**Environmental Awareness: Which Kind of Education or Knowledge Provides Highest Environment Quotient**

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<tr>
<td>Keywords</td>
<td>Environmental Awareness, Environment Quotient, Prospective Teachers, Responsible, Attitude, Development, Information, Knowledge, Pollution, Behaviour, Education, Global Warming, Actions</td>
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**Abstract**

Education is a process which provides us the knowledge and understanding of the complex nature of environment of which we are a part and to appreciate human dependence, obligations and responsibility with duty, devotion and rights. The concept of environment can be understood in a framework of ideas and principles that involve human actions with impact on others, extended to ahead of the day to day and routine activities. The problem prevails when people do not understand the environmental crisis and issues. The ultimate drivers of environmental degradation are population growth, inappropriate technology and consumption choices, and poverty, leading to changes in relations between people and ecosystems, and development activities such as intensive agriculture, polluting industry, and unplanned urbanization. The responsible environmental behaviour is the product of personality factors, action skills and knowledge that influenced the intention to act. How the learning influence impact of any activity, can be explained by relevant quotients. To study the influencing effects of academic literacy on the environmental crisis and issues, environment quotient can be calculated. There is need to add to the existing body of literature, the important insights regarding developing programs that promote pro-environmental behaviour and sensitize the community about the various complex and local environmental issues. The interpretation of data found ecological base at 4.27, ecological understanding at 4.33 while ecological behaviour at 3.86 which indicates that ecological base marginally increases ecological understanding but ecological understanding was unable to convert or modify ecological behaviour. It indicates that the type of knowledge provided in schools and colleges is totally insufficient and less valuable as per environmental crisis and issues are concerned.
1. Introduction

Education is a process which provides us the knowledge and understanding of the complex nature of environment of which we are a part and to appreciate human dependence, obligations and responsibility with duty, devotion and rights. Understanding shapes the mind to deal with natural and artificial surroundings and encompasses the reciprocal relations. The concept of environment can be understood in a framework of ideas and principles that involve human actions with impact on others, extended to ahead of the day to day and routine activities. The problem prevails when people do not understand the environmental crisis and issues. What is waste and how to deal with, create and concentrate the contamination and pollution problems on earth. Wastes buried under earth, heaped on surface, flowed in water or blown in air do not provide solutions but severe the problem. The challenges are linked with the conservation and maintenance of the life supporting systems such as land, water, air, and biological diversity. The ultimate drivers of environmental degradation are population growth, inappropriate technology and consumption choices, and poverty, leading to changes in relations between people and ecosystems, and development activities such as intensive agriculture, polluting industry, and unplanned urbanization (Alexandar and Poyyamoli 2014). Saunders (1980) and Fink (2003) have found that traditional classroom lecture based teaching learning approach have limited effectiveness in helping students to retain information, become self-learners and develop skills in transferring knowledge and solving problems. Learners construct knowledge by physically and mentally acting on objects or phenomena in the environment (Piaget 1970) and through social interactions with members of the community (Vygotsky 1986).

Figure-1: Improvisation of Knowledge to Elaborate Applications

The ultimate aim of knowledge processing is that the learner should elaborate on applications of knowledge and may also produce new knowledge using cognitive processes, rather than being passive listeners. Research has demonstrated that when students are involved in active teaching learning process, retention of knowledge is significantly increased (Grant 1997; Cooper et al. 2000), there is enhanced motivation and higher-order learning (Kern and Carpenter 1986) and development of practical skills (Kent et al. 1997). There is a strong agreement that fieldwork is advantageous for learning in the biosciences (Davenport 1997; Baggott and Rayne 2007) and nature studies has traditionally strong connections with fieldwork. In addition to the direct educational benefits, fieldwork has been reported to increase confidence and motivation (Smith 2002; Boyle et
al. 2007). However, in practice, field work in the environmental studies at school/college level is limited or negligible and there is a very little research on the experiential learning at school/college level in India (Alexandar and Poyyamoli 2014).

2. Learning Impact

Badola et al. (2012) and Fiallo and Jacobson (1995) have concluded that education is an important factor that influences knowledge. It is important to know how the learning environment is used and the influences of tools and techniques as the technology evolves. The design of different types of learning environments can depend on the learning objective, target audience and type of contents. An important tool with sustainable effects is required for improving people’s understanding and for motivating communities to cooperate and take initiatives for conservation and sustainable resource use. Rizvi (1986) and Norberg-Hodge (1991) observed that modern schooling prevented children from viewing the context in which they live, which led to diminution of traditional values, skills and sustainable lifestyles. Kurtycz (2005) found communication approach a new perspective of responsible environmental behaviour which allows considering it not only from the individual perspective but also from a social perspective. The responsible environmental behaviour is the product of personality factors, action skills and knowledge that influenced the intention to act. The individuals susceptible to learn and change their behaviour towards the environment are influenced by the interactions they have with other individuals because communication is a way of approaching and explaining processes in society. The environment Quotient can be found by the questionnaire used in this study as given below:

$$\text{Environment Quotient} = \left( \frac{\text{Ecological Behaviour} - \text{Ecological Understanding}}{\text{Ecological Base}} \right) \times 25$$

How the learning influence impact of any activity, can be explained by relevant quotients. To study the influencing effects of academic literacy on the environmental crisis and issues, environment quotient can be calculated. Environment Quotient can be explained on the basis of following table:

<table>
<thead>
<tr>
<th>Sr. No</th>
<th>Environment Quotient</th>
<th>Type of Knowledge</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>More than 9.00</td>
<td>Environmentally Perfect Knowledge</td>
</tr>
<tr>
<td>2</td>
<td>From 7.50 to 8.99</td>
<td>Environmentally Literate</td>
</tr>
<tr>
<td>3</td>
<td>From 6.00 to 7.49</td>
<td>Environmentally Good Knowledge</td>
</tr>
<tr>
<td>4</td>
<td>From 5.00 to 5.99</td>
<td>Environmentally Satisfactory Knowledge</td>
</tr>
<tr>
<td>5</td>
<td>From 4.00 to 4.99</td>
<td>Environmentally Average Knowledge</td>
</tr>
<tr>
<td>6</td>
<td>From 2.50 to 3.99</td>
<td>Environmentally Poor Knowledge</td>
</tr>
<tr>
<td>7</td>
<td>Less than 2.50</td>
<td>Environmentally Illiterate</td>
</tr>
</tbody>
</table>

Table-1: Type of Environmental Knowledge on the basis of Environment Quotient

It is important to acknowledge that this is virtually impossible to identify all relationships and environmental compartments and compositions to deliver a perfectly acceptable relation or formula which can explain every phenomenon. Transparent assumptions and conceptually and mathematically sound equation may explain environmental impacts better. Knowledge without applications can be termed as information only. Any information cannot influence anyone if it has no practical utility. Knowledge must lead to some kind of understanding, followed by attitude and
behavioural change. Effective learning is the positive and constructive approach of effective teaching. How the information is transferred, influences knowledge, cognitive process and then learning starts. Effective learning, effectively align attitude and modify behaviour.

3. Sources Of Environmental Knowledge

Formal school system provides a good framework in which a large segment of the population shows concern towards environmental issues. Through formal education, we intend to teach future generations to act responsibly towards the environment. However, it should be noted that this can neither be promoted by moral understanding nor by lectures on character development. Apart from the formal curriculum, students may obtain environmental information, through participation in a number of extra-curricular activities, in special meeting or field visits to country parks and various outdoor education activities. Over the past decades, there is a considerable increase in activities promoting environmental knowledge by government and non-government organizations and institutions through printed and electronic media.

4. Literature Search

Most people in the world today have an immediate and intuitive sense of the urgent need to build a sustainable future. They smell the problem in the air, taste it in their water, see it in more congested living spaces and blemished landscapes, read about it in the newspapers and hear about it on radio and television but they do not know what sustainable development is. People understand the environment, its functioning and significance only if they know the worldly process and also if they possess the curiosity to work directly using their senses to observe and smart enough to enhance the power of senses. Andrews et al. (2003) and Boyle et al. (2003) have favored providing exposure to the hidden curriculum of interpersonal skills and self-management but Smith (2004) found it disappeared from the undergraduate curriculum. Novak (1964) suggested that inquiry involves human beings in the struggle for reasonable explanations of phenomena about which they are curious. Place based knowledge enhancement approaches are valuable for several reasons. These approaches provide students with opportunities for learning in real situations (Sarkar and Frazier 2008), connect new learning to students’ prior experiences (Smith 2002) and actively engage students in making sense of what they are learning. A study conducted by Edwards and Cutter-Mackenzie (2013) emphasized that play based education must be integrated into environmental education. Moore et al. (2011) and Boyes and Stanisstreet (2012) pointed out that various environment related activities outside the classroom can encourage students learning and beliefs about their surrounding environment and enhance their knowledge. Techniques for creating problem-based learning environments may vary but field experience is often cited as an effective tool to increase student interest and learning by creating an authentic, interactive atmosphere in which students can creatively solve problems (Hudak 2003, Walker 1994). Use of computers and other instructional and information technologies can support problem-based learning and has also been shown to increase motivation and conceptual knowledge (Kerfoot et al. 2005; Taradi et al. 2005).

Hewson et al. (1998), Macbeth (2000), Nersessian (1991) and Strike and Posner (1992) have identified several pedagogical strategies that favour conceptual change. The classroom context influences the interaction between motivational and cognitive factors in learners. During the educational process, teacher should encourage different people in the class to express their ideas in a variety of ways and must invite them to fully explain their ideas. Bell (1995) contends that
experiential learning consists of a relationship between people and their environment during which a meaning is discovered. Novak (2002) found conceptual change a difficult process in which students, in order to change their conceptions, need to insert the new information in their previous cognitive structures i.e. these previous structures must allow the desired construction. Science and Technology, even though advanced, cannot help in bringing about the change of attitude. Hence education in environmental sociology and moral and ethical philosophy is needed and environmental study should be made a mandatory part.

It is now well established that knowledge about the natural world will influence attitudes regarding the natural world, which will in turn impact one’s actions on behalf of the natural world (Goralnik and Nelson 2011). Tanner (1980) suggests that informal education and life experiences with role models, such as parents and teachers, are crucial factors in developing the environmental sensitivity of an individual.

5. Research Questions

The current research is focused on the effectiveness of active teaching learning strategy to address the environmental crisis and issues. There is need to add to the existing body of literature, the important insights regarding developing programs that promote pro-environmental behaviour and sensitize the community about the various complex and local environmental issues. Haryana state is facing serious environmental problems due to rapid urbanization/industrial growth, agricultural chemicals and the increase in the number of vehicles. Prospective teachers are major agents for creating environmental awareness as they are future responsible teachers and citizens. This study aims to enquire the following research questions:

i.) How to learn and develop sense of curiosity is achievable through present form of teaching methodology.

ii.) Prospective teachers can bring attitudinal and behavioural change in students for environmental crisis.

iii.) Present teaching methodology can efficiently prepare effective future teachers.

6. Research Design – Questionnaire And Sample

The questionnaire was designed specifically for this study, keeping in mind the fact that environmental degradation is not a prominent environmental issue for people in India, as compared to developed countries. Use of terminology such as recycling bins, insulated homes, hybrid cars, and energy efficient homes was avoided based on the assumption that people in a developing country like India are not yet familiar with such environmentally friendly practices and products. The text of a questionnaire is in many ways similar to the source code of a program. It is the result of a lengthy design process. It includes instructions, and should be well tested before it can be used. The questionnaire used in this study has been developed and validated by Rahi (2015). The questionnaire originally comprised fifty questions which were divided into six sections, comprising Orientation Questions, Multiple Choice Knowledge Questions, Multiple choice Understanding Questions, Individual Related Questions, Reliability Questions and Questions to assess Teaching Skills. In the case of this study, the researcher was particularly interested to gain an understanding of educational availability and capabilities in terms of raising awareness of environmental issues in the Haryana State.

Out of fifty questions spread over in six sections, this study selected twenty five questions and grouped these in three groups which include Ecological Base, Ecological Understanding and
Ecological Behaviour of Prospective Teachers. The sample in the present study involved a total of 400 prospective teachers selecting 20 students each from 20 colleges of education located at different places of Haryana State. The prospective teachers i.e. B.Ed. students were randomly chosen. Every individual had an equal chance of being selected but only a limited number was required. Once the data has been prepared, the next step is to actually analyze it. The categorizing, ordering, manipulating and summarizing of data to obtain answers to research questions is termed as Data Analysis. For the purpose of this study MS Excel was used to enter data and perform the statistical computations with ease. The percentage was converted to a score on a scale from 1 to 5 to smooth the progress and facilitate the study.

7. Analysis And Interpretation Of Data

Table-2: Comparison of Observed Traits as Ecological Base, Ecological Understanding and Ecological Behaviour of Prospective Teachers

<table>
<thead>
<tr>
<th>SrNo</th>
<th>Observed Traits</th>
<th>Agreed %</th>
<th>Environ Score</th>
<th>Group Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Environment, water and soil are very important to us?</td>
<td>100</td>
<td>5.00</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Every person should have knowledge of environment and health.</td>
<td>97</td>
<td>4.85</td>
<td></td>
</tr>
<tr>
<td></td>
<td>By reading books, magazines, newspapers, etc. one can know the importance of health and environment.</td>
<td>85</td>
<td>4.25</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Do you agree that Environmental Science studied by you in graduation provides the full knowledge about environment?</td>
<td>57</td>
<td>2.83</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Do you think that people will care more about the environment after they are made aware of it?</td>
<td>86</td>
<td>4.32</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Is there a link between health and environment in which you live? Do you agree that increase in pollution may increase risk to human health?</td>
<td>96</td>
<td>4.80</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Do you think that the air you breathe and water you drink is pure?</td>
<td>63</td>
<td>3.17</td>
<td></td>
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<tr>
<td></td>
<td>Is it good to provide Plastic Carry Bags by shopkeepers or to burn Agriculture Remains by farmers?</td>
<td>75</td>
<td>3.75</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Should everyone join the environmental awareness campaigns?</td>
<td>100</td>
<td>5.00</td>
<td></td>
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<tr>
<td></td>
<td>Do you think that new buildings/ plans should be designed to conserve water and energy?</td>
<td>96</td>
<td>4.81</td>
<td></td>
</tr>
<tr>
<td>B</td>
<td>If you went to a shop to buy a new fridge, you would find lots of different types in the shop. Which fridge would you buy?</td>
<td>95</td>
<td>4.75</td>
<td></td>
</tr>
<tr>
<td></td>
<td>If you want to purchase some new and updated product, what will you do with the old product you have in your house?</td>
<td>84</td>
<td>4.20</td>
<td></td>
</tr>
<tr>
<td></td>
<td>In general, how much do you feel you know about environmental issues and problems?</td>
<td>80</td>
<td>4.00</td>
<td></td>
</tr>
<tr>
<td></td>
<td>What do you think about your parents’ perception about environmental problems?</td>
<td>82</td>
<td>4.08</td>
<td></td>
</tr>
<tr>
<td></td>
<td>What do you think about your parents’ behavior towards environmental protection activities?</td>
<td>92</td>
<td>4.62</td>
<td></td>
</tr>
<tr>
<td>C</td>
<td>How is the Quality of Air in your city or village?</td>
<td>75</td>
<td>3.77</td>
<td></td>
</tr>
<tr>
<td></td>
<td>There is Ozone Hole in atmosphere over Antarctica?</td>
<td>80</td>
<td>3.98</td>
<td></td>
</tr>
<tr>
<td></td>
<td>How is the Quality of Drinking Water in your city or village?</td>
<td>80</td>
<td>3.98</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Numbers of Motor Vehicles are increasing in your city or village?</td>
<td>78</td>
<td>3.88</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Industries provide employment but increase pollution?</td>
<td>73</td>
<td>3.66</td>
<td></td>
</tr>
<tr>
<td></td>
<td>In marriage, functions and temples high volume loud speakers are used?</td>
<td>83</td>
<td>4.15</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Uncooked and cooked food available in the market is contaminated?</td>
<td>77</td>
<td>3.87</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Use of Electromagnetic things like power lines, cell phones, etc. is increasing?</td>
<td>69</td>
<td>3.47</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Drinking water tap is running without any use?</td>
<td>83</td>
<td>4.13</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Polar ice is melting because of global warming?</td>
<td>75</td>
<td>3.75</td>
<td></td>
</tr>
</tbody>
</table>

Behaviour of any person in daily life at academic institution or work place and home is a reflection of his or her internal awareness of that person about knowledge and participatory practices. What knowledge has planted in one’s mind will portray in his (her) behaviour. Need, consequences and control motivate respondents to respond reciprocally. Social norms and aspects catalyze the process to tackle issues. So, it is not the personal perception but reference attitude which decides the
resultant behaviour. As reference behaviour cannot be a sole decision but is decided by influencing groups or situations or scenarios like community, society, etc. This influencing attitude assists in determining or deciding one’s attitude which helps in establishing behaviours. If the surrounding environment or influencing factors are changed, attitude or behaviour can be changed. Processed and applied information can help one in environmental and behavioural maturity. Any questionnaire needs to be constructed considering these facts so that proper, better and accurate picture may come out.

After collection of the data, the agree percentage of responses with respect to each question was tabulated. The agree percentage was converted to group percentage and group percentage have been scored on a scale of 1 to 5 to show the weight, merit and significance of the traits.

On the basis of data analyzed in Table-2, as provided by responding prospective teachers, environment quotient can be found, on basis of the formula, as suggested under title Learning Impact. Knowledge type, whether influencing or not can be explained on the basis of the calculated environment quotient as explained in table-1.

\[
\text{Ecological Impact} = (3.86 - 4.33/4.27) \times 25 = 71.15
\]

\[
\text{Environment Quotient} = \frac{71.15}{10} = 7.11
\]

Environment quotient at 7.11 indicates Environmentally Good Knowledge of responding prospective teachers.

8. Discussion

The relocation of the manufacturing facilities in one way or another cannot address the growing problem of anthropogenic pollution - it merely changes the jurisdiction of the pollution created. In order to achieve the reasonable level of global environmental sustainability, the citizens must be empowered with essential knowledge, information and understanding. Then only they can exert pressure on their elected representatives and administration to develop and implement policies for securing environmental sustainability. The awareness among the public and industrial people has to be created and motivated by the updated and improvised techniques and incorporating the innovative and implementable solutions to reform our economy.

The present study found environment quotient on the basis of responding prospective teachers as 7.11 which indicates environmentally good knowledge. The interpretation of data found ecological base at 4.27, ecological understanding at 4.33 while ecological behaviour at 3.86 which indicates
that ecological base marginally increases ecological understanding but ecological understanding was unable to convert or modify ecological behaviour. It indicates that the type of knowledge provided in schools and colleges is totally insufficient and less valuable as per environmental crisis and issues are concerned.

There is need to alert the public, focus the educational curricula and develop the moral imperatives and skills regarding environmental protection and conservation. Let the people clearly differentiate between the sustainable development and environmental sustainability. Whatever the resources are available, are exhaustible. If we take care of future generations while development, that is sustainable development and if immunity, health and composition of environment are too maintained, that is environmental sustainability. Development should exclusively be relies upon and is firmly rooted in the integrity and sustainability of the natural environment. If nature’s resource base is irredeemably depleted or irreversibly degraded, the means of prosperity design for social welfare will be seriously jeopardized.

9. Conclusion

The environmental conscious community is serious about achieving even a modest degree of global environmental sustainability and sustainable development. After the industrial revolution, economic development through industrialization based on science and technology have become a model. Science and technology have brought immense benefits to mankind but we are paying a high price for it in terms of environmental degradation and the price is rising to foil the achievement of even a modest degree of globally sustainable development and this has serious implications for future generations. It is not the use of science and technology but appropriate research, proper attitude and less consumptive lifestyles, can build the earth’s ecological capacity. Hence, what is needed to bring about the change of attitude is education in moral and ethical philosophy. In the young and mature minds, it is essential to strengthen the environment respecting moral values. To protect people living in polluted regions, proper and effective education represents a relevant means of prevention because this type of education encourages learners’ awareness of their environment's ambient conditions, as well as their active participation in solving problems. However, ways to utilize education in the environmental health, protection and conservation field have yet to be developed.

10. References


