

# Environmental Awareness Questionnaire for Students: Construction And Validation

**Dr.Harjeet Kaur Sra, Principal**

Rattan Professional Education College, Mohali (Sohana), Punjab

## Abstract

*Today the Environment deterioration is of great concern for all of us. We need to sensitize and aware people about environment and its problems. Environmental awareness means being aware of the natural environment and making choices that benefit the earth, rather than hurt it. The present Questionnaire is prepared to study the Environment awareness among students. The questionnaire consists of 40 test items. The questionnaire possesses high content and face validity. The reliability of the questionnaire was measured with the help of test retest method and split half(Odd-even) method. The coefficient of correlation was found to be.96 which is significant at .01 level of significance. Further the split half (Odd-even) coefficient of correlation was found was to be 0.69 which was significant at .01 level of significance. Environmental awareness questionnaire (EAQ) can be used to assess environmental awareness of undergraduate students, senior secondary students and adults.*

**Key words:** Questionnaire, Environment Awareness, students

## Introduction

Today the delicate ecosystem of our earth is facing the danger of destruction in the hands of man due to overexploitation of natural resources and rising levels of environmental pollution. The need of the hour is creating awareness among people about environment and its associated problems. We need to work individually and collectively for conserving our environment.

## Planning the questionnaire

Planning is an essential step for the construction of a questionnaire The planning stage includes the purpose of the questionnaire, the target population and the types of items to be included. The purpose of the questionnaires was to test the environmental awareness of the students. Many books related to environment, environmental awareness and Environmental Education was consulted for preparing the questionnaire. some thesis and manuals of already standardized tools was also taken into consideration to seek the guidelines and to plan appropriately for the questionnaire. The statements in the questionnaire mainly concentrated upon the environment, environmental pollution and main environmental issues which include depletion of ozone layer, acid rain and global warming.

## First draft of the EAQ

After selection of 70 statements, individual try out on 20 students was carried out. After the first try out, only 60 statements were selected for the consideration of Experts. The questionnaire containing 60 statements was given to ten experts for their valuable opinion. The experts were professors of different departments of Panjab University, Chandigarh; Punjabi university, Patiala and Guru Nanak Dev University, Amritsar.

## Selection of Statement on the basis of Expert's opinion.

After seeking expert opinion from the intellectuals, 5 item of EAQ were dropped and five items were rectified. Thus the first draft of EAQ consisted of 55 items in all.

**Preparation of second draft.**

A sample of 150 students was randomly selected and the EAQ was administered to them .On the basis of the responses given by them, 6 items were deleted and 1 new item was added. So, the second draft consisted of 50 items.

**Preparation of final draft by item analysis**

The second draft was administered to a sample of 70 students from the colleges of Chandigarh. After scoring the test items, an item analysis was carried out. Two kinds of information, viz item difficulty and discriminating power of items were computed. The difficulty value of an item is defined as the proportion or the percentage of the target population who answer the item correctly. It is also an average index of difficulty. The determination of the index of discrimination also known as the item validity index is another important aspect in item analysis. The discriminating part of the item may be defined as the extent to which success and failure on that item indicates the possession of the trait or achievement being measured.”

For this questionnaire, item analysis was carried out in accordance with Kelly’s (1939) method. He demonstrated that when extreme groups, each consisted of approximately 27% of the total group were used, the ratio of the difference in ability of the groups to the standard error of their difference i.e. the degree of uncertainty about the size of the real difference, was found to be maximum. Kelly showed that by taking upper and lower groups of 27% each of the total group, one could say with great confidence that those in the upper group were superior in ability measure by the test to those in the lower group.

For calculating the difficulty value (D.V.) and the discriminating power (D.P), the following formulae were used.

$$D.V. = \frac{R_u + R_L}{N}$$

$$D.V. = \frac{R_u - R_L}{0.5N}$$

Where  $R_u$  = Number of right responses in the upper group.

$R_L$  = Number of right responses in the lower group.

$N$  = Total number of students in both group.

The D.V. and D.P for each item thus computed are given in Table –

‘A’ stands for Acceptance. ‘R’ stands for Rejection,

**Table I: Difficulty value and discrimination index for each item in EAQ.**

Item No.	RU	RL	DV	DP	Remarks
1	18	13	0.81	0.26	A
2	19	11	0.79	0.42	A
3	18	4	0.31	0.21	R
4	16	9	0.66	0.37	A
5	16	7	0.60	0.47	A

Item No.	RU	RL	DV	DP	Remarks
6	16	5	0.55	0.58	A
7	17	9	0.68	0.42	A
8	17	11	0.73	0.31	A
9	2	7	0.24	- 0.26	R
10	16	11	0.71	0.26	A
11	4	3	0.18	0.05	A
12	15	9	0.63	0.31	A
13	16	11	0.71	0.26	A
14	6	5	0.29	0.05	R
15	7	6	0.34	0.05	R
16	17	7	0.63	0.53	A
17	18	11	0.76	0.37	A
18	18	10	0.74	0.42	A
19	15	10	0.66	0.26	A
20	16	6	0.58	0.53	A
21	13	8	0.55	0.26	A
22	18	12	0.79	0.31	A
23	16	11	0.71	0.26	A
24	11	5	0.42	0.31	A
25	15	6	0.55	0.47	A
26	16	7	0.60	0.47	A
27	17	9	0.68	0.42	A
28	18	9	0.71	0.47	A
29	4	3	0.18	0.05	R
30	15	14	0.76	0.26	A

Item No.	RU	RL	DV	DP	Remarks
31	14	13	0.71	0.05	R
32	16	10	0.68	0.31	A
33	11	6	0.45	0.26	A
34	18	10	0.74	0.42	A
35	17	9	0.68	0.42	A
36	19	9	0.74	0.53	A
37	4	3	0.18	0.05	R
38	16	6	0.58	0.53	A
39	16	8	0.63	0.42	A
40	14	4	0.47	0.53	A
41	6	5	0.29	0.05	R
42	16	8	0.63	0.42	A
43	17	10	0.71	0.37	A
44	19	10	0.76	0.47	A
45	19	14	0.87	0.26	A
46	18	7	0.66	0.58	A
47	15	3	0.47	0.63	A
48	18	6	0.63	0.63	A
49	18	8	0.68	0.53	A
50	16	11	0.71	0.26	A

It may be noted from the table that the difficulty value ranged from 0.18 to 0.87 and D.P. ranged from 0.05 to 0.63.

For the selection of the item, the criterion recommended by Ebel (1966) give in Table 2 was given due consideration.

**Table 2: Criterion for Item Evaluation**

Index of discrimination	Item Evaluation
0.40 and above	Very good items
0.20 to 0.39	Marginal items usually subject to improvement
Below 0.19	Poor items

Using the above criteria the items which were accepted or rejected or modified on the basis of their D.P. (Index of Discrimination in EAQ.)

**Table 3: Number of items accepted or rejected or modified on the basis of their D.P. (Index of discrimination in EAQ).**

S.No.	Item No.	Total	D.P.
1.	3, 9, 11, 14, 15, 29, 30, 31, 37, 41	10	Below 0.20
2	1, 4, 8, 10, 12, 13, 17, 19, 21, 22, 23, 24, 32, 33, 43, 45, 50	17	0.20 to 0.39
3	2, 5, 6, 7, 16, 18, 20, 25, 26, 27, 28, 34, 35, 36, 38, 39, 40, 42, 44, 46, 47, 48, 49	23	0.40 and above

From the table 3, it is very much clear that 23 items were very good items as their D.P. ranged from 0.40 to 0.63. So they were retained as it is. The researcher had to delete 10 items as their D.P. was below 0.20 (ranging from – 0.26 to 0.21 and were considered as poor items. Out of the total 50 items, 17 items were modified as they were average items (D.P. ranging from 0.20 to 0.39).

Thus, the final draft of the EAQ had 40 items.

### Validity of EAQ

Validity means ‘truthfulness’. This questionnaire possesses high validity as its content validity was found with the help of Expert’s Opinion.

**Content Validity :** Content validity (also known as logical validity) refers to the extent to which a measure represents all facets of a given social construct. Before the questionnaire was administered to actual participants, a group of ten experts reviewed the assessment and compare the questions included on the assessment against a blueprint. The experts studied different sections and questions included in the questionnaire and rated the assessment from 90 to 100% indicating the appropriateness of the assessment.

**Face Validation:** Face validation in a sense is a form of common sense applied to a questionnaire's purpose. Researchers employing face validation on their questionnaire need only look at the questionnaire as a whole and its individual items and ask themselves, "Does this measure what it should?" For this method of validation, no quantitative methods are needed. The questionnaire used in this study serve the purpose for which this was constructed.

**External Validity:** It refers to how well the study reflects the real world and not just an artificial situation. Although the prescribed instrument is specifically designed for students but it can be applied to teachers and students of senior

secondary, college and university level. The questionnaire is supposed to have general applicability to all the sections of the society and to different persons of different age. This questionnaire has applicability to a diverse group of people and a wide array of natural environments.

### Reliability of EAQ

Reliability refers to the precision or accuracy of the measurement or scores. It means the degree to which the test agrees its i.e. if the test is administered under similar conditions, the results should not vary much.

The reliability of the questionnaire was measured with the help of test-retest method and split-half (odd/even) method. The researcher administered the first test randomly to 50 students. The researcher again administered the same EAQ to the same set of students after gap of one month. The coefficient of correlation was found to be 0.96 which is significant at 0.01 level of significance. Further the split half (odd-even) coefficient of correlation was found to be 0.69 which was significant at 0.01 level of significance.

### Description Of Environmental Awareness Questionnaire (EAQ)

Environmental Awareness Questionnaire was developed to know the environmental awareness of the students. The questionnaire measures awareness of students about the Environment, Environmental Pollution and main environmental issues like depletion of ozone layer, acid rain and global warming. There are 40 statements in the questionnaire.

**Table 4: Number of items under each dimension in the EAQ.**

S.No.	Dimension	No. of Statements	S.No. of Items
1.	Environment	15	1, 2, 3, 4, 5, 6, 7, 8, 10, 16, 18, 23, 24, 25, 40
2.	Environment pollution	11	9, 11, 12, 13, 14, 15, 17, 19, 20, 21, 22,
3.	Depletion of Ozone Layer	6	26, 27, 28, 29, 30, 31
4.	Acid rain	4	32, 33, 34, 35
5.	Global Warming	4	36, 37, 38, 39

### Scoring for EAQ

The EAQ consists of 40 statements. Each statement has four options i.e. a, b, c, and d. Three options are wrong and one option is right. The subject had to select the correct option. Right option score is one and the wrong option is given a score of zero. Scoring can be done with the help of a scoring key. In the end, all the scores are added and the results can be interpreted in terms of percentile.

### Norms

The percentile norms are prepared on the basis of Environmental Awareness scores obtained from a sample of 600 students studying in different colleges in Chandigarh. The norms have been presented in Table 5.

**Table 5: Percentile Norms**

Percentile	Gender		Interpretation	
	Male raw Scores	Female raw Scores		
95	38	40	Very High	Above 37
80	36	37		
75	36	36	High	36
70	36	36		
60	35	35	Medium	32-35
50	34	35		
40	32	35		
30	23	34		
25	22	33		
20	22	32		
10	20	23	Low	Below20(Male) Below23(Female)
5	20	22		

**Use of the questionnaire**

Environmental awareness questionnaire(EAQ) can be used to assess environmental awareness of undergraduate students, senior secondary students and adults.

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**QUESTIONNAIRE FOR ENVIRONMENT AWARENESS**

**Name** : **Date:**  
**Male/Female** : **Age:**  
**Class** :  
**Name of the college** :  
**Address of the college** :  
**Email id (If any)** :

**Purpose of the Tool:** This questionnaire is designed to assess the environment awareness among the students at undergraduate level. The questionnaire measures the extent and degree of awareness of students about environment, environmental pollution and main environmental issues like depletion of ozone layer, acid rain and global warming.

**Instructions:**

1. There are total 40 questions. Please read each question carefully.
2. Put Tick mark against the correct answer.
3. Each question carries one mark. There is no negative marking.
4. Do not overwrite or cut anywhere.

**QUESTIONNAIRE FOR ENVIRONMENT AWARENESS**

1. World environment day is celebrated on
  - a) 5<sup>th</sup> June
  - b) 14<sup>th</sup> February
  - c) 5<sup>th</sup> April
  - d) 30<sup>th</sup> October
  
2. Due to occurrence of water on earth it is also known as:
  - a) White planet
  - b) Green planet
  - c) Red Planet
  - d) Blue planet
  
3. Environment is a study of:
  - a) Our surroundings
  - b) Air pollution
  - c) Biosphere
  - d) Interaction between different organism with surroundings.
  
4. Nature maintains its equilibrium by:
  - a) Food Chain
  - b) Food webs
  - c) Bio-geo-chemical cycles
  - d) All the three
  
5. Which Indian state has the least forest cover?
  - a) Punjab
  - b) Haryana
  - c) Himachal Pradesh
  - d) Delhi
  
6. The term biosphere means:
  - a) A sphere of forest that supports life
  - b) Anything that supports life.
  - c) The sphere of earth planet where life can exist.
  - d) A community of living beings.



7. Environmental education fosters among different countries and regions.
- a) Sense of responsibility
  - b) Solidarity
  - c) Foundation of a new ecological order
  - d) All the three
8. In which part of India Chipko Andolan started.
- a) Garhwal
  - b) Darjeeling
  - c) Sikkim
  - d) Kashmir
9. The factor most responsible for man-made carbon monoxide contamination in the atmosphere in:
- a) Forest Fires
  - b) Cattle population
  - c) Increase in Population
  - d) Burning of fossil fuels
10. UNEP is the
- a) United Nations Engineering programme.
  - b) United Nations Environment project.
  - c) United Nations Environment programme.
  - d) United Nations energy programme.
11. Use of DDT is banned in many countries because:
- a) It kills useful organisms
  - b) It kills harmful organisms.
  - c) It is non-biodegradable
  - d) It is expensive
12. Use of angithis by poor in the rooms causes death due to suffocation which is due to inhalation of gas called as:
- a) Nitrogen trioxide
  - b) Sulphur oxide
  - c) Carbon monoxide
  - d) Carbon Dioxide
13. Use of polythene bags should be discouraged because:
- a) It pollutes soil.
  - b) It is easily available and cheap
  - c) It is non-biodegradable
  - d) It is reusable

14. Ultraviolet rays (UV-B) causes diseases in humans like:
- a) Cataract
  - b) Skin cancer
  - c) Decreased immunity
  - d) Tuberculosis
15. Maximum per capita municipal trash is generated by.
- a) India
  - b) Pakistan
  - c) Bangladesh
  - d) USA
16. Sustainable development does not need:
- a) Planned exploitation of sources.
  - b) Continuous availability of resources
  - c) Conservation of natural resources.
  - d) Man Power
17. Taj Mahal in Agra is damaged due to:
- a) Leather industry
  - b) Waste of paper mill
  - c) Emission of SO<sub>2</sub> from Mathura refinery
  - d) Water pollution
18. First solar city of India is:
- a) Amritsar
  - b) New Delhi
  - c) Anandpur Sahib
  - d) Mumbai
19. The increased Co (Carbon Monoxide) in air causes.
- a) Eye problems
  - b) Brain problems
  - c) Nose disorder
  - d) Chest pain
20. The major source of water pollution is:
- a) Domestic waste water
  - b) Industrial waste water
  - c) Effluent agriculture
  - d) Human activities
21. Soil erosion do not occurs due to:
- a) Heavy rain
  - b) Strong winds

c) Deforestation

d) use of manures

22. The combination of smoke and fog is named as:

a) Photochemical smog

b) Dust fog

c) Smog

d) Slug

23. The process of producing manure from waste especially organic waste is known as:

a) Vermiculture

b) Aquaculture

c) Sericulture

d) Silviculture

24. Organic farming is useful for the conservation of:

a) Air

b) Water

c) Soil

d) Plants

25. Major global environment problems are:

a) Global warming

b) Acid rain

c) Ozone hole

d) All the three

26. Hole in the ozone layer is due to:

a) Carbon dioxide

b) Chlorofluorocarbons

c) Nitrogen

d) Sulphurdioxide

27. Ozone shields the earth because it can:

a) Absorbs ultraviolet rays

b) Absorbs excess heat

c) Absorbs Co<sub>2</sub>

d) All the three

28. On Depletion of Ozone Layer, the radiation striking the earth's atmosphere will be:

a) Infrared

b) Radio waves

c) Ultraviolet

d) Microwaves

29. The ozone hole was first observed by scientists in:
- a) Great Britain
  - b) Iceland
  - c) Antarctica
  - d) Australia
30. Which of the following contains the ozone layer in the atmosphere?
- a) Stratosphere
  - b) Troposphere
  - c) Thermosphere
  - d) Mesosphere
31. Ozone layer is thickest at the height of:
- a) 20Km
  - b) 40Km
  - c) 23Km
  - d) 30Km
32. Acid rain is caused by emission of:
- a) Carbon monoxide
  - b) Sulphur dioxide
  - c) Soot
  - d) Carbon dioxide
33. Acid rain is:
- a) Rain with mixture of nitric acid and Sulphuric acid
  - b) Rain of hydrochloric acid
  - c) Rain with Sulphuric acid
  - d) Rain of water
34. Acid rain is harmful to:
- a) Forest covers
  - b) Crops
  - c) Building materials of marble
  - d) All the three
35. Which causes erosion on building material?
- a) Rain
  - b) Acid rain
  - c)  $\text{NO}_3$
  - d)  $\text{SO}_2$
36. Half of the greenhouse effect is due to:
- a) Carbon dioxide
  - b) Methane

- c) Nitrogen                              d) Carbon Monoxide

37. Global Warming refers to

- (a) Decrease in temperature of the earth  
(b) Loss of Ozone  
(c) Accumulation of Carbon dioxide in the atmosphere  
(d) Decrease in concentration of Oxygen

38. Global Warming affects:

- (a) Melting of Ice peaks leading to rise in Sea Level  
(b) Change in the Rain fall  
(c) Damage of microorganism and disturb in ecosystem  
(d) All the three

39. Which gas plays major role in maintaining heat balances of atmosphere?

- a) Nitrogen oxide                              b) Methane  
c) Chlorofluorocarbons                              d) Carbon dioxide

40. Earth can be saved from global warming, acid rain and ozone depletion by use of:

- a) Solar energy                              b) Wind energy  
c) Thermal energy                              d) Both a & b

**Scoring Key of Environmental Awareness Questionnaire (EAQ)**

Q.No	Correct Response	Q.No	Correct Response
1	a	21	d
2	d	22	c
3	d	23	a
4	d	24	c
5	a	25	d
6	c	26	b
7	d	27	d
8	a	28	c
9	d	29	c
10	c	30	b

<b>11</b>	<b>c</b>	<b>31</b>	<b>b</b>
<b>12</b>	<b>c</b>	<b>32</b>	<b>a</b>
<b>13</b>	<b>c</b>	<b>33</b>	<b>c</b>
<b>14</b>	<b>b</b>	<b>34</b>	<b>d</b>
<b>15</b>	<b>d</b>	<b>35</b>	<b>b</b>
<b>16</b>	<b>d</b>	<b>36</b>	<b>a</b>
<b>17</b>	<b>c</b>	<b>37</b>	<b>c</b>
<b>18</b>	<b>c</b>	<b>38</b>	<b>d</b>
<b>19</b>	<b>d</b>	<b>39</b>	<b>d</b>
<b>20</b>	<b>b</b>	<b>40</b>	<b>d</b>