



Journal Homepage: -www.journalijar.com
**INTERNATIONAL JOURNAL OF
 ADVANCED RESEARCH (IJAR)**

Article DOI:10.21474/IJAR01/5214
 DOI URL: <http://dx.doi.org/10.21474/IJAR01/5214>



RESEARCH ARTICLE

ENVIRONMENTAL EDUCATION AS A SUBJECT IN SCHOOLS.

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Manuscript Info

Manuscript History

Received: 18 June 2017
 Final Accepted: 20 July 2017
 Published: August 2017

Keywords:-

Environmental Education, Science,
 Curriculum, Integration.

Abstract

Global issues such as environment degradation, pollution, soil erosion, growing population are of concern to parents, educators, other stakeholders and governments of both developed and developing countries. Ensuring environmental sustainability requires a paradigm shift in conceptualization, research and Science education. There is an urgent need for transformative Environmental Education and active environmental participation. The schools can introduce endless subjects from Sex education to Environment Education and still remain absolutely ignorant about what really is to be done. A student is burdened by the never ending traumas of other subjects and examination pressure; where on the earth would he/she get time to read about a Tsunami, when haunted by Trigonometry. An integrated approach to this area is of vital importance. The present paper deals with the status of Environmental Education as an independent and integrated subject.

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Introduction:-

Nature is a source of life for living beings. To meet all the requirements humans explore natural resources excessively without being followed by remediation measures or rehabilitation of natural resources. Environmental degradation becomes critical in view of globalization and modernization at global level. In the era of technological advancements, we have started ignoring the importance of environment that should be conserved and preserved. The major causes of environmental degradation are population growth, industrialization, changes in consumption patterns, and poverty. These issues are threatening the equilibrium that could exist between people and ecosystems. In an effort to address these issues, Environmental Education for sustainable development is emerging as an important approach to encourage students to conserve and protect the natural environment in their schools and in their surroundings. Environmental Education is not only education to inspire environmental stewardship and responsible citizenship, but also to protect today's "de-natured" and increasingly unhealthy society.

Recognizing the need and importance of Environmental Education (EE) in India, several efforts have been made to reorient and reorganize school education and establish EE more formally. Environmental Education has been introduced as a subject compulsory for all the students of Arts, Science and Commerce at the undergraduate level by University Grants Commission (UGC), at the school level by National Council of Education Research and Training (NCERT) and State Education Councils of almost all the states of India. School textbooks, in all subjects and at all levels, have been revised to integrate environmental concepts.

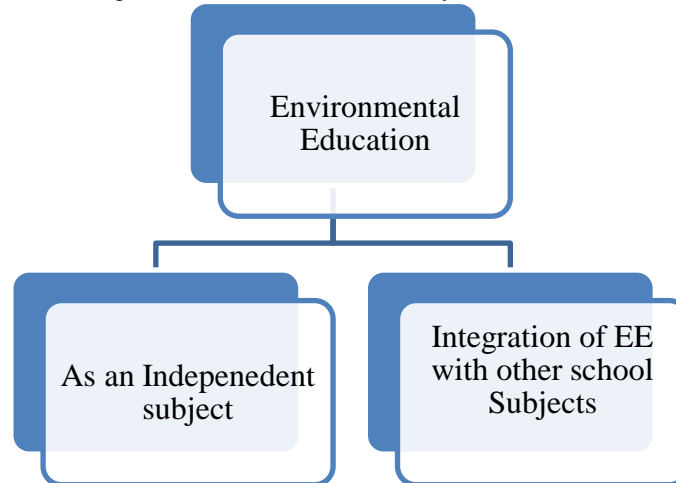
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According to Tanaka (2000) environmental knowledge can be defined as individual understanding on functioning of environment, interaction of human with the environment; origin of environmental problems and how to overcome these problems.

Environmental Education in School Curriculum:-

In Environmental Education, the curriculum can be referred to as the sum total of all the experiences that learners undertake to help them develop environmental literacy, skills in solving problems, decision making, and active participation in taking action towards the environment while taking into consideration the ecological, political, economic aspects (Palmer, 1998). Environmental Education is a mean to foster environmentally responsible attitudes and behavior in students. It is possible to include Environmental Education as an independent subject in the school curriculum as well as to integrate it into formal education system in India.



Environmental Education as an Independent subject:-

One of the approaches of implementing Environmental Education in the school curriculum is to include it as an independent subject. The single subject pattern of organizing the curriculum treats each subject as a separate component of the curriculum (Jackson, 1992). This has been the traditional way of organizing the curriculum in many countries including India. There have been arguments against establishing Environmental Education as a separate subject.

Providing environmental knowledge was one of the objectives in implementing Environmental Education other than enhancing awareness, attitude, skills and behavior towards environment among students.

Challenges regarding Environmental Education as a separate subject:-

1. Content of Environmental Education:-

At present, the content of the Indian Environmental Education is not much comprehensive and informative for the students. It should be enhanced in such a way that it expresses a clear association to the environment and the environmental concerns. Siddqui & Khan (2015) suggested that the content should associate the learning with the actual world. It has to be applicable to the learners and include issues that are significant to the society and also it should equip the learners with the adequate skills in order to continue learning all through the life.

2. Allocation of Time:-

One of the challenges is the limited time available for teaching environmental concerns within the context of the school timetable. Environmental Education thus nearly always has to be scheduled for the afternoons and weekends - a situation that is not ideal, either for teachers or learners.

3. Less Academic Value of the Subject:-

Siddqui & Khan (2015) in their study observed that students also give less importance to learning environment as a subject since they consider it to be of no academic value to them.

4. Curriculum Load:-

The Central Board of Secondary Education recommends at least two periods a week for the subject and recording the performance of students in the form of grades. But it has been seen that students, particularly of the classes which have to appear in Board exams, take the subject as a burden and feel still more taxed by the additional workload. There is a tremendous pressure from parents and community regarding how heavy the school curriculum has become, which in turn is responsible for development of stress among students and thereby affecting their normal developments. Hanunah (2004) agreed that making EE as a single subject might interfere with the existing curriculum that was already overloaded.

5. Locality of Students and Teachers:-

Ghosh, K. (2014) observed that there was significant difference in environmental awareness among Secondary School students with respect to the locality. The students of rural and urban Secondary Schools are not equally aware about the environment. In addition to this, teacher candidates who lived in urban area had more positive attitude towards environmental problems than the ones who lived in rural area (Oncu & Unluer, 2015).

6. Preparation of Teachers :-

Pre-services preparation and in-service training of teachers are major problems in implementation of environmental curriculum. Given the huge number of teachers and geographical character of the country, management of in-service programmes is indeed a challenge.

7. Eligibility of Teachers:-

Mostly postgraduates in science are hired to teach EE, who have almost no background of the subject and are absolutely handicapped when it comes to practical teaching. An average teacher of this subject is seldom able to even define the term ecology.

8. Knowledge Base of Teachers :-

When emphasizing the importance of teachers in the effective implementation of Environmental Education, it is suggested that teachers have to be committed with a good knowledge base in Environmental Education. Miles et al. (2006) found that teachers' belief and degree to teach EE in schools were still low besides having limited knowledge in the field.

9. Interest of teachers:-

Teksoz et. al. (2010) in their study on pre-service Chemistry teachers observed that some participants did not believe the contribution of Environmental Education in resolution of environmental problems.

Environmental Education in Integration with School Subjects:-

Across curriculum approach refers to the integration of content and skills into existing courses in a manner so as to focus on that content without jeopardizing the integrity of the courses themselves (Hungerford et al., 1994). With reference to Environmental Education, when it is integrated into the school curriculum it becomes the "thread" that runs through the whole curriculum. This is a popular way of integration in curriculum, where a theme or topic is addressed through the lenses of different subjects (Drake, 2004). In this sense, Environmental Education draws its content from the subject specific content of each subject. In doing this, Environmental Education therefore does not replace a particular subject, but is treated holistically through all the areas of understanding and experiences (Tilbury, 1995).

Science is available as one of the most relevant subjects to apply the environmental knowledge through this approach because there is mutual dependency relationship between the content itself and the environment. The notion of integration here refers to the making of connections across disciplines. Through integrating Environmental Education into existing subjects will help learners in developing understanding, skills and attitudes, which will enable them to take an active and responsible role in the conservation of the environment.

Kadji (2002) wrote that an integrative approach in teaching is based on both philosophy and practicality. It is generally an approach which purposefully draws together knowledge, skills, attitudes, and values from within or across subject areas to develop a more powerful understanding and linkages of key ideas. The integrative approach is widely used in various countries like Tanzania, Uganda, Nigeria, New Zealand, China and Jamaica. These countries have been reported to use integrated teaching and learning in their education systems (Stapp, 1997).

Hassan & Ismail (2011) found in their study on infusion of EE in Chemistry teaching that most teachers disagreed to make EE as a separate study. In addition to this a study by Ozden (2008) on pre-service teachers in Turkey, especially who studied Physics, Chemistry, Biology and Science & Technology revealed positive attitudes towards environment. Science is one of the subjects taught in the secondary schools. It is possible to infuse EE with theories of Science to make EE more interesting.

Abdullah et. al. (2011) conducted a study on integration of Environmental Education in Science and found that Biology is a subject that most widely adopted environmental knowledge in its curriculum content. Almost all the topics of environmental knowledge have been applied through this subject. For example, the chapters in the Biology curriculum that applies the knowledge of the environment are the chapter on 'Food chain & Nutrition'. These chapters discuss the environmental issues related to food chain and hunger in the aspects of the food that feed the world, world food problems, the green revolution, sustainable agriculture, and responsibilities of the individuals. Chemistry is also useful in providing knowledge about hazardous waste and chemicals.

Teksozet. al. (2010) observed that pre-service teachers were planning to integrate environmental issues into their content of teaching. Some participants provided similar examples for incorporation of Environmental Education into their own teaching practice. For instance, carbon monoxide emission and its effects on the environment, hazardous wastes and its damage on ecological balance, nuclear energy and nuclear power plants, air pollution, and water use were among the environmental issues that the participants intended to teach in their lectures.

According to the Environmental Education: Scope and Sequence Expectations (2009), EE can be infused in the following disciplines: The Art, English, Guidance and Career Education, Interdisciplinary Studies, Mathematics, Native Studies, Science, Social Sciences, Humanities, and Technological Education. The problem is not that it is not embedded in the curriculum, but that some teachers find different reasons for not implementing it. Integration of EE requires a strong social network that purports strong allegiance to the environment; a strong environmental philosophy for teachers and students; bridging research and praxis and filling in the gaps with recent research (Stevenson, 2007).

Environmental Education is not a one-dimensional procedure as is the case of traditional education in which the educational asset is offered only by means of the "frontal" teaching. On the contrary, it possesses a three-dimensional character as it is internationally accepted (Palmer, 1998). More specifically, Environmental Education is divided into three forms:-

1. Environmental Education about the environment.
2. Environmental Education in or from the environment.
3. Environmental Education for the environment.

The first form of Environmental Education attempts to transfer knowledge through teaching subjects which refer to the environment on scientific fields e.g. Physics, Chemistry, Biology, Geology, as well as to Social Sciences and Humanities, e.g. Economics and History. The second form of Environmental Education appears through activities realized in the environment as such, where the participants can experience it, its value and its problems directly and personally by assuming activities within it. Last but not least, the third form is about our moral attitude towards the environment and it deals with shaping ecological values, attitudes and behaviors.

Innovative Teaching-Learning methods to Improve Environmental Education:-

It is argued that there are no standardized methods for the teaching of Environmental Education. But for the effective implementation of Environmental Education, appropriate teaching and learning methods need to be used. The interdisciplinary nature of Environmental Education emphasizes holistic and interdisciplinary teaching and learning. This can be done by engaging pupils in critical inquiries into real issues of the environment and in actions addressing those issues (Stevenson, 2007).

1. Field Based Education:-

Field based education is one component of active Environmental Education. There is a strong agreement that fieldwork is advantageous for learning in the Biosciences (Baggott and Rayne, 2007). Tekzos et al. (2010) investigated Chemistry teachers in Turkey where most of them gave more focus on the field work in infusing EE. Through field work activities, students gained direct experience from environment and at the same time their awareness improved. However, in practice, field work in the environmental studies at school level is limited or negligible and there is very little research on the experiential learning at school level in India.

2. **MOTORIC Learning Model:-**

Sukarjita et. al. (2015) used MOTORIC learning model to integrate Environmental Education with Science at secondary level. The MOTORIC learning model consist of seven components- *Motivation, Observation, Talking, Orientation, Reinforcement, Implementation and Confirmation*. The implementation of MOTORIC model on a small group of samples was done by inserting environmental messages on key words science lessons that can be attributed to the environment. They observed that the integration of Environmental Education materials in science lessons through the application of MOTORIC learning models in the sample test of students were able to increase the knowledge about the environment amounted to 68.07% in small groups , while the increase in large group of test samples was 64.15%.

3. Peter & Cheruto (2013) revealed that group discussions, question and answer, and experimental methods enhanced students understanding. In addition, these methods further promoted transfer of learning especially on real life situations.

4. **Use of the Science-Technology-Society (STES) Framework:-**

Given the current striving for sustainability and the corresponding paradigms shift in Science, Technology, Research and Development, Environment perception, Economy and Policies; e.g., from unlimited growth-to-sustainable development, unlimited consumption of “goods”, culture and education- to active participation and involvement, the corresponding paradigms shift, at all levels of education is unavoidable (Zoller, 2011). The objective of STES literacy for sustainability pedagogy is to promote integration among Science, Technology and Environmental Education. The development of critical thinking, decision making, problem solving and transfer of knowledge among students is another objective of STES (Barak et. al., 2007).

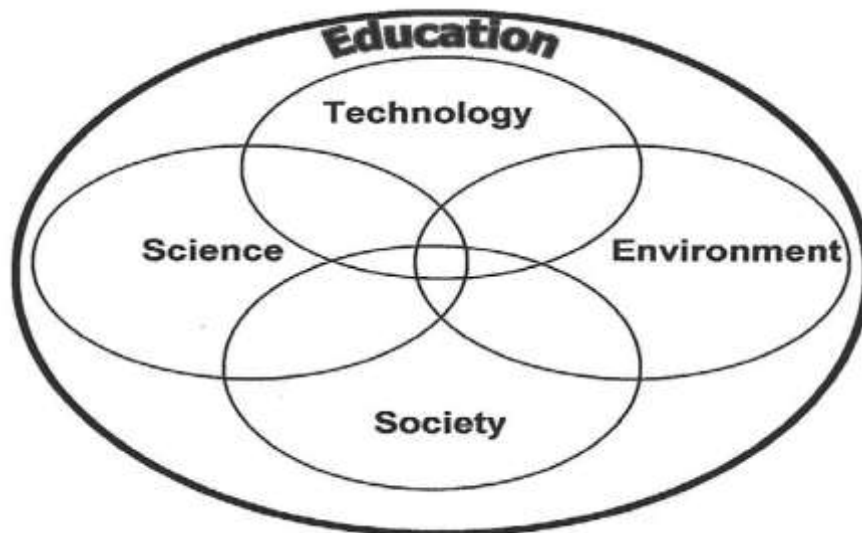


Fig 1:-The Science-Technology-Environment-Society (STES) framework for research and education for sustainability (Zoller, 2004).

Table 1:-Features of STES.

From	To
Teaching	Learning
Knowing	Thinking
Teacher – centered, Authoritative, frontal instructions	Student centered, real world, project oriented team learning
Teaching independent subjects	Integrative science , social science and environmental education

Conclusion:-

Successful integration of Environmental Education into the school curriculum will depend on the specific conditions, aims of education, and socio-economic structure of a particular country. Arguing for the integration approach, Bolstad (2005) found that schools are likely to find space for Environmental Education if it can be associated with existing subjects in the curricula rather than creating a new subject. On the other side of the coin, integration of Environmental Education into different subjects creates a number of limitations and challenges to

education systems (Johnson, 2005). Abdullah et. al. (2011) observed that teaching Environmental Education with Science is a convenient form to aware students. But they also suggested that present Science curriculum is just providing environmental knowledge on the surface. In addition, teachers find it difficult to link Environmental Education content with subject content because there seems to be no clear formula for implementation. As a result, many teachers are not comfortable with teaching through integration (Drake, 2004). The incorporation of EE within Science Education and across the curriculum span requires a strong ethical commitment on behalf of the teachers as the primary sources of change. As Lacob (2013) pointed out that incorporation of environmental issues into curriculum requires micro and macro level changes that will bolster successful integration.

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