowledge than girls, where as regarding environmental attitude girl students were found better than boys.

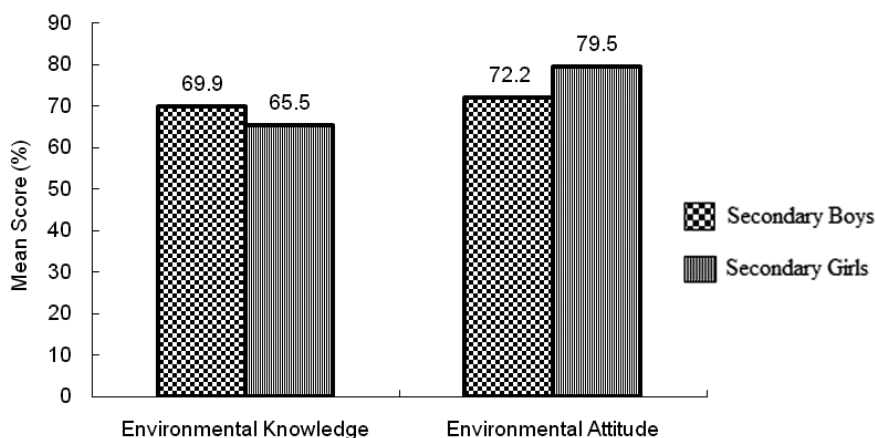


Figure 1 Environmental knowledge and attitude of the secondary students

4-4. Environment related practices of the secondary students

The data regarding students' practices and activities show that all of them were in the habit of using safe source of water like tube-well and water tap as well as most of them possessed good habit of water savings. Those who had an access of using water tap were used to keep it off if it was open unnecessarily. Besides, all students had a good practice of waste management. Particularly, rural students were found excellent in this regard as a good number of the rural students (18%) were used to bury their household wastes in the ground. Most of the urban students were involved in various environment-friendly co-curricular activities that help to develop environmental literacy, as the urban schools provide this opportunity. But the schools of the rural areas were seemed poor in this regard.

Moreover, it was found that almost all the students (98.5%) had the habit of energy conservation by keeping the switches off when not required. Practices of the students indicate that many of them were not aware about sound pollution as they had practice of listening to high volume music. Particularly, the boy students were seemed to have this practice more than that of the girl students. Furthermore, the students had a habit of taking care of the plants, which are indispensable for our survival. An interesting finding was that cent percent of the students did not have the bad habit of smoking, as well as most of them were

used to advise others not to smoke. Most of the students opined that they were used to think about the environment deeply. Figure 2 sketched an image regarding these interpretations.

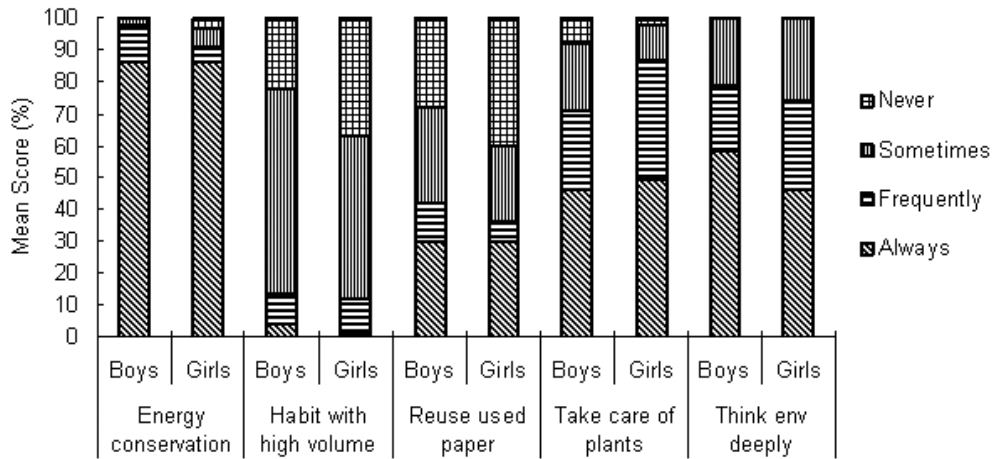


Figure 2 Environment related practices of the secondary students

4-5. School's environment-friendly practices

It was found that environment-friendly practices of the schools were not enough to encourage the students to flourish environmental literacy. Particularly, rural schools were seemed mostly poor in this concern.

Data in the table 3 show that school's initiatives to nurture environmentally literate people were found more knowledgeable in the issues like facilities of air and light in the classroom, cleanliness of the school ground, sufficiency of trees in the school compound and sufficiency of latrines in the school. On the other hand, initiatives of the schools were found poor in the issues like use of wastebasket, cleanliness of school latrines, sufficiency of the environment related topics in the bulletin board, sufficiency of environment-related books in the school library etc.

5. Discussion and Suggestions

This study sketched a picture on environmental literacy among the secondary level students of Bangladesh. It was found that the secondary level students, particularly the rural students, lacked proper environmental knowledge. The main cause is thought that rural students don't get the environmental knowledge like urban students from various media like TV channels, radio channels, newspapers etc.

The findings of Datta (1981), Muttaqi (1983) and Afrin (2002) were somewhat similar to the findings of this study. All of them found that the students appeared to have a poor command of factual environmental knowledge. Moreover, the findings regarding student's environment related practice and school's initiatives of this study were parallel to the findings of Afrin (2002).

Another interesting finding is that in spite of their relatively poor position in environmental knowledge, girl students showed a more positive environmental attitude than boy students. In present researcher's judgment, higher levels of girl's environmental attitude and lower levels of environmental knowledge can be brought together in a dynamic way. Because

Table 3 Schools' Environment-Friendly Practices

Issues	Location	Extent of likeness		
		Satisfactory	Moderate	Poor
Cleanliness of the classroom	Urban	4	6	0
	Rural	0	8	2
Facilities of air and light in the classroom	Urban	7	1	2
	Rural	2	7	1
Use of waste basket	Urban	1	8	1
	Rural	1	1	8
Cleanliness of the school ground	Urban	5	4	1
	Rural	1	8	1
Amount of trees in the school compound	Urban	2	8	0
	Rural	8	2	0
Sufficiency of the latrines	Urban	5	5	0
	Rural	0	8	2
Cleanliness of the latrines	Urban	4	3	3
	Rural	3	3	4
Sufficiency of the environment related topics in the bulletin board	Urban	4	5	1
	Rural	0	3	7
Books related to environment in the school library	Urban	1	4	5
	Rural	1	2	7
Psychological environment of the school	Urban	1	6	3
	Rural	2	3	5

the environment is somewhat more important to women, it may also be an attractive way to approach scientific education for girls. If this higher level of attitude can be captured and sustained through environmental education, it could even help turn around current trends by encouraging and fostering more female scientists. Besides, In Bangladesh, girls help their parents in household works than the boys. So Girls developed their attitude through the work though their knowledge is poor.

However, since there are still a deficiency of environmental knowledge among the students, hence the educationists, curriculum specialists, policy-makers, teachers, researchers

and other concerned individuals should think more about the matter. Johnston (cited in Muttaqi, 1983) found that the teachers believed the existed environmental crisis and that all school systems should require students to take courses in environmental education. This, according to the teachers, is one of the means of combating environmental deterioration. However, this finding fairly indicates that teachers are highly motivated to grow environmental literacy among the students. To make them more resourceful and to ensure schools' environment-friendly practice, various pre-service and in-service training should be provided. If the students are properly sensitized, educated, guided and inspired, they will develop positive attitude and skills in environmental activities and their knowledge regarding environment will be set up at a standard level. Furthermore, it is also suggested that a wider and stronger base of environmental literacy can be achieved by better alignment of environmental education with state standards of learning, environmental education should be given to the students through both multidisciplinary approach and separate subject as well, stronger environmental education quality assurance for teachers, application of environmental education to after-school and home school programs and capturing high public interest in the environment. These recommendations might look like difficult to execute overnight, but initiation at the earliest is necessary.

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Appendix

1) MCQ test

1. Which one is the cause for heating atmosphere?
 - a. Increase the length of day
 - b. When the sunlight falls in angular
 - c. Increase of humidity
 - d. When wind blows from the cold region
2. Which gas is responsible for increasing temperature of the world?
 - a. Oxygenc.
 - Carbon dioxide

- b. Hydrogen
d. Nitrogen
3. Which one is the Greenhouse gas?
a. Oxygen
b. Hydrogen
c. Carbon dioxide
d. Nitrogen
4. What is the consequence of Greenhouse effect?
a. Sea-level will decrease
b. Atmosphere will be extreme cold
c. Atmosphere will be extreme hot
d. Biodiversity will increase
5. What is the measure for preventing carbon dioxide increase?
a. Establish Oxygen plant
b. Deforestation
c. Forestation
d. Increase the use of CO₂
6. What will be if there is no atmosphere?
a. The earth will become very cold
b. The earth will become very hot
c. The earth will become desert
d. Season will be unchanged
7. Name the wind, which is responsible for lot of rainfall in Bangladesh.
a. Land wind
b. Monsoon
c. Western wind
d. North Pole wind
8. In what type of the area rain falls more?
a. Where trees are few
b. Where trees are many
c. Where amount of CO₂ is high
d. None of the above
9. On which factors health and cleanliness of the environment depends on?
a. Plant and Animal
b. Air and Water
c. Man and Nature
d. Land Mine resource
10. How we can clean the environment?
a. By taking care of plants
b. By cleaning the wastes
c. By improving sanitation
d. All the above
11. Which one is necessary for conservation of energy?
a. Not use necessary equipments
b. Repair problematic equipments
c. Use Radio/TV always
d. Use personal resource unlimitedly
12. What we should do to prevent the waste of fuel?
a. Off the oven after cooking
b. Dry clothes by gas oven
c. Be careless while using fuel
d. Use problematic engine
13. Which oven does not pollute the environment?
a. Solar oven
b. Kerosene oven
c. Gas oven
d. Fire wood oven
14. Which one plays the principal role to keep the environment fresh and healthy?
a. Plants
b. Rain
c. Flood
d. Human being

15. Which is the largest mangrove forest in the world?
a. African forest
b. Sundarban
c. Tundra forest
d. Evergreen forest
16. What role the forest plays to keep the balance of the environment?
a. Forest controls the direction of wind
b. Forest helps to keep the environment cool and make rainfall
c. Forest protects from Greenhouse effect
d. All the above
17. Which one plays the principal role to keep the balance of the environment?
a. Ecosystem
b. Human
c. Air
d. Land
18. Which one is the producer?
a. Human
b. Green plants
c. Fungi
d. Tiger
19. What will be if a crop is grown on the same field every year?
a. Fertility of the land decreases
b. Nitrogen decreases
c. Decreases the elements that are needed for the plants
d. Land deterioration
20. Which disease can be attacked through ultra violet rays?
a. Skin cancer
b. AIDS
c. SARS
d. Hepatitis
21. Which is the identification sign of Arsenic polluted tube-well?
a. Blue sign
b. Green sign
c. Yellow sign
d. Red sign
22. What measure should be done to prevent population explosion?
a. Make people educated
b. Increase mass awareness
c. Inform people about population control
d. All the above
23. How the polythene pollutes the environment?
a. Poisonous elements are mixed with it
b. Poisonous gas is generated while it is manufactured
c. It is not decomposed in air
d. It is not biodegradable
24. Which pollution is occurred by drug addiction?
a. Air pollution
b. Water pollution
c. Sound pollution
d. Social pollution
25. On which date the 'World Environment Day' is celebrated?
a. 5 April
b. 5 May
c. 5 Jun
d. 5 July

2) Attitude Scale

Direction: Give your opinion to the following statements. Mention your opinion by a 'Tick' (√) mark.

Statement	Fully Agreed	Mostly Agreed	Neutral	Not Mostly Agreed	Not Fully Agreed
In order to keep the environment beautiful, its land, water and air must remain pollution-free					
Thinking for land pollution is unnecessary though thinking for water pollution is necessary					
Awareness for conservation of oil and gas is needed					
Since man has prospered highly in Science, he do not need to depend on environment					
Leaves and branches of the trees should not be broken unnecessarily					
Balance of the environment is not dependent on human activities					
It is not necessary to use water economically					
Mosquitoes, flies, insects etc. should be destroyed because they are harmful					
Increase of carbon dioxide in the air may bring danger for the environment					
Nature will conserve air, water, land etc automatically because these are the parts of the nature					
Everybody should obey the law of 'ban of polythene'					
None should throw pitch and cough here and there					
Everybody should aware about noise pollution like high volume music, motor horn etc.					
It is not a matter if we, the younger, do not think about environmental pollution					
The environment near our homes can be kept beautiful if we try a little					

3) Questionnaire

Direction: These items are related with your environment related practice. Mention your opinion by a 'Tick' ($\sqrt{\quad}$) mark.

1. Which water do you use for cooking and other works at home?
 - a. Water tap water
 - b. Tube-well water
 - c. Pond or river water
 - d. Not applicable

2. What do you do if a water tap is open unnecessarily?
 - a. Off the tap
 - b. Do not off the tap
 - c. Do not take it under consideration
 - d. Not applicable

3. What do you do with the wastes of your family?
 - a. Throw it here and there
 - b. Put it at the fixed place
 - c. Bury in the ground

4. Are there any activities like Science Club, Nature Study Club etc. in your school?
 - a. Yes
 - b. No

If your answer is 'Yes' then response the question number 5. If your answer is 'No' then go to question no 6.

5. How do you participate in these activities?

Always	Randomly	Sometimes	Never

6. Give your extent of execution of the following activities by a 'Check' ($\sqrt{\quad}$) mark

Activities	Always	Randomly	Sometimes	Never
Keep the switches off when it is not required				
Listen to music or TV with high volume				
Write on the opposite side of used paper				
Take care of the plants				
Smoke				
Advise others not to smoke				
Think about the environment deeply				

Observation Schedule

Name of the School:.....

Location: Urban Rural

Observable Feature	Satisfactory	Moderate	Unsatisfactory
Cleanliness of the classroom			
Facilities of air and light in the classroom			
Use of waste basket			
Cleanliness of the school ground			
Amount of trees in the school compound			
Sufficiency of the latrines			
Cleanliness of the latrines			
Sufficiency of the environment related topics in the bulletin board			
Books relates to environment in the school library			
Psychological environment of the school			