

Environmental Education: a Paradigm Shift

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Abstract

Various ideas have been introduced for teaching environmental sciences through formal education. These attempts have created environmental awareness, but Environmental Education (EE) has still not been achieved. For bridging the gap between environmental awareness and education three important changes are proposed:

- The focus of science education must change from creationism to a naturalistic view, right from school.
- The learner must remain the focus and must develop a holistic understanding of his environment.
- Environment friendly habits must be developed from school days, wherein teachers become role models in the formal education system.

Awareness leads to understanding and understanding to action. Awareness leads to ‘information’, which develops an understanding of the ‘science’ and leads to action, which is culture (ethics). Ancient Indian culture allowed the population to put environmental ethics into practice. This was achieved through role models. The Gurukul system practiced in India at that time, is a very good example of this.

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Introduction

Since environmental sciences have now been introduced as a compulsory subject (*Sakal*, 13 November, 2004), at various levels in the formal education system, it has assumed greater importance. How should the subject be taught? The curriculum developed seems to be exhaustive (NCERT, CEE and State University New York, 1994), but do we have the basic infrastructure for its effective delivery? Such questions are being raised, and environmental sciences educators have begun to shoulder the responsibility of teaching the subject. Various training sessions and refresher training programs are being organized for the educators (Chavan, 2004). The difficulties faced in teaching the subject have already started filtering in for discussions in the academic circle and will begin to surface sooner or later. Why is it difficult to teach environmental science? Why is it that earlier efforts have only partially reached the level of awareness they should have? (Jackson, 2001)

The answer lies in the complex nature of the subject and the interpretations of its various aspects. No single one of its aspects can be given greater importance. Nor can any one of them be ignored. It is a multidisciplinary area, where the overlaps and inter-linkages are intricate. Dexterity is required for handling the subject. For an in-depth understanding of environmental science at the graduate level, the students must be prepared right from their school days. For effective delivery of the subject, especially at the primary and high school levels, three important things have to be taken into consideration.

The First Concern: The Focus of Science Education

The first is that science plays an important role in developing and nurturing interest in our environment. A keen look at the science curriculum suggests that along with the basics in chemistry, physics and biology (NCERT), a child learns that all known sciences have various applications, primarily, for the benefit of mankind. Many eminent scientists have devoted their lives to research in the field of science and awesome scientific and technological progress has been achieved. This must be communicated to the children, and no doubt, formal education is an excellent medium for it. It is now clear that technological progress, and the way it progressed, had a disastrously negative impact on our environment. This is something our children should know as well.

Imagine a chapter from a science textbook devoted to basic science; the next devoted to technology or applied science; the third devoted to the positive and negative impacts of the development of science and technology; the fourth to the conservation of the environment; the fifth to biodiversity; and the sixth to agriculture and the use of fertilizers and biomagnification. The learner might end up being utterly confused. But this is virtually what students go through in a single academic year. The student learns to appreciate his curriculum thus: what he learns has to be reproduced during the academic evaluation, for which, he is expected to know everything that is taught, whether relevant

or not. He has to score in a test that tells him how much he knows. Secondly the student learns that everything that is developed for the good, has a bad outcome as well, which is noticed a little or much later than the positive outcome, so one has to take care while planning.

So how should the information be presented? What should be the focus of science education? At this juncture, it is appropriate to quote that debates were raised several times in the early 20th century on how science should be taught. The world (people) was just overcoming the belief that God was the creator and that God had made man differently—probably in his own image. From the year 1900 to 1970, (Clark, 1986) crucial decisions have been taken by leading nations through discussions and debates among scientists and the Christian religious leaders about the science curriculum. The theory of evolution proposed by Sir Charles Darwin and his two important books *The Origin of the Species* and *The Descent of Man* provoked these debates. Could man be just another animal or is he meant to rule the world as Genesis suggests? Does our ancestry lie among the apes? Such crucial questions profoundly influenced the formation and development of the science curriculum at the school level. Creationism or the creationist approach got the better of evolution or the naturalistic approach in the decision-making process and the human race became the focus of the school science curriculum.

If students learn science with such notions of superiority, will effective EE for Sustainable Development (SD) be achieved? The concept of superiority can be dealt with later. If a natural system is to be sacrificed for technological or industrial development it will be sacrificed by our future generations, as they too will be doing it for good or valid reasons. Unless it is taught that man is not special and is only as important as other biological specimens, and that if he is special it is only so that he can care for the well being of the wide range of other organisms like plants and animals, and that coexistence with them is the only thing that is going to brighten up his future, his earth—only then can the pupil be motivated to do so and learn to do so. Yes, all this is a part of the present curriculum as well, but in the end, what the student learns is that the human race is superior and that it must make progress, and progress means technological and industrial growth. Without using the exact words, this is what is impressed upon the learner's mind repeatedly through his entire schooling. Can this be termed a fallacy of curriculum design? Probably not, but the concept underlying science education must be rethought.

The Second Concern: The Absence of Learner Centered Education

Another concern is how should the learner appreciate environmental sciences? Recently a debate ensued on whether geography, history and the natural sciences should be taught as a part of environmental sciences. What needs to be understood is should the student appreciate environmental science as it is in India, Pakistan, UK, US, etc? The geography of the world differs from country to country and so does the climate, and so arises the diversity in the biological world. The student also learns that country x is rich in such

and such minerals and so such industries are in large numbers in that country. The nature of pollutants is so and so and that the pollutants have affected agriculture in that country in such and such a manner. Also, such are the effects of pollution on the population, the forests and the rivers and the soil. So it is appreciated as a problem of 'that' country. This is what a child learns, wordlessly again. The recent event in which the US refused to agree with the post Kyoto commitments is a very good example of how the concept of country, and thinking only of the citizens of that country, dictates the decision-making process. On the other hand, the cleaning of the Rhine, sets an example as to how the river's natural beauty and cleanliness were restored by Holland, through an international program. When it becomes everyone's concern, things happen.

Is it possible for the student to learn about his environment as 'his home; his earth'? This will make it easier for the learner to realize why he needs to know all this. If the boundaries of various countries are laid down in the geography curriculum, and if through history the child is going to understand that people from so and so country have come and plundered our country in the past, will he be able to appreciate that the environmental concerns of any other country have a direct bearing on his life and are his concerns as well? The seeds of distinction once sown at a tender age, are difficult to remove. How can global environmental issues filter down to a graduate student, if he repeatedly learns such distinctions during the ten-twelve years of schooling?

Instead of generalizing and speaking about the various distinctions, if the learner is put at the center, and if the education imparted respects his identity not as an Indian or American, but him as a part of the environment, as a part of this world, the appreciation of environmental sciences will be much better. What the student needs to learn is his role as a part of the environment and the best way to act without harming his environment. The complex notions of boundaries of various countries and the economy must come later, when the mind becomes mature enough to understand that such distinctions are only man-made. The present adult population does not have this maturity, as they are loyal to their country, but not to the Earth (Our Earth!), because this is what they have learnt from their childhood.

The Third Concern: Role of the Environmental Science Educator

To compound the problem, environmental sciences are linked to our daily existence and our private life and habits. EE was earlier introduced as one of the values in value education (Rajput, 2003). This is the third most important concern that needs to be addressed right from the early days of schooling. Schoolteachers play a vital role in developing habits by setting an example. If a schoolteacher advocates the rejection of plastics but daily brings her meal to school in a plastic bag, her teaching, however well taught, becomes meaningless. To the pupil it might mean that this is only to be learnt and not practiced. In addition, if parents use and throw plastic bags, learning cannot take place. Everything only remains in print, which is exactly what is happening presently. It

is true not only of plastic bags but also of all consumables and even about the use of natural fuels for transport and communication. So environmental science is not about industrialization alone, or deforestation and pollution, but our daily habits as well (De Bono, 1969).

How can environmentally friendly habits be developed? The *gurukul* system once practiced in ancient India, is a very good example of how habits and practices were inculcated, which were in tune with the local environment. The habits developed dexterity for living as a part of nature. Natural systems were not taxed and the guru achieved this through the *gurukul* system, which was the then existing formal system of education. A guru had several disciples of various ages living with his family. They were taught rituals and the disciples copied the manner in which the guru behaved. The guru's behaviour had a profound impact on the disciples' minds. Habits were handed down religiously and a harmonious balance with nature was maintained. The guru was the role model and was responsible for educating a batch of students who went back to their own worlds and raised a family and taught these habits to their children. A person undergoing such training spent several years with the guru. He was given sufficient time to develop the maturity required for performing the very acts his guru taught. This was a balanced, time-tested approach and not the firefighter's approach that is now being used for teaching environmental sciences.

Habits have to be handed down from the earlier generation to the next; it is only then and thus, that the deep-rooted meanings of these actions are also conveyed. It is seen in several schools and also appreciated by the educators that the learner is told to break his bad habits and, in case the parents suffer from the same condition, to break theirs as well. Children are told to tell their parents to repair leaking taps and segregate waste among other things. This might impress upon the child that his parents do not behave in a manner that his educator expects of them and as a result, he will lose respect for his parents and his educators as well, which goes against moral science and value education (also taught in schools) which are also compulsory subjects (Covey, 1994). Educators are role models to the students until they are 10-12 years old. Since pre-school, interaction between parents and educators through parent-teacher meetings must be directed towards bridging this gap. Environmentalists can be invited for such meetings and policies must be developed for sustainable EE. Parents must be made aware of the things that will be taught in school and also should realize the need for their participation and cooperation. What is taught in school, is not a part of scholastic education but is also meant to be an integral part of their lives and that of the future generation's. Children need appreciation, from their parents as well as from teachers. If they feel that they will not be appreciated by their teachers because their parents do not segregate waste or for any other issue discussed in class that is expected to be taken home, they might be driven to lie, or attempt to hide, or ignore what is being taught. These mental conflicts are not healthy (De Bono, 1969). It is known that children are aware of what goes on in their homes (Green Treks Network, 2004), and therefore, they are asked to teach their parents about what must be done about waste segregation, leaking taps and such other things.

The real climax comes when it all ends with a question paper, which they answer either by rote learning, or by recalling the information given during lessons (Maynard, 2004). In 1956, Benjamin Bloom headed a group of educational psychologists who developed a classification of levels of intellectual behavior important in learning. Bloom found that over 95 per cent of the test questions that students encounter require them to think only at the lowest possible level...that of the recall of information...

Besides this, students are expected to carry out some projects on the environment such as collecting information and pasting pictures cut from magazines, or something along these lines. These projects are expected to fuel their creative abilities, which might be the case, but most of the time children turn towards their parents for assistance and often, it is the parent who plays a leading role in doing the project. What then, is achieved? The completion of such projects is mandatory as they are academically evaluated. Where and what is the value of the child's creativity? This is true of other subjects as well. But this is surely not education.

Why have we come to such a stage? Where do the roots of such a disastrous change lie and how did it go unnoticed? This is clearly evident from the history of our country: having lost several generations to battles with the invaders who looted the country and rendered the population insecure, followed by the last 57 and a half years for establishing as an independent nation. India does not have a generation that assumes the responsibility of becoming role models for teaching environment as a science, ethics and culture. The complexity arises because it is everyday science, with links to the past and the future. Everything in this subject has a deep underlying meaning that speaks through actions, not words. Every significant environmental action has a cultural significance and a scientific base. It takes great skill to balance the two —the understanding and the action that follows. Each action has to be weighed as its roots lie in the past and its results will affect the future. Therefore the role of an environmental science educator is very important.. Students follow/imitate an educator and consequently magnify through their actions whatever mistakes an educator makes. If an educator of environmental sciences is unable to practice what s/he preaches nothing can be achieved.

Conclusion

Therefore, to sum up, for achieving holistic EE, changes will have to be made in three important aspects that are the focus of science education, which is very fundamental to the process of learning environmental sciences. Superiority of the human race must not be employed to destroy the natural world. Secondly the approach should be cultivated with a student centered idea of the subject delivered. And thirdly, environmental science educators must become role models and must put into practice what is preached. Educators must give due respect and do the needful before they teach, only then will the learners be enabled to bridge the gap between walking the walk and talking the talk. Only then can the objectives of EE be achieved.

References

2002 Education for Sustainability –From Rio to Johannesburg: Lessons Learnt form decade of Commitment (UNESCO)

CEE and SUNY. 1994. Developed as part of a television program on Environmental Education ‘Essential Learnings in Environmental Education – a Database for Building Activities and Programs’ Ahmedabad: Center for Environmental Education Nehru Foundation for Development, Ahmedabad, and New York: State University New York, USA College of Environment and Forestry Publication

Chavan, D. K. 2004. ‘Paryavaran Shiksan Shikshakansaathi Swayamadhyyan Pustika’ – Developed for Yashwantrao Chavan Maharashtra Mukta Vidyapeeth, Nashik

Clark, Ronald W. 1986. *The Survival of Charles Darwin – A Biography of a Man and an Idea*. A Discus Book, Published by Avon Books, ISBN: 0-380-69991-5

Covey Stephan R. 1994 *The Seven Habits of Highly Effective People – Restoring the Character Ethic* ISBN 0-671-71117-2

De Bono Edward 1969 *The Mechanism of Mind* ISBN First published in Great Britain by Jonathan Cape

Handbook on Environment Education for Educators based on the Maharashtra Syllabus 1994 by the Bharati Vidyapeeth Environment Education and Research Institute (details not available)

History of Indian Education (details not available)

Jackson, M. G. January 2001a. ‘Environmental Education in India –*What has been Achieved?*’ Indian Educational Review vol 37 no.1,: 20-30. NCERT publication

Jackson M. G., July 2001b. ‘Effective Environmental Education Needs New Science’ Indian Educational Review vol37 no. 2, by pages 22-38. NCERT Publication

Raghunathan, Meena and Mamata, Pandya. (eds.) 1997. ‘The Green Educator’ Ahmedabad: Center for Environmental Education, Ahmedabad, Publication supported by the Ministry of Human Resources Development, Govt. of India.

Rajput, J. S. July 2003. ‘The Values Context in Environmental Education’ Journal of Value Education – vol 3 no.2 :5-13. NCERT Publication

Sakal, November 13th 2004. News about introducing environmental sciences as an obligatory subject

Srivastava, A. K. 'Population Development, Environment and Health' APH Publishing Corporation.

The Gurukul System (details not available)

The National Consultation on Environmental Education in Schools by Environment Education Cell of the National Council of Educational Research and Training

Websites

Abstract/Summary UNCED Collection UNITED NATIONS CONFERENCE ON ENVIRONMENT AND DEVELOPMENT COLLECTION
<<http://www.ciesin.org/datasets/unced/unced.html>> (3 July 2004)

Composting - Building Your Own Compost Bin, Green Treks Network, Inc. 2004
<<http://www.greentreks.org/allprograms/composting/index.asp>> (13 August 2004)

Counseling Services - University of Victoria: Learning Domains or Bloom's Taxonomy: Competence Skills Demonstrated 2003
<<http://www.coun.uvic.ca/learn/program/hndouts/bloom.html>> (11 December 2004)

Development of Handbook on Environmental Education: Project of Bharati Vidyapeeth Institute for Environmental Education and Research, Pune
<<http://www.greeneducator.org/eose/bviever.htm>>

Environment Education Division <<http://www.envfor.nic.in/divisions/ee/ee.html>> (11 September 2004)

John Maynard Developed and Expanded by Model Questions and Key Words Based on Bloom's Taxonomy Updated: December 10, 2004
<<http://www.utexas.edu/student/utlc/handouts/1414.html>> (22 December 2004)

Open Learning Technology Corporation Limited Last modified: 1st May 1996

Smith, M.K. 'Jerome S. Bruner and the process of education' 2002, the encyclopedia of informal education <http://www.infed.org/thinkers/bruner.htm>. Last updated: February 14, 2004

The Belgrade Declaration Conference United Nations Conference on Environment and Development (UNCED), Rio de Janeiro, 3-14 June 1992 (The Earth Summit)
<http://www.nbs.bg.ac.yu/view_file.php?file_id=586> (July 2004)

The negotiation of the Kyoto Protocol and its rulebook December 16th 2004
<http://unfccc.int/essential_background/kyoto_protocol/items/2830.php> (20 December 2004)

The World Summit on Sustainable Development: Agenda 21 Chapter 36, UNESCO 2002
<http://habitat.igc.org/agenda21/a21-36.htm>. (20 June 2004)

UN Conference on Environment and Development (1992)
<<http://www.un.org/geninfo/bp/enviro.html>> (3 July 2004)