

## TEACHING OF ENVIRONMENTAL SCIENCE: A STUDY ON CONTEMPORARY RELEVANCE

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### Abstract

*The teacher plays an important role in shaping and molding the habits, manners and good character of the children. Therefore, to gear up environmental awareness programme, it is essential that teacher should have sufficient knowledge of Environmental Science. It is the responsibility of teachers training college and universities to groom teachers for this task also. The existing teachers training course should be suitably amended to incorporate Environmental Science content emphasizing methods to deal with Environmental Science content at school and college and to develop skills in organizing Environmental Science programmes with co-curricular activities like NCC, NSS etc. Environmental Science is the process of recognizing values and clarifying concepts related to environment and its problems in order to develop skills and attitudes necessary to understand the environment. It also entails practice in decision making and self-formulating a code of behavior about issues concerning environmental quality. The Educational Institutions and universities have a crucial role to play by educating people at all levels, conducting research, making objective assessments and advising on policy matters. To make this movement an observable reality in India, universities and colleges should come forward and give Environment Education its proper place in teaching, research as well as extension activities in all courses of environmental science study. This research paper is to be critically Teaching of Environmental Science – A Study on Contemporary Relevance.*

**Key Words:** *Self Formulating, Multidisciplinary, Human Environment, Self Motivated Effort, Environmental Ethics.*

### Statement of the Problem

Environmental Science examines the effects of humans on nature, by applying biology, ecology, chemistry, and the traditional earth sciences toward studying the environment and addressing environmental problems. Building on the earth science curriculum (which includes geology, oceanography, and meteorology), environmental science looks at how the systems in each of these fields operate, how they relate to each other, and how they respond to various inputs and stresses (including human activity).

Teachers of environment science introduce their students to principles of natural resources management, methods of reducing pollution, means of producing energy, and the influences and impacts of global climate change. Also discussed are historical examples of environmental disaster (such as major oil spills), major events in the history of environmental discourse (such as the 1962 publication of *Silent Spring*), and changes in historic environmental concerns (such as Paul Ehrlich's Population Bomb and the global cooling scare of the 1970s).

It is a highly politicized field—but also a hugely important one. Lack of knowledge about environmental issues leads to bad environmental policy decisions, on both sides. We need teachers of environmental science who are passionate about equipping students with the knowledge base and reasoning skills needed to approach these high-impact questions—and who have the character to teach such a subject without making it perversely political, or taking advantage of students' ignorance to promote their own political visions.

Environmental science teachers at universities divide their time between teaching and research, while those at teaching colleges have more classes with little or no research responsibilities. Teachers responsible for research may also be responsible for obtaining research grants, and typically are expected to publish some amount of peer-reviewed work on a regular basis. And again, environmental science also requires knowledge (and instruction) in a variety of other scientific disciplines:

## **Environmental Science Disciplines**

### **Geology**

A basic component of earth science classes, geology is the study of the earth's land. Students of basic earth science learn about the rock cycle, fault lines, and about erosion and weathering. Environmental science students build on that knowledge, learning about soil science, sediment transport, and impacts of pollution.

### **Meteorology**

Another basic component of earth science classes, meteorology is the study of the earth's weather. Students of basic earth science learn about the water cycle, cloud formation, and kinds of weather. Environmental science students build on that knowledge, learning about the historical weather patterns in specific regions and across the world, the effects of human industry on weather, and about dispersion patterns of chemicals introduced into the atmosphere. This is also where most of the data pertinent to the global warming debate is studied. Students learn about the effects of cloud cover on temperature, about variations in

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solar activity, about greenhouse gases—methane, carbon dioxide, and (most significantly) water vapor—and about plant and animal contributions to the atmosphere. Environmental scientists also develop computer models of atmospheric circulation and heat transmission—and careful teachers explain to students the strengths and limitations of such models.

## **Oceanography**

The study of the earth's oceans includes an introduction into marine biology (a rapidly-expanding field of science, and the primary location of those new species currently being discovered), discussion of pollution issues (including the problems of international responsibility for the oceans), and the role the ocean plays in maintaining the earth's global temperature.

## **Ecology**

Ecology is the study of how organisms interact with their environment. It examines population growth, and how populations respond to various environmental pressures. Additionally, it examines the inter-relationships between species, including predator-prey relationships and the effects of apex predators upon biodiversity. Ecological study also identifies keystone species for different ecosystems, and develops means of measuring the relative "health" of different ecosystems.

An important aspect of ecology is examining the ability of various ecosystems to sustain themselves, and to respond to stresses from human activity. Now a staple of business development in the United States, the environmental impact report is based upon such understandings of ecology—which continue to be revised as we learn more about different ecosystems. The expert teacher of environmental science must keep up with these advances in scientific knowledge, so that students learn how to best evaluate different effects upon specific ecosystems, instead of reverting to outdated assumptions (for example human population growth and agricultural output have both performed entirely differently from the predictions of Ehrlich in the 1960s—who was using reasoning employed in the previous century by Thomas Malthus).

## **Environmental Chemistry**

Principally concerned with water and soil pollution, environmental chemistry examines the chemical alterations of the environment. In some cases these are chemicals natural to the environment (often food sources for various plants and microorganisms), while in other cases these are chemicals introduced by human activity, which may interfere with naturally occurring chemical reactions.

## Cross-Disciplinary Study

Since environmental scientists study the impacts of humans on the environment, they usually have some social science background as well, for studying human institutions (sociology) and freewill market transactions (economics). Additionally, they need some knowledge of environmental law, and of policy process for administrative agencies. Finally, computer science skills are employed in developing models of climate change, and in testing theories that cannot be tested in the larger world (since the earth cannot be put into a laboratory).

In multidisciplinary model the concepts of a theme of environmental education are infused into various established disciplines multi desiparadas approach is more, comprehensive but requires curriculum coordination to achieve in depth coverage. The characteristics of environmental education are as:

- i. Environmental education should be integrated into the whole system of formal education at all levels.
- ii. Environmental education should be interdisciplinary in nature.
- iii. Environmental education should adopt a holistic perspective which will examine the ecological, social, cultural and other aspects of particular problems.
- iv. Environmental Education should be centered on Practical problems related to real life.
- v. Environmental education should aim at building up sense of values.

## Environmental Education in India

The concept of environmental education is about a century old there has been a sudden increase in the activities related to it, during the past quarter century. This is visible in the form of a large amount of literature, variety of school, college and university curricula, plays, films, radio and television programmes, conferences, seminars and many other national and international activities. In 1899, Patrick Geddes, the Scottish professor of botany, founded a unique educational establishment, 'The Outlook Tower' in Edinburgh, England. Its purpose was to improve upon the existing environment and qualities of education were closely interdependent.

It was in 2015, at the University of Keele, Germany, the environmental education was agreed to be an essential part of education for all because of its immense educational potential and importance of understanding the environment. With the organization of conference on 'Human Environment' at Stockholm in 1972, Environmental Education became truly international. This conference is popularly known as 'Stockholm Conference' and was attended by 113 nations, United Nations agencies and-governmental organizations. The

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conference established the need of environmental education in view of generalized environmental problems and show that there is wide interest to solve these problems. As a part of its action plan, the conference recommended that United Nations Environment Programme (UNEP) be established, 'environment fund' be launched 5th June be celebrated every year as 'World Environment Day'.

The recommendation take the necessary steps to establish an international programme in environmental education, interdisciplinary in approach, in-school and out-of-school, encompassing all levels of education and directed towards the general public, in particular the ordinary citizen. Unison together with United Nations Environment Programme (UNEP) launched in Jan. 2015 an International Environment Education Programme (IEEP). Its major objectives were designing and evaluating new methods, curricula, materials and programmes (both in school and out-of-school; youth t/ and adult) in environmental education, training and retraining personal to adequately staff environmental education programmes. In October 2015, IEEP organized the historic International Environment Education Workshop in Belgrade Yugoslavia. Majority of countries (63%) said that they need environmental education programme for both types, formal and non-formal education sectors.

### **Curriculum and Environmental Education**

In 2018, Ministry of Human Resources Development (MHRD) launched the scheme of Environment Orientation of School Education: This scheme is implemented in the states and union territories through education department and the voluntary agencies having expertise and interest in environmental education. Environment generally consists of two main aspects natural and manmade or social. The study of interactions between the man, the natural and social environment is called Environmental Science. Environment is the outer biophysical system in which people and organisms exist. In a broad sense the word environmental can be used to refer to anything, living CI or non-living that surrounds and influences living organism. Environmental Science is an integral process which deals with man's interrelationship with his natural and man-made surrounding's including the relation of population growth, pollution resources allocation and depletion, conservation, technology / urban and rural planning to the total human environment. Environment education is a study of the factors influencing ecosystems, mental and physical health, living and working condition, decaying cities, and population pressures. Environmental Science is the process of recognizing values and clarifying concepts related to environment and its problems in order to develop skills and attitudes necessary to understand the environment. It also entails practice in decision making and self formulating a code of behavior about issues concerning environmental quality.

## Importance of Environment

Industrial emission of pollutants to the atmosphere, soil and water cause environmental problems far beyond the city limit. The exploitation of natural resources required to maintain the standard of living in urban areas bring about spills and emissions of environmental pollutions into the environment. Thus, the need for air, water and soil quality monitoring at a global level grows and increases exponentially as land, water and soil use intensifies. In this chapter, a short review of existing literature on air, water and soil quality, broad objectives of the research problem are presented.

Air pollution is defined as any atmospheric condition in which certain substances are present in such concentrations and duration that they may produce harmful effects on man and his environment. The major constituents of air are nitrogen (78%), oxygen (20.94%) and argon (0.93%). In addition to nitrogen and oxygen which make up 99% of the atmosphere, there are small amounts of other gases, minute droplets of various liquids and tiny particles of varieties of solids. The atmosphere which is a gaseous envelope around the earth is divided to several concentric zones. Troposphere which contains the air that has a definite composition of different gases is closest to the surface of the earth. When due to some natural processes or human activities the concentration of substances is increased in the air, it causes pollution of the atmosphere. Air pollution has become an important factor of environmental degradation. Air pollution occurs due to release of smoke from the chimneys of the industries, burning of fuels like coal, wood as well as the exhausts from automobiles. Now a day's rapid industrialization and use of automobiles for transport to cope with the growing demand of the growing human population have become the major sources of air pollution. The amount of pollutant in the air is expressed in terms of its mass/volume concentration, usually as micrograms of pollutant per cubic metre of air.

## Teaching and Description of Environmental Science

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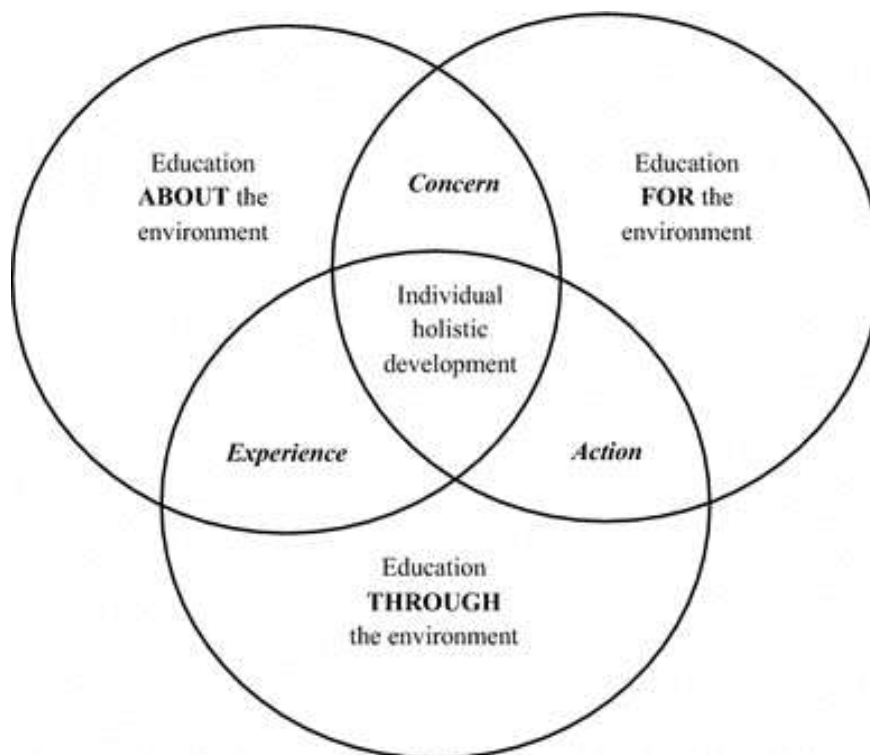


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### ***National Curriculum Frame Work***

It has been mentioned in National Curriculum Framework 2015 that teaching and learning would be woven around the environment of the learners and integrate environmental concerns as well at classes I and II. Environmental studies will be separate subject for study at class III to V. Environmental Science will be included in science and social sciences at Upper Primary Stage (3 Years). Essentially it has to be learnt mainly through concrete situations related to immediate environment during the first two years at the primary stage.



The remaining three years of primary education where environmental studies are to be introduced. The focus would, however, remain on object, events, natural phenomena and learner's environment. Children would continue to learn to observe, explore and identify occurrences in their environment. At upper primary stage the environment should continue to be a major source of the learning and the students should try to understand the changes taking place all around. At secondary stage, learning of science would continue to be built around natural and social elements of environment.

Sufficient self-motivated efforts have not been made to implement Environmental Science in universities and colleges. University Grants Commission (UGC) issued notices to all universities in India for compulsory implementation of six month module for environmental studies for undergraduate courses in all branches of higher education with effect from academic year 2003-04. For this purpose, the course outline of the module has been also developed and sent by UGC to different universities. The core module syllabus for Environmental Studies proposed by UGC is quite comprehensive. It has eight different units, (i) The multidisciplinary nature of environmental studies, (ii) Natural Resources, (iii) Ecosystems, (iv) Biodiversity and its Conservation, (v) Environmental Pollution, (vi) Social Issues and Environment (vii) Human Population and the Environment and Field Work.



### What need to be done?

- Environmental Science should be included in the curricula for pre-service teacher education.
- The staffs of teacher education institutions should be educated in these respects.
- The implementation and development of inservice training, including practical training in Environmental Science should be made in close cooperation with professional organizations of teachers
- Teachers and learners should be involved in the preparation and adaptation of instruction a! material of environment education.

The Tbilisi Conference recommends that teachers in formal education, organizers in non-formal activities for young people and adults, administration personal and educational planners and instructors should be familiarized with environment linked subject matters. Teachers training programme in environment education should focus on development of knowledge, skills and attitudes concerning environment, its issues and problems and development of competences in the teaching and supervision of the activities related to EE. The Wilkes 1985 stated that "The key to successful Environmental Science is the classroom teacher. If teachers do not have the knowledge, skill and commitment to environmentalise their curriculum, it is unlikely that environmentally literate student will be produced. For this, special training to prospective and individualized behavior based on global ethics, which can be realized only through the enlightenment and training of educational professionals.

### Summing up

Thus there is a need for intensive teacher education programme for both teachers and teacher educators". UGC and NCERT have also undertaken various programmes for the enhancement of university and school curricula in the field of Environmental Science. The UGC had granted a project on Environmental Science in April 1994 and Faculty of Education, Mahatma Gandhi Kashi Vidyapeeth, Varanasi was designated as regional resource centre for teachers training in Environmental Science. This intensive teachers training programme in the field of Environmental Science is being conducted at different levels. The teacher plays an important role in shaping and molding the habits, manners and good character of the children. Therefore, to gear up environmental awareness programme, It is essential that teacher should have sufficient knowledge of Environmental Science. It is the responsibility of teachers training college and universities to groom teachers for this task also. The existing teachers training course should be suitably amended to incorporate Environmental Science content emphasizing methods to deal with Environmental Science

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