

## Education for Sustainable Development through the Lens of Science

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### Abstract

Science as a way of learning can promote rational thinking among students. It also enables the learners step away from personal or contextual biases. The concept of Education for Sustainable Development (ESD) views education as a powerful tool for creating a sustainable future which has been defined as a novel approach for educating all so that the issues of the present and the future can be resolved successfully. With an objective of responding to the aspirations embedded under ESD, the utilization of Science as a catalyzer for enhancing the potent role of education for bringing about sustainability has been advocated in this paper.

**KEYWORDS**–Sustainable development, lens of science, education

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### Introduction

The term ‘Sustainable Development’ has multiple interpretations. It is viewed as a concept as well as a process to achieve stipulated goals of development. This leads to disagreement among people for a single definition of it. Sustainable development being a multi-layered term covers many dimensions of development such as social, economic, environmental and cultural. The very first definition of sustainable development was given as “development that meets the needs of present generations without compromising the ability of future generations to meet their own needs” (The World Commission on Environment and Development, 1987). The same is reflected in various definitions given by different authors and agencies. But what is the meaning of it? What are the needs of the present generation? What will be the needs of future generation? People concerned about sustainable development often suggest that while making decisions the social, economic and environmental objectives or needs should be considered in a perfect blend for meeting the future needs. Thus, for sustainable development following points given by Rio Declaration on Environment and Development must be kept in mind: (United Nations Conference on Environment and Development, 1992)

- Healthy and productive life in harmony with nature;
- Exploit resources without causing environmental damage;
- Environment protection as an integral part of development process;
- Eradicating poverty and reducing disparities in living standards;
- Better scientific understanding of problems.

In order to respond to the above mentioned principles, education is viewed as an essential tool to serve the purpose. It can work as an agent of sustainable development. Agenda 21 has stressed on education in its chapter 36 “Promoting Education, Public Awareness and Training” since these three are the key factors of sustainability (United Nations Conference on Environment and Development, 1992). Additionally, educating all has always been an inseparable part of sustainable development agenda. Furthermore, education is always a vital part of many international discussions. Hence, it isn't an exaggeration to say that Education for Sustainable Development (ESD) can become a promoter of quality education and a true enabler of sustainable development.

### **Place of Science in Education for Sustainable Development**

Science has to become an imperative part of sustainable developmental process because of two reasons: science plays a remarkable role in providing methodical solutions; and science is not disconnected from society. Science is essentially viewed as an objective and probably the most rational way of finding solution of any problem. It brings objective arguments and facts that fuel the reflections on social and economic phenomena, and allow going beyond mere opinions. Further, a scientific approach itself can stimulate the demand of reasoning while dealing with various dimensions of sustainable development.

Science for sustainable development is the focus of Chapter 35 of Agenda 21. It calls for: (United Nations Conference on Environment and Development, 1992)

- strengthening the scientific basis;
- enhancing scientific understanding;
- improving long-term scientific assessment; and
- building up scientific capacity and capability.

Report of World Summit on Sustainable Development (2002) emphasized importance of science-based decision-making as well as networking with and among centers of scientific excellence; and between science and education for sustainable development. Also, the special session of the General Assembly (United Nations, 1997) stressed the need of authoritative scientific evidence for assessing environmental conditions and changes.

However, when it comes to teaching science in an educational framework, it cannot take place in a separated manner and that too without considering ethical values. Science teaching should strive to balance two things at the same time: to cultivate a vision of the future which is grounded on human values; and to foster among children an appropriate temperament to address issues on an objective point of view. Science helps students broaden their point of view for looking at the problems beyond their routine experiences. Science process skills; basic and integrated; play unique role in developing and strengthening scientific temperament among learners. All these skills are the essential skills for 21<sup>st</sup> century (Turiman et al., 2011). It helps students learn to think in a logical way and resolve any problem in a step by step manner. The solution obtained in a scientific way is always verifiable and repeatable. Many of the issues/barriers falling in the way of sustainable development can be resolved by sensitizing the students and

making them address those issues by using basic as well as integrated science process skills.

The term ‘science’ is not only associated with natural and physical sciences, it is closely related to social sciences as well. The solutions of many social problems are formed on empirical evidences, pattern of their occurrence and the ways of looking at those problems. Many contemporary problems of the society have been solved by scientific approach. Even the modern advancements and technological inventions introduced in the society have been brought about by science and scientific approach.

### Lens of Science

Sustainable development requires using the lens of science for viewing and analyzing the routine activities which would develop a unique perspective solely scientific by its very nature. This lens of science can be represented through its components: knowing science, learning science and doing science. The following diagram shows a cyclic relationship among the three components of lens of science.

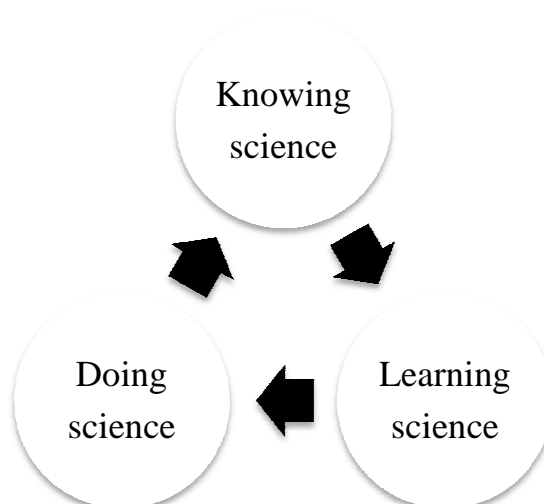


Figure 1: Lens of Science

An explanation of the lens of science is given below in terms of its components. The first one is Knowing. Knowing science is the pre-requisite for and the outcome of the other two components since most of the people first think about it. *Knowing science* covers attaining the theoretical knowledge of science which includes: dual nature of science, scientific processes, scientific method and the outcomes of the processes. Knowing about something enables one to acquire the skills related to it which is Learning science; the second component. It is about trying out what has been known about science. It is about understanding and realizing how exactly the scientific process works. It is the phase of rehearsing. In this phase, some attempts may result into success and some in failure. *Learning science* enables one to appreciate the beauty of science and imbibe the skills related to science. Learning also includes enabling one to contextualize the universally authenticated knowledge. The experiences of success and failure lead one to actually do

the science. Hence, *Doing science* is all about applying what has been known and learnt about science to solve a problem or an issue. While doing science, an individual may come across some challenges which may require knowing more about science. Therefore, this cyclic process goes on leading to solutions of socio-economic issues and creating new knowledge. In a longer run, the lens of science develops an attitude which is scientific in nature. Lens of science makes an individual look at a routine phenomenon critically and give an objective explanation of that phenomenon.

When a group of people is addressing an issue in a step by step manner it becomes a scientific method by its very nature. Here each team member works in an independent way and finds the answers of the questions that stem from his/her own experiences and thought pattern. As a result, each member comes up with his/her unique solutions and their positive and negative aspects. In this case, the chances of mere guessed solutions or the solutions emerging from baseless debate are reduced to greater extent. Also, the solutions are contextualized to the contemporary situations rather than mere replication of available solutions which may or may not fit into their own picture. Seeking solutions through scientific method enables one to realize the dual nature of science which itself considers the probability of expiration of the knowledge generated after following scientific method. In a way, it prepares people for accepting the probability of emergence of new problems while addressing the present one. It also develops positive regard about arousal of unexpected events/ problems and; enthusiasm for fixing those problems by raising hope and positivity among people. This kind of mindset is favorably required for sustainable development and in 21<sup>st</sup> century. Scientifically trained minds of the young generation can think and act like scientist who always strive to find the solutions of the identified problems and disseminate the outcomes and their experiences in the form of knowledge generated.

### **A View of Education through the Lens of Science**

Sustainable development is an emerging concept and indeed new challenges would arise as the efforts will be made towards attaining it. In order to address those issues accurate action should be taken to train the future generation from their very young age. Then only; after growing up; they will be able to contribute as responsible and mature citizens for attaining sustainable development. 21<sup>st</sup> century is the era of globalization and cooperative efforts. By providing students all the opportunities to develop and nurture scientific perspective, present educational institutions will be creating world citizens who will work collaboratively in the direction of sustainable development.

Here, the teacher's role becomes very challenging. S/he works as a learning facilitator and makes all the efforts to sensitize the students about the local, national and global concerns such as poverty, pollution, environment, injustice, inequality and quality of life; and address them through scientific perspective. Teacher pays special attention in framing instructional objectives keeping in mind the goals of sustainable development and designs the classroom activities such that students get maximum opportunities to work on seeking the solutions independently and in their own unique ways. In this way students perceive various aspects of sustainable development in a scientific manner. Teacher also links the content of various subjects rather than only science subject to the principles of sustainable development.

## Conclusion

The realization of sustainable development strives to create sustainable future, a future which our next generation deserves to live in. The lens of science can serve the purpose of achieving the goals of it. Development of human mind in 21<sup>st</sup> century requires a point of view which is objective and reasonable in nature. The aspirations embodied in National Policy of Education talked basically about: i) preservation of environment, ii) observation of small family norms and iii) development of scientific temper (Ministry of Human Resource Development, 1986). They can be realized through lens of science integrated to education for accomplishing sustainable development of an individual as well as the society.

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