CHAPTER I
INTRODUCTION

In India teaching in natural setting or close to nature has been prevalent since the time of Gurukul system of education. It is the oldest system of education on our planet, tracing its root back 10,000 years to the time of ancient civilization and dedicated to the highest ideals of all round human development- physical, mental and spiritual. In this, all the aspects of one’s personality are developed while utilizing an integrated curriculum that empowers the student to know oneself and develops the confidence and empathy to utilize knowledge for serving the society. The Gurukul system trained intellectual cognitive abilities and extended it to include the development of intuition, aesthetics and a futuristic and ecological perspective based on universal outlook. (Bhatnagar & Saxena, 2003).

Earlier, education was situated in the need to satisfy man’s innate curiosity while he lived in the lap of nature. Students were given education about animal husbandry, agriculture and other professions innatural teaching surroundings to make them worthy and productive members of the society. The entire environment and all the surrounding activities were used for teaching by adults acting as teachers. In ancient period, there was a heritage of ecological education which somewhere got lost due to the implanting of western education system on Indian soil. Now in times of environmental pollution and western concern for sustainable development, there is a need to re-locate ecological approach in the classroom structure of curriculum transaction. The present need to learn from nature has its roots deeply embedded in the past. The experiential authority on the ecological approach can be claimed as shown in the works of Rabinder Nath Tagore and Gandhi ji.

Rabindranath Tagore’s Shantiniketan is based on natural learning experiences and the Basic Education Scheme of Gandhi ji is also based on making young children learn from their culture and crafts in natural settings to become solution provider by understanding the problems. Both Rabindranath Tagore and Mahatma Gandhi were the two national leaders who gave the firmament of pragmatic solution to education in India. They were not only theorists but practitioners as well and their results are epitomized in Shantiniketan and Basic Education. Both of them discovered the fundamental unities of our culture.
Tagore envisioned an education that was deeply rooted in one’s immediate surroundings but connected to the cultures of the wider world, predicted upon pleasurable learning and individualized to the personality of the child. He felt that a curriculum should revolve organically around nature with classes held in the open air under the trees to provide for a spontaneous appreciation of the fluidity of the plant and animal kingdoms, and seasonal change. The premise of basic education also based on the fact that children learn better through a purposeful activity which stimulates its learning and makes learning a joyous pursuit. They quickly learn various things by doing. For example, while digging the earth, the children learn about soils, and while spinning the wheel, learn counting. In the process the children can acquire not the superficial literacy, but far more importantly the capacity of using hands and intelligence for some constructive purpose.

Correlation with craft and environment and co-ordination with other subjects is an important aspect of Basic Education. The children do not learn with their mind or body but with a coordination of both body and mind. This frees them from the tyranny of purely academic and theoretical instruction against which its active instincts make a healthy protest. Besides, handicrafts teach the children how to see, think and work in a given situation. This helps them to gain self-confidence and manifest their capacities.

In Basic Education and in Shantiniketan, experience is the central theme and knowledge has never been divorced from reality as is the case at present. The children were taught in the open air under the shade of trees. These practical activities were the best means of instruction in all subjects. There was a close and inseparable connection between the faculties of mind and body. According to them all knowledge should be collected direct from the sources instead of books. Basic craft provides scope for satisfaction of instincts like curiosity and construction. Furthermore, it helps to develop the spirit of investigation, enquiry, exploration, manipulation and experimentation in the student but this does not find replication on wider bases in India. It is time Indian schools should try ecological approach thereby reviving an old Indian system in a modern scientific way. Also, Faure (1972), chairman of the UNESCO Committee, in his report, ‘Learning to be’ concludes that education must combine practical experience with academic studies and it must do this in a way that promotes self-education and prepares people for life-long learning. Now environmental issues have brought similar concerns in teaching learning again.
1.1 EDUCATION FOR SUSTAINABILITY

The global commitment for sustainability is evident in the declaration by United Nations as the decade of education for sustainable development for the period 2005-14. Educators all over the world are learning how to teach for sustainability under this initiative of the United Nations. Recent research shows how vital it is for the children to spend time in the natural world. And since many parents no longer let their children play freely outdoors, schools must give their students the opportunity to play and learn in natural surroundings. Research conducted in the United States showed integrating learning with the environment as the major theme or context which improved achievement scores in language arts (reading and writing), math, science and social studies and is a great way to implement constructivist learning.

Education is a light that shows the mankind the right direction to move. The purpose of education is not just making a student literate but to enhance rational thinking, knowledge and self sufficiency. When there is a willingness to change, there is hope for progress in any field. Creativity can be developed and resultant innovations benefits both students and teachers.

“In order to enhance rational thinking, knowledge and self sufficiency both the means as well as the requirements of the educational process have tremendously changed during the last few decades as there is a shift from the teacher-controlled approach towards a learner-directed approach in planning learning goals, learning environments composition, and learning resources” (Attwell, 2007; Brown & Adler, 2008; Anderson, 2009). Achieving well-defined standards of learning by children in schools is a powerful success indicator of the system that works. At the primary stage there is the need for comparability of formal and informal learning. Moreover, Indian parental expectations are so high that every parent wants that their child comes home disciplined (military style) and achieve success in examinations conducted by the schools. Thus, schools and parents help students to think, analyze, develop a variety of skills and excel in their chosen areas ultimately resulting in a more creative and a curious child.

The formal education system fulfils the needs of a centralized society, but it is far less useful from the perspective of people of today’s locality. The very form of this
education system reinforces centralizing logic and at the same time restricts the opportunities to draw on the experiences of everyday life. In order to correct this inordinate shortcoming, it is not enough to change the content of education, but also the nature of education has to be changed with the prioritization of informal learning experiences, besides formal education and expanding the area of learning.

Effective teaching and effective student learning have always been a central focus of current educational reform movements. There have been series of attempts of information through vocational education, introduction of ICT, banning of corporal punishment and introduction of Continuous Comprehensive Evaluation etc. Moreover, the framework for meeting the national educational goals for all students has been designed. So, the overall effect of education is determined by its content as well as by the way in which it is delivered.

Most of the educational researches now focus on the ways of teaching that can enhance academic achievement of the students using the best available resources. Researches have been conducted to use a number of new teaching learning approaches in order to improve the performance of the learners. Learning is a psychological phenomenon and no two learners in a class are alike. In order to cater to the needs of the diverse learners and improve their academic achievement, research today has shifted its focus from autocratic and teacher oriented classrooms to instructional strategies wherein pupils are given due importance in putting their views in front of the teacher. Apart from physical participation of students in the class, it is important to involve their thoughts, ideas and surroundings into teaching. So, teachers need to adopt an integrated and holistic education approach today that can ensure a healthy future for students.

Teaching approaches thus must cater to the developmental needs of the students. Ecological approach implements such teaching strategies in classroom that utilizes the developmental principles of human development.

“The ecological viewpoint is based on the understanding that the student and the learning environment mutually interact, learning is interactive and happens in relevant contexts. But there is disconnection between the classroom learning and the real life due to over emphasis on achievement that takes away the joy of learning and its application in real situation. Educationists have been suggesting integration of
classroom learning with real life. With rising concerns about environmental issues, the contemporary focus is on linking learning interaction with environment through green curriculum” (Johnston and Carter, 2003). So, there is an urgent need of changing the process of teaching in order to improve the learning process. Also, in order to strengthen their teaching teachers need to combine the surroundings, real life examples and teach students through nature that would help them to understand the concept of ecological approach.

1.2 ECOLOGICAL APPROACH

“There is a myth that the purpose of education is to give students the means for upward mobility and success. The plain fact is that the planet does not need more successful people. But it does desperately need more peacemakers, healers, restorers, storytellers and lovers of every kind. It needs people who will live well in their places. It needs people of moral courage willing to join the fight to make the world habitable and humane. These qualities have little to do with success as our culture defines it.” Orr (1998)

Ecological approach aims at improving teaching-learning process keeping in mind the needs of diverse learners. According to this approach, learning takes place in a dynamically evolving learning space which is formed by the wider community of learners and teachers.

“An ecological approach is a holistic approach which encompasses diversity, rather than being disconnected and specialized. It is modelled on ecology, where the focus is not only on the sum of the parts, but on the linkages and interactions between them. An ecological approach to basic education involves relating the people concerned to the subject being covered, while exploring the linkages between the sub-issues and how their actions, or inaction, connect to the whole picture being studied. The subject and method are both linkage-based” (Foner,2002). It is concerned with how the activity is part of the environment and at the same time how it influences and is influenced by the environment. Its starting-point is the interaction between individuals and their environments.

In order to bring people’s education closer to their needs, the need is to transfer resources and decision-making from the capital to the regions and even the local communities. If education is to become ecological, it must above all regain its
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links with the school, family, environment and community life. Ecological education is not a specialized discipline within the field of educational sciences but it also studies the environment. On the contrary, it is a lifelong practice of social learning and knowledge transmission that is carried out in all spheres of life. It deals with how to restore links with people’s experience in their natural, social, and cultural environment.

“An ecological approach to education is a holistic, interdisciplinary approach in relationships between human beings, nature, and the universe” (Hautecoeur, 2002). It implies adopting an approach that is aware of both the physical and natural environment, as well as the social and cultural environments. It would have to include all these variables as parameters to guide the teaching/learning process and to assist the designers of curricula in producing an ecological learning experience.

“An ecological approach to lifelong education means both a conscious attitude towards the interactions with natural/cultural environment, an ethic of preserving resources and bio-cultural diversity, techniques and methods of applying this ethic, and a proactive policy of moral (legal) change aiming to preserve or restore the quality of environment. Also, an ecological approach to adult education consists of uncovering vernacular types of education, treating them with respect, and drawing as much as possible from them in endogenous development initiatives” (Hautecoeur, 2002).

An ecological approach aims to understand how mathematics is embedded in other human activity, its embeddedness in social life and in thought, and its position in history, in language, and in learning.

Inevitably an ecological approach starts out from people’s lives, from what people actually do and from the sense and meaning people give to their activities. In this way, an ecological approach gets to concentrate on vernacular activities and vernacular values, often contrasting them with more dominant ones.

Thus, it is ‘a continuous process of learning, including education and training, enabling students to think and act more responsibly and creatively in the context of their environment, their culture, and their community’. It applies to human activities as a whole, including everyday activities and the domestic economy, where knowledge is often oral or even implicit, acquired and transmitted through practice.
In order to make education more relevant, meaningful, and effective, as educators, those teaching methods need to be employed which are extremely flexible, individualized, and personalized. Teachers also must have an idea of what ‘lessons’ they are ‘teaching’ to their students. Teachers therefore have to be prepared with ‘lesson plans’ that could be tailored to learners’ needs, learner’s readiness and the availability of content matter. This means that for both the ‘teacher’ and the ‘student’ learning has to be completely fluid, flexible, and dynamic.

Ecological approaches are linked to the conviction that people living in a certain community are the basic actors in the solution of the collective problems faced by that community. Ecological approaches require a shift of mind that brings current daily activities to the centre of life and learning; they are built on what people have naturally and in abundance.

Generally much learning is in the routine, of observing, participating in, and reflecting upon everyday activities. Nevertheless, students also learn by participating in new practices and by engaging in activities such as negotiating and organizing.

The ecological approach matters because it does not limit students to one method, but rather offers them portable and flexible strategies for participating meaningfully within the various rhetorical environments that they will encounter both at the school and beyond it.

### 1.2.1 Need and Importance of Ecological Approach

Education is not only achieved through teaching, reading and writing rather it is achieved through a variety of other means. Neisser (1982) was highly critical of laboratory-based experimental studies of memory, and argued for a more ecologically based approach, that is a more naturalistic approach. His book begins with an article arguing point-by-point the importance of studying natural memory and criticizing the methods of experimental psychology. His argument about the importance of studying phenomenon in their natural settings applies equally well to the teaching of mathematics, which needs to get beyond an over-reliance on purely psychological approaches.
Barton (2007) stated that “an ecological approach emphasizes diversity and sees it as a virtue: diversity is a source of strength, the roots of the possibilities of the future. Such an approach has been successful in educating large number of people and eradicating their environmental and legal ‘illiteracy,’ increasing their self-confidence, and enabling them to be more positive regarding issues of environmental protection and improvement. People have come to realize that they are part of a wider and complex ecological system, and that they should live in harmony with it”.

Ecological approaches to basic education are crucial in helping ease and lessen the environmental crisis. It is most effectively achieved when an ecological approach is used, multifaceted, interlinked, and diverse in terms of both content and execution.

“Strategies for improving education – of young people as well as adults – must go far beyond the classroom and into the lives, the culture, the commerce, and the institutions of daily life” (Korten 1994).

Many factors namely parents, schools, church, the media, occupational peers, and more shape one’s values and one’s world-view.

1.2.2 Ecological Factors

There are numerous ecological factors that affect students in homogeneous ability grouped mathematics classes viz. family, friends and environment. The practice of ability grouping has endured the test of time in the battle of good versus evil and advantages versus disadvantages.

The key factors as given by Aldgate (2006) in the developmental-ecological model are as follows:

- Each child is an individual with individual potentialities;
- Children develop along different dimensions simultaneously;
- Milestones are an important concept but should be used within a context that recognizes each individual’s potentialities;
- Children themselves have a part in influencing their development through their behavior and dynamic transactions with others;
• Cultural diversity is an important determinant in how individual children transact with the environment in which they live;

• Children’s development is influenced by many factors, including internal factors such as their temperament, and external factors such as input from parents and others, so that the circumstances in which children grow up will interact with their intrinsic capabilities.

The ecological-developmental approach looks at the child within the context of his or her family and the environment.

1.2.3 Theoretical Perspective of Ecological Approach

An ecological approach in teaching is not new. The introduction of different ecological approaches into science has been a direct outgrowth of the development of evolutionary theory. Although Darwin’s analyses of natural phenomena in terms of their interdependence provide good examples of ecological thinking, the term “ecology” itself was introduced in the 1870s by Ernst Haeckel, a German zoologist and evolutionist who defined it as the science of the “correlations between all organisms living together in one and the same locality and their adaptations to their surroundings” (Haeckel, 1896). The linguistic roots of the term come from the Greek word “oikos” which denotes household or living space.

Ecological theory has been influential in the field of teaching. Ecological theory not only has deep and far reaching roots in the field, but also has the potential to influence new directions and development in teaching. Tudge, Gray & Hogan (1996) mentioned that the ecological approach is shared with other frameworks within which human development is considered, ranging from cultural psychology as represented by Shweder (1990), Rogoff (1990), and Valsiner (1989), through the co-constructionist perspective on development (Tudge, Putnam and Valsiner (1996); Wozniak, 1993) and encompassing developmental psychology (Gottlieb, 1992; Johnston,1985). It is linked most notably to the work of Gibson, Shanahan, Lewin, Vygotsky ,leontjev, Barker and Bronfenbrenner. The central concern of all ecological theories is the mutual relationship or mutual reciprocity between developing individuals and their environment.

There have been several waves of ecological movements with distinct emphasis that have occurred in the history of psychological science (see Fig. 1.1).
Such as Lewin’s (1936, 1939) field theory and Bronfenbrenner’s (1977) experimental ecology of human development promoted the scientific study of the highly interdependent and nested nature of human mind and behavior, using experimental methods.

Barker’s (1968) and Neisser’s (1982) ecological psychology emphasized the assessment of personality and cognition in naturally occurring contexts. Gibson’s (1979) ecological psychology of perception centered on the concept of affordance, or the mutual interdependence of object and perceiver. Berry’s (1979) ecological model of social behavior aimed to explicate the links between physical features of macro-environments and social behaviors and cognitions.

In Vygotsky’s (1978) cultural-historical theory, learning takes place through interaction with more competent others, and all development is framed within a context that is socially created at both local and broad societal levels and is affected by the developing nature of the individual. Dewey’s understanding was very close to Vygotsky’s in that Dewey (1910) believed that “mind and character require a culture medium in order to develop” and saw development as a process that is related to social practices, beliefs, and ideologies.
“John Dewey, who has been called the most influential educator of all time, was promoting ecological approach before most of us were born. His vision might be used to meet all of today’s educational challenges. He theorized the role of nature in educational experiences. He emphasized that the social world was dynamic rather than static” (Cahan, 1992). He was highly critical of educational practices that put the teacher in the position of handing out facts as discrete units to passive students as a brick layer would deliver bricks to all. Freire (1998), another highly influential educator, also detested this type of education, which he called banking education- the educator banking deposits in the educatee (i.e. students).

Both men insisted that there is an intimate connection between knowledge and activity. Also, Dewey’s ecological perspective is similar to the grassroots perspectives offered by Prakash (1995) who argues that modern ecological science has become disconnected from concrete problems, the natural world and local initiatives.

Both Bronfenbrenner (1979) and Vygotsky (1978) postulated that “human development occurs within the social interactions among people”. Dewey (1938) initially described this approach by stating that “the actions of individuals are affected by the whole situation in which they are involved and people interact with one another to form it”.

Similarly, Annan’s (2005) model of ‘situational analysis framework’ is based on the ecological approach which suggests that the problem is not within the child but outside it. The contributions of Urie Bronfenbrenner span over 60 years (Lerner, 2005), with some of the basic ideas of his ecological theory traced back to a series of articles written in the 1940s (Cairns & Cairns, 1995; Bronfenbrenner, 1994). He declares that although he is often credited as the originator of this perspective but he is not. Rather, he acknowledges the influence of many scholars such as Kurt Lewin, Lev Vygotsky, George Herbert Mead, Jean Piaget, Sigmund Freud, and others and suggests that the significance of his contribution is the manner in which he conceptualized these ideas in a systemic form (Bronfenbrenner, 1979).

Also, Derksen (2010) in his article the influence of ecological theory in child and youth care: a review of the literature mentioned that Bronfenbrenner has been described as a pioneer who has made outstanding contributions and influenced the work and writing of many scholars in the study of the ecology of human development (Barnes, Katz, Korbin, & O’Brien, 2006; Brendtro, 2006; Cole, 1979; Moen, 1995; Pence, 1988; Lerner, 2005).
“Bronfenbrenner’s perspective has some bearing on the works of Bandura (1977) and Vygostky (1978) in that environment is either explicitly or implicitly considered as a primary mechanism in children’s development by all three theorists” (Krishnan, 2010). It has since been applied not only in developmental, child, and educational psychology, but also in other educational research. Wilsey (2013) quoted different examples in his doctoral dissertation that McCann (2004) applied this theory to an investigation of how graduate students construct their learning in an online course, Tissington (2008) applied it in examining the transition to formal teaching of alternative certification candidates, and Leonard (2011) used it to determine the effect of school community partnerships on student development and success in an urban U.S. high school. In language teaching, examples include Van Lier's (2003) application of this theory as a framework for research with educational technology for language arts in a U.S. elementary 31 school and in an intensive English as a Second Language (ESL) program at a U.S. university, and Borroto and Yeh's (2010) English language learning research in an urban public high school in San Francisco, CA. This theory is useful for research espousing an ecological worldview because it is activity-based and focused on the connections within and across nested systems (Van Lier, 2003, 2004).

The investigator concentrates on the interaction between children and their material environments. So, the underpinnings of theoretical framework are based on Urie Bronfenbrenner’s ecological approach to teaching to understand multilevel etiological factors affecting academic achievement of the students in school. “The development of the child cannot be explored or explained by any one single concept, like biology, but rather by a more multidimensional and complex system. According to Bronfenbrenner, a child’s development is shaped by the varied systems of the child’s environment and also by the interrelationships among the systems. The relationship between the child and the environment as he saw is reciprocal; the environment influences the child and the child influences the environment. Human beings, Bronfenbrenner suggested, cannot develop in isolation, but within a system of relationships that include family and society. This theory lays stress on the quality and context of the child’s surroundings. Bronfenbrenner maintains that because the child develops, the interaction with the environments acquires a complex nature. The chance for complexity appears since the physical and cognitive structures of a child grow and mature” (Ryan 2001).
As the theory views school environment as “a set of nested structures, each inside the next like a set of Russian dolls (Using the metaphor of the matrioshka)” (Bronfenbrenner’s, 1979), the current theoretical framework allows investigation into simultaneous effects of individual traits and interpersonal and contextual factors on academic achievement. Using the Ecological Systems approach to teaching and learning, an educator will have a more holistic view of his/her students, and will be able to respond in a more effective and appropriate way to support the needs of his/her students.

This theoretical approach can be used to understand the nested environments that affect children in a complex variety of combinations. The main principles of this theory include four nested environments and how they relate to the individual (Hamilton and Moore, 2004). A graphic representation of the key features in Bronfenbrenner’s ecological model is presented in following figures:
Oswalt (2008) has explained different aspects or levels of the environment that influence children's development in his article “Urie Bronfenbrenner And Child Development” as follows:

“The first system of environment is the micro-system, which refers to the small and immediate environment the child lives in. Children’s microsystem will include any immediate relationships or organizations which they interact with, such as their immediate family or caregivers and their school or daycare. How these groups or organizations interact with the child will have an effect on how the child grows; the more encouraging and nurturing these relationships and places are, the better the child will be able to grow. Furthermore, how a child acts or reacts to these people in the microsystem will affect how they treat his/her in return. Each child’s special genetic
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and biologically influenced personality traits, what is known as temperament, end up affecting how others treat them.

Bronfenbrenner’s next level, the mesosystem, describes how the different parts of a child’s microsystem work together for the sake of the child. For example, if a child’s parents take an active role in a child’s school, such as going to parent-teacher conferences and watching their child’s soccer games, this will ensure the child’s overall growth. In terms of school environments, parental communications with teachers and peers in schools are mesosystems, and such systems are expected to significantly influence children’s academic achievement.

The exosystem level includes the other people and places that the child himself/herself may not interact with often himself/herself but that still have a large affect on his/her, such as parents’ workplaces, extended family members, the neighborhood, etc. For example, if a child’s parent gets laid off from work, that may have negative effects on the child if his/her parents are unable to pay rent or to buy groceries; however, if his/her parent receives a promotion and a raise at work, this may have a positive effect on the child because his/her parents will be better able to give his/her physical needs.

Bronfenbrenner’s final level is the macrosystem, which is the largest and most remote set of people and things to a child but which still has a great influence over the child. The macrosystem includes things such as the relative freedoms permitted by the national government, cultural values, the economy, wars, etc. These things can also affect a child either positively or negatively”.

It will be demonstrated that such approaches enable students to become more attuned to the nature and process of change occurring around them. The ecological approach works well to look at a diverse group of populations with the same lens, and understand how these overlapping and intersecting systems affect the child’s development.

In the ecological approach students not only interact with their environments, they co-create aspects (e.g. evaluative perceptions) that influence processes of selection they will commonly refer to as assessment. This process of niche construction (Odling-Smee, Laland& Feldman, 2003) provides a means of being able to explain changes in the learning environment, and related selection processes,
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within and between episodes of student interaction. This interaction between individuals, and with the situated world around them, is a key social- and practice-based dimension of the process, as with the ecological approach.

So, this approach is appropriate for the present study because it takes into consideration and analyses the totality of learners' lives and provides a framework for examining the impact of each of the environmental layers onto the learner's outcomes.

1.2.4 Principles of Ecological Approach

Children are curious about how the world works, so childhood is the time to give them a solid grounding in ecological principles. Students at primary stage start to explore the bigger world around them, so what better time to give them a solid grounding in the laws of the universe and the principles of ecology — in short, ecological literacy and consciousness. As students begin to widen their sense of community, we should encourage them to include the natural world in their growing sense of place.

Here are the most important ecological principles to teach our students using fun, experiential, exploratory, hands-on, visceral (my word for full-body, get-down-and-dirty) activities!

A USDA Forest Service social scientist, faculty members, and graduate students from the University of Georgia’s Institute of Ecology compiled a list of eight general ecological principles (Barrett, Peles, & Odum, 1997). An understanding of general ecological principles is included in both the National Science Education Standards (NSES), and NAAEE (North American Association for Environmental Education) Guidelines for Excellence. These are: Adaptation, Behavior, Diversity, Emergent properties, Energy flow, Growth and development, Limits and Regulation

A brief description of each principle and associated concepts taught by the investigator during research is given in the Chapter III.

1.2.5 Ecological Approach and Mathematics Teaching

“Mathematics is a way of knowing and of existing in the world; it is difficult to imagine our daily lives without basic mathematical technologies such as measurement, counting, comparing, and locating. Historical and contemporary evidence show that every human culture (however small) not only motivated by utility
but also by aesthetics, religion, or enchantment, is capable of developing some form of mathematics” (Davis & Hersh, 1981; Joseph, 1990).

Mainstream mathematics, such as the mathematics curriculum in most parts of the world, is applicable to wide areas of experience and is integrated into other disciplines. Basic mathematics is a globally understood language; it is an approach to being in, engaging with, and relating to the world, and to perceiving and understanding the structure of our worlds. Both the social and physical worlds are being understood from a mathematical view at an increasing rate.

Davis and Hersh (1986) maintain that “the application of mathematics to almost every aspect of the human world is often established on questionable assumptions and has problematic implications”. Skovsmose (1990) argues that “school mathematics has political implications as it favors certain groups of students, stratifies society, and serves as an introduction to an ideology characterized by certainty, idealism, and rationalism”. “It appears the modern world is filled with the spirit of Descartes, a dream about a universal method whereby all human problems could be worked out rationally, systematically, and by logical computation” (Davis & Hersh, 1986; Jardine, 1998). Due to the wide range of application and internationalization of modern mathematics, school mathematics is implicated in theories about building democratic societies. In addition the long held view that mathematics has nothing to do with culture and politics is flawed.

Teaching requires the teacher to encourage students to build on each other's ideas and to participate in conversations about mathematics until they have constructed a shared understanding of a concept or skill. During these conversations, students are expected to share not only their solution pathways but their understandings as well (Cobb, Wood & Yackel, 1993; Solomon, 2007). For this to occur successfully, the teacher needs to be able to scaffold student participation in the mathematics classroom.

In mathematics teaching, there should be such concepts which could prove to be an effective foundation for the generation of a new direction to think and reason. Teachers must come out with different and new meanings. They should build a culture of learning; aside from old learning i.e. a constructive culture, which means engaging their senses in learning. Moreover, it implies of creating better learning
situations for them and gradually moving to upper levels. For example, this meant that number sense comes before the written numerals and place value.

Moreover, this ecological approach in mathematics involves a mere and vivid observation on people, their families, cultures, communities and policies and also realizing their strengths and the areas in which they are lagging behind. The recent focus on individual-based models, which accept methodological individualism, should be seen as a return of reductionism in ecology. The main underlying idea of ecology is that everything is interconnected. There must be a connection between what is taught and what he really experiences. There must be integrity in concepts. The concepts must have a link among each other and to the whole. Hence the need to introduce integrated approach in mathematics.

“Scientific literacy requires skill in math, as does learning about ecology and environmental systems. There is plenty of mathematics to be discovered in the natural world, from patterns in Nature to Nature's engineering, and a symbiosis exists between basic scientific principles and their mathematical expressions in Nature” (Adam, 2003).

Math is rarely used in a vacuum. It is always doing or solving some task or problem that has real-world benefits. The principle of ecology makes tangible connections between mathematics and students' personal experiences, in other subject matters, their school lives, or their home life. For example, when working to understand percentage problems in an eighth grade classroom, students could relate their work to the division and distribution of understandable objects and materials such as money, pizza slices, or playing time on a video game system.

Excluding Nature from the math classroom is unnatural. Including nature would enliven the subject. Young students can be taught sustainability using simple math, such as sharing. Basic mathematics - percents, ratios, graphs and charts, sequences, sampling, averages, growth, calculus, variability and probability-all relate to current, critical issues such as pollution and the sustainable availability of resources. Understanding the math of exponential growth and limits to growth is essential for environmental literacy. Mathematical modeling is essential in assessing global environmental change.
“Science, mathematics and technology are defined as much by what they do and how they do it as they are by the results they achieve. To understand them as ways of thinking and doing, as well as bodies of knowledge, requires that students have some experience with the kinds of thought and action that are typical of those fields” (Rutherford & Ahlgren, 1990). Also, they have mentioned the various strategies used by the teachers in ecological approach such as:

- **Starting with questions about nature**: This begins with questions and phenomena that are interesting and familiar to students, not with abstractions or phenomena outside their range of perception, understanding, or knowledge. This way students get acquainted with the things around them including devices, organisms, materials, shapes, and numbers and learn how to observe them, collect them, handle them, describe them, become puzzled by them, ask questions about them, argue about them, and then try to find answers to their questions.

- **Engaging students actively**: Students have many and varied opportunities for collecting, sorting and cataloging; observing, note taking and sketching; interviewing, polling, and surveying; and using hand lenses, microscopes, thermometers, cameras, and other common instruments. They dissect; measure, count, graph, and compute; explore the chemical properties of common substances; plant and cultivate; and systematically observe the social behavior of humans and other animals. Among these activities, none is more important than measurement, in that figuring out what to measure, what instruments to use, how to check the correctness of measurements, and how to configure and make sense out of the results are at the heart of much of science and engineering.

- **Concentrating on the collection and use of evidence**: Students are given problems-at levels appropriate to their maturity that require them to decide what evidence is relevant and to offer their own interpretations of what the evidence means. This puts a premium on careful observation and thoughtful analysis. Students need guidance, encouragement, and practice in collecting, sorting, and analyzing evidence, and in building arguments based on it.
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- **Providing historical perspectives:** History is important for the effective teaching of science, mathematics, and technology also because it can lead to social perspectives, the influence of society on the development of science and technology, and the impact of science and technology on society. It is important, for example, for students to become aware that women and minorities have made significant contributions in spite of the barriers put in their way by society; that the roots of science, mathematics, and technology go back to the early Egyptian, Greek, Arabic, and Chinese cultures; and that scientists bring to their work the values and prejudices of the cultures in which they live.

- **Insisting on clear expression:** Effective oral and written communication is very important in every facet of life, mathematics teachers should emphasize clear expression, because the role of evidence and the unambiguous replication of evidence cannot be understood without some struggle to express one's own procedures, findings, and ideas rigorously, and to decode the accounts of others.

These practices find their bases in early pragmatic education beliefs too. Dewey (1910) had opined the same when he said that only by wrestling with the conditions of the problem at hand, seeking and finding his own solution (not isolation but in correspondence with the teacher and other pupils) does one learn. These interactions alter the knowledge and change the learner’s perceptions of that knowledge; so what is learned is not based just on an individual’s past experiences, but on the collective experiences of the learning community.

Fasheh (1990) was of the opinion that his mother was a best example of an educated person. He realized this in the mid-1970s when he found his mother better than him at mathematics though she was illiterate. When he made this discovery, it is hard to believe that he was incharge of training teachers giving them instructions about teaching mathematics. This wonderful discovery made him realize various things which he considered very important in thinking about ecological approaches in education.

Fasheh (2002) emphasized on observing the action of people, their thinking process and most importantly their knowledge which he believes are not accepted by
today’s ideologies of world. He strongly believed in bringing out that invisible aspect through cultural expression. Education should aim at unfolding the presence of a real creator in every person which makes him valuable and known from an unknown personality. He believed that experience plays a very prominent role in the process of education, and that education is incomplete without experience. He also emphasized on historical settings of a society that has a great impact on the experience of an individual.

Admiring his mother’s knowledge, he considered her to be better than him because he found a naturality in her thinking, practice and expression. He believed his education was intended to produce tanks and warplanes but her knowledge seemed to be creator of everything. Accordingly he provided a different perspective of who is an educated person. He stressed on the undeniable fact that there must be a vivid connection between what the person says and what he preaches. He says his teaching unlike his mother’s teaching was detached from this viewpoint.

He also considered friendship and generosity to be the heart of education which is an important trait of Arab culture. He felt his sheer responsibility was to awake all the educators, teachers, health workers, artists, workers, students, farmers towards saving the planet from the current developments.

Faseh (2002) also throws light on how important are the habit of reading and the capacity to expression in education. A best example of this is the experience of Cordoba in Spain in ninth century. He had seventy public libraries free of the tyranny of textbooks and grades. ‘Technology’ does not inculcate things in an individual whereas the habit of reading and expression does. ‘Reading’ is an incredible journey from present to the past. It provides a glimpse of history to man which he can never ignore. In fact, it is very crucial for man to know about himself for developing meaning and understanding.

Further he gave an example about how to perceive a problem and how to find an effective solution by elaborating on the story about a man in Jordan who very effectively succeeded in securing funds for the needs in the refugee camp. He made a very innovative research by finding out how much the people spent on cigarettes in a year which was atleast $2 million a year whereas the number of people in camp was 35000. Through that simple approach (which Faseh refers to as an ecological
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approach), they first of all changed the perception of the problem and, thus, its solution i.e. to cut back expenditure on cigarettes and utilize them for fulfilling basic needs.

According to Faseh (2002) in ecological approach following steps should be followed:

- First of all change the perception of the problem and, thus, its solution.
- Secondly use ‘research’ in a very meaningful and useful way.
- Thirdly put people back in position of actors, not watchers and demanders.
- Fourthly open the gateways of imagination by changing the concept of perception and pleading for the availability of more and more options.

He believes that teaching of mathematics should not be mere teaching of concepts but linking it with environment, systems and real potential of the learner.

Thus, teaching mathematics ‘ecologically’ means teaching it with attention to the multiplicity of environments, systems, and potential in which and from which students learn. By teaching methods of conscious adaptation, mathematics teachers can offer students constructive strategies for recognizing, utilizing, and solving different problems within multiple environments.

Teaching through ecological approach provides opportunities to the students to apply mathematical concepts and reasoning to real life problems. It also helps in developing knowledge through the use of real world. It meets the learning needs of individual students and group of learners and meets their varying needs. It also helps students to develop social skills by creating content for interactions. In addition to improve academic performance and to cultivate more positive social behaviors, ecological approach has been found to lead to greater motivation towards learning and to improve self-esteem.

Thus ecological approach is learning from surroundings and through doing. It is the process through which individuals construct knowledge and acquire skills from direct contact with immediate environment. It occurs when individual engages in some activity reflects upon the activities, critically drive some useful insight from analysis and incorporates the result through a change in understanding and the behavior. This type of approach helps students to apply their knowledge in real life situations and help them to come with viable answers.
1.2.6 Barriers to an Ecological Approach

Wagner (1997) in ecology and basic education among the Indigenous peoples of Canada has specified the following factors that make it difficult to adopt ecological approaches:

1. One of the major obstacles which appears to be the traditional insistence on independence in (basic) education systems. In the field of education, this leads to behaviour and ways of doing things that are contrary to the needs of people and communities.

2. Moreover, many education systems are marked by a narrow functionalism: funding related to circumscribed numbers of entrants and leavers (enrolments, drop-outs, and those gaining certificates); and (pedagogical) evaluation focusing on individual formal learning and performance rather than on the impact of learning on participants’ real lives, on their circumstances and conditions in the community. Although initiatives are limited in some cases by constraining factors, dominant models that are merely reproduced in other cases with little awareness that this is what is happening.

3. Moral, cultural, and social problems are transformed into practical, technical, pedagogical, and individual problems especially when educational activities and institutions are isolated from the environment in which teaching occurs. Basic education systems then become impermeable to the human, cultural, and natural environment. And they prove particularly insensitive towards minority languages and cultures. What is required is to see education systems as part of a wider purpose than mere pedagogical functionality. Education is more than a technique; it is a fundamental vehicle of social justice.

What is lacking in many cases is the relationship between education systems and their environments, their learners’ needs, and their ethnocultural and socio-cultural contexts.

‘It is better to light a candle in the dark than to curse the darkness. The application of the ecological approach and the awareness of the place and role of human beings in relation to the environment are also a challenge at the professional level. Though there are so many obstacles teachers are believed to enter twenty-first century with creativity, humanism and optimism.

In this troubled world of constant change, can people keep the child within them and at the same time live in harmony with their surroundings? What can help
them to overcome the stress of everyday life, and to evolve? Usually, when people have serious problems, they turn to education, schools, and teachers to help and guide them. They look for the miracle that will turn children and adults into educated human beings who can adapt to sudden changes, can cope and develop in a way that will contribute to the well-being of society.

According to Hautecoeur (2002), this approach presupposes “an awareness of the ways in which we interact with our natural/cultural environment, an ethic of conserving resources and bio-cultural diversity, techniques and methods of applying this ethic, and a proactive policy of changing customs (laws) with the aim of preserving or restoring the quality of our environment”.

It is necessary to work out a specific ecological approach for the educational environment, the implementation of which would bring about positive changes in the content of programs; the organization of the education process, by emphasis on student participation, independent and collaborative work, and effective learning methods and techniques; school materials, so that these reflect the problems of the environment in everyday life; learners’ commitment to the process of evaluating the results of educational activities, academic courses, training, etc.

Creating such an educational environment presupposes an additional appropriate learning. Students have lost the intimate relationship with their surroundings; they no longer know how to use local resources; they have become increasingly dependent on forces that are further and further removed from their concerns. Their locality becomes a sort of temporary stopping place into which goods are imported and from which refuse is exported.

Our school is the world, everyday life. We are building a vision of the world, we are seeking the means to preserve and improve it. The ecological model asserts that families and schools influence each other and, together, they have a profound impact on child development.

“One aspect of the ecological framework has particular utility for enhancing parental involvement. It posits a shared responsibility between teachers and parents for children’s academic and behavioral success” (Christenson, 1995). This suggests that families and schools need to communicate the beliefs and information they have about each other and their motivation to interface with another. “When the
microsystems of a child’s home and school are in conflict, this conflict disrupts the functioning of the mesosystem and negatively affects the children” (Bronfenbrenner, 1979; Christenson & Hirsch, 1998).

Ysseldyke and Christenson (2002) contended that it is important for educators and parents to understand the concept of the total learning environment – instructional support, home support, and home-school support – when creating successful learning environments for students. Similarly, Christenson and Anderson (2002), stated, “The learning context is composed of critical systems (child, home, school, peer, and community or neighborhood) that affect academic, social, and emotional learning for students in grades K-12. The learning context is an interwoven structure of circumstances and people that surround the child across systems at a given point in time and over time. Thus, an ecological approach to children’s academic and behavioral success is vital when defining parental involvement.

1.3 PARENTAL INVOLVEMENT

Parents are a child's first and enduring teachers. They play a crucial role in helping their children to learn. In the present era, parents want and need information about what’s happening in their child’s classroom and how they can help. The best way to know is to get involved, as their involvement can make an important difference in their child’s life.

In other words, success in the education of children depends, at least in some part, on the involvement of their parents. If a child sees that their parents are enthusiastic about education, they are far more likely to view their schooling in a positive light, and be more receptive to learning.

To this end, parents should be seen as vital partners in a child's education, as they can not only help the child to do homework on time and in giving a child vital coaching and advice out of school hours, but they also determine the child's home environment, where children spend much of their waking hours. Engaging and working with parents is one of the most vital parts of providing children with an excellent education. Thus, when parents are involved in their children’s education at home, they do better in school. And when parents are involved in school, children go farther in school and the schools that they go to are better.
Parental involvement has been touted for years as a very important predictor of student achievement in schools. Involvement can mean: reading to your child, checking homework every night, discussing your children’s progress with teachers, voting in school board elections, helping your school to set challenging academic standards, limiting TV viewing on school nights, and become an advocate for better education in your community and state.

Or, it can be as simple as asking your children, “How was school today?” But ask every day. That will send your children the clear message that their school work is important to you and you expect them to learn.

Thus, the family makes critical contributions to student achievement from preschool through high school. A home environment that encourages learning is more important to student achievement than income, education or cultural background.

Also, involving parents into their children's education has long been regarded as an important policy to improve the total quality of education (Domina, 2005; Epstein, 1995; Fan and Chen, 2001; Driessen, Smit, and Sleegers, 2005; Edwards and Warin, 1999; Harris and Goodall, 2008; Lee and Bowen, 2006). Above all, as parents are their children's earliest teachers, they have both the right and the motives to take an active part in the child's achievement development (Slaughter and Epps, 1987), and they bring “a lifelong commitment to the child's well-being and deep caring” (Hiatt-Michael, 2008). From a more pragmatic and pedagogical perspective, parental involvement has been reported to lead to higher school achievement and attainment (Aslanargun, 2007; Driessen et al., 2005; Edwards and Warin, 1999; Harris and Goodall, 2008; Hiatt-Michael, 2008; Muller, 1998; Stewart, 2008), better social functioning (Driessen et al., 2005), higher student attendance, less suspension and expulsion, better graduation rates, higher satisfaction with the school, student improved goal-setting and pride in school work (Hiatt-Michael, 2008), and pupils' increased motivation, attachment to school, responsive behaviors, and self-esteem (Yildirim and Donmez, 2008).

1.3.1 Meaning of Parental Involvement

Parental Involvement is used as an umbrella term to imply parents’ efforts to take an active role in their children’s education. Traditionally, parental involvement
has been narrowly defined, focusing mainly on the activities parents can do in the home that support the learning taking place in schools (Auerbach, 1989; Gonzalez et al., 1995). These include, but are not limited to, reading aloud to their children, providing assistance with homework, and teaching such basics as ABCs and counting to ten. Parents are naturally their child’s first teacher, a role taken seriously by most as it is regarded as one of the most important roles of parents in the education of their children (Nieto, 1985). However, this role is quickly taken over by schools and government agencies if parents are judged inept at fulfilling their responsibilities as first teacher (Daniel-White, 2002).

Parental involvement is important to the educational success of a young adolescent and yet generally declines when a child enters the middle grades (Epstein, 2005; NMSA, 2003). Parental involvement is defined as having an awareness of and involvement in schoolwork, understanding of the interaction between parenting skills and student success in schooling, and a commitment to consistent communication with educators about student progress. The term “parents” refers to biological parents, adoptive and step-parents, and primary caregivers (e.g., grandmother, aunt, brother).

In the publication entitled Enhancing Parent Involvement: A Practical Guide for Pennsylvania’s Schools Supporting Students with Disabilities developed by Pennsylvania’s Federally Funded Parent Center (2015), it is mentioned that No Child Left Behind Act (NCLB) defines parental involvement as the participation of parents in regular, two-way, and meaningful communication involving student academic learning and other school activities, including ensuring that parents play an integral role in assisting their child’s learning; parents are encouraged to be actively involved in their child’s education at school; parents are full partners in their child’s education and are included, as appropriate, in decision-making and on advisory committees to assist in the education of their child; and the carrying out of other activities.

“Parental Involvement is a concept that can include many different activities. It can range from an impersonal visit to school once a year to frequent parent-teacher consultations to active school governorship. Thus, individual parents can be placed on a continuum ranging from very low (or non-existent) to very active involvement” (Brito and Waller, 1994).
Parental Involvement is described as the degree to which a parent is committed to his or her role as a parent and to the fostering of optimal child development (Maccoby and Martin, 1983).

“Parental engagement involves partnerships between families, schools and communities, raising parental awareness about the benefits of becoming engaged in their children’s education, and providing them with the skills to do so” (Muller 2009).

“The common wisdom is that parental involvement and strong schools are inseparable--that you cannot have one without the other. Indeed, research indicates a strong link between parental involvement and student achievement” (Hester, 1989).

Davies (1991) has defined parental involvement from a shifting perspective. As society restructures itself, as communities restructure themselves and as schools restructure, parental involvement also is being transformed.

“The term parental involvement, in contrast, is used by some to refer only to those activities that take place in the school such as volunteering, meeting with teachers and other school personnel, attending school events, and parent teacher conferences” (Hill and Taylor, 2004).

Goodall and Vorhaus (2010) use the term “Parental Involvement” to capture learning at home, school-home and home-school communication, in-school activities, decision-making and collaborating with the community.

In a project focusing on enhancing the school readiness of disadvantaged preschool children in the US, parental involvement is defined as comprising 1) parental warmth and sensitivity, 2) support for a child’s emerging autonomy, and 3) active participation in learning. (Sheridan et al, 2010).

Parental involvement has been defined across studies as representing many different behaviors and practices at home or at school, including parental aspirations, expectations, attitudes and beliefs regarding their child’s education (Henderson, Mapp and Averett, 2002).

Jeynes (2005) found discussing school issues is positively correlated with adolescent academic achievement. Lee and Bowen (2006) reported a similar association between parent-child educational discussions and elementary European American students’ achievement (but a negative one with Hispanic/Latino ones). Muller (1998) found parent-student talking about school is associated positively with
math scores of eighth graders but not tenth graders. Stewart (2008) reported parent-child discussions (about activities and events at school) play a substantial role in increasing tenth grade students’ achievement. Sui-Chu and Willms (1996) found discussing school activities had a strong impact on academic achievement of middle school students. On the contrary Chen (2008) found that parental support represented by helping students find ways to resolve school problems had a negative association with academic performance of Hong Kong students at grade ten. Begum (2007) found parents’ participation in school activities had an impact on the math and reading performance of preschool, first, third, and fifth grade European American, Hispanic, and African American children, but not on Asian children.

Thus, parental involvement has great influence in developing psychological and academic achievement of the child. Now a day’s society is based on competition in which everyone has the tendency to perform as practically as possible so here motivation, involvement and support of parents make him more confident and optimistic. The extent of parental interest, encouragement is obviously a crucial factor in child progress. Psychologists are agreeing that the family has the most significant impact on the development of child.

1.3.2 Types of Parental Involvement

Whether in a supportive and/or an active role, parental involvement can mean very different things, depending on one’s perspective. Teachers may want parental involvement in the form of helping children with their homework. Parents may see parental involvement as making major decisions in the school. The truth is that parental involvement can and should take many forms. Parental involvement may entail reading to preschool children. It is getting children ready for school every morning. It is volunteering at the school. It is serving on collaborative decision making committees, and it is lobbying legislatures to advocate for children. The list of examples could be very long. In this sense it takes many forms ranging from parent-child communication to participating/volunteering in school activities.

“Parental Involvement” is the participation of parents in every facet of children’s education and development from birth to adulthood, recognizing that parents are the primary influence in children’s lives. Parental involvement takes many forms, including two-way communication between parents and schools, supporting parents
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as children’s primary educators and integral to their learning, encouraging parents to participate in volunteer work, sharing responsibility for decision making about children’s education, health, and well-being, collaborating with community organizations that reflect schools’ aspirations for all children

(Source- http://www.papta.org/domain/73)

According to Vandergrift and Greene (1992), parental involvement has two independent components i.e. parents as supporters and as active partners.

Focusing on one of these components alone is not a sufficient approach to parental involvement. Parents can be active, yet not supportive of the education process. They also can be supportive but not active at the school. Of course, the ideal is the parent who is both supportive and active; but this often is difficult when both parents work outside the home, or when there is only one parent in the home.

Pettit (1980) attempted to organize the various dimensions of parental involvement. Petit specifies three levels or degrees of increasing parental involvement i.e. Monitoring, Informing, and Participation.

The National PTA Board of Directors (1993) has endorsed three types of parental involvement, parents as the first educators in the home; parents as partners with the schools and parents as advocates for all children and youth in society.

Grolnick and Slowiaczek (1994) also researched parental involvement in children’s schooling. They categorized parental involvement into three types. The first was involvement through behavior such as participating in school activities, for example, an open house or parent/teacher conferences. The second type was through personal involvement such as talking with the student about school and showing that they cared about what occurred at school and the final type of involvement was cognitive/intellectual involvement, which exposed the child to cognitively motivating activities such as books or current events.

Tomilson (1991) maintains that parental involvement in schools may take one of the four forms i.e. exchange of information (via letters, circulars, reports, visits); personal involvement in educational matters (homework or classwork); informal involvement in administrative matters, via the Parent Association and formal involvement in school governing.
Fullan (1982) identifies four forms of parental involvement as instruction at school, instruction at home, school governance and community service.

Desforges and Abouchaar (2003) in a review of the English language research literature on parental involvement (relating mostly in primary and secondary schools) identified following forms of parental involvement:

- Good parenting in the home, including: the provision of a secure and stable environment; intellectual stimulation; parent-child discussion; good models of constructive social and educational values; high aspirations relating to personal fulfillment and good citizenship;
- Contact with schools to share information;
- Participation in school events;
- Participation in the work of the school;
- Participation in school governance.

Steinberg et al. (1996) found that the type of involvement that most impacted student achievement was physically getting the parents to the schools. Attending school programs, extracurricular activities, teacher conferences, and open houses were activities that drew parents to the school. Attending school functions regularly required a lot of effort, more so than helping with homework, and was noticed by school personnel and the child. The researchers noted that this type of commitment sent a strong message about how important school was to them and how important it should be to their child. This type of involvement reinforced the interconnectedness of the two worlds of home and school.

Epstein (1995), as a leading researcher in the field, sorts out the types of parental involvement as parenting skills, communicating with school, volunteering in school, helping their children learn at home, taking part in the school decision making process, and collaborating with the school community.

Muller (2009) stated 'Family-school and community partnerships are re-defining the boundaries and functions of education. They enlarge parental and community capacity; they create conditions in which children learn more effectively. In these ways they take education beyond the school gates'.
Ecological theory underpins research that shows how parenting practices, the quality of education, and the resources of a community all interact and contribute to the learning outcomes of children from different socio-economic backgrounds (Ryan, Fauth, and Brooks-Gunn 2006). From this broader perspective, there are three major contexts within which children develop and learn: the family, the school, and the community.

Epstein’s overlapping spheres of influence model (Epstein 1987, 1996), detailed in Figure 2, implies that successful partnerships must be forged between these three spheres in order best to meet the needs of the child. Her model recognizes that students learn more and succeed at higher levels when home, school and community work together and play collaborative, complementary and supportive roles to support learning and development (Epstein and Sheldon 2006).

![Figure 1.4: Epstein’s overlapping spheres of influence model](https://www.pbis.org/family/family-partnership)

**Figure 1.4: Epstein’s overlapping spheres of influence model**


Epstein’s model has been built on by researchers and practitioners to explain how educators, families and communities can connect to support student learning and success (Desforges and Abouchaar 2003; Muller 2006). Epstein emphasizes that student outcomes improve when schools and families share goals and work in collaboration to achieve these goals.
Parents’ involvement in school-based activities is most likely to have a positive influence in the early years of schooling when children require additional support to adjust to a new learning environment and to develop a sense of belonging (Henderson, Mapp and Averett, 2002).

Bronfenbrenner (1979) showed that there are external forces, such as the exosystem which contains the larger social system such as parent-workplace schedule, that affect the life of the child even though the child does not have a direct relationship. As Bronfenbrenner’s ecological theory suggests, child development is influenced by a number of external systems that act simultaneously to influence and guide development. He surmises that a toddler sits at the center of a series of circles representing micro-systems, meso-systems, exosystems, and macro-systems, where the parental relationship represents an exo-system with high influence (Darling, 2007). Therefore, the role of the parent as a development agent and/or catalyst is vital to the overall development of children.

A study by Jeynes (2005) indicated that when parents get involved in their children’s education by asking them what they learned at school, and encouraging them to narrate and explain in detail their experiences for the day, children tend to perform higher academically.

Using Bronfenbrenner’s ecological theory as its theoretical underpinning, this study attempt was to highlight the importance of parental involvement in academics and school functions, such as school family workshops and how such active participation relates to the children’s academic achievement.

Thus, parents can be an important resource to schools if used wisely. As schools are under increasing pressure due to decreasing resources, increasing needs of children and the demands of the 21st century. They cannot do the big job of preparing our most precious resource for the future alone. It is important, therefore, to take advantage of the resource of those most interested in children--their parents--in new and innovative ways.

1.3.3 Barriers to Parental Involvement

Despite the benefits of parental involvement, parents and teachers alike have reported barriers to the effective involvement, across varied cultures and groups within cultures (Bermudez, 1993; Comer & Haynes, 1991; Davies, 1993; Epstein,
1986; Epstein & Dauber, 1991; Harry, 1992; Huss-Keeler, 1997; Lightfoot, 1981; Moles, 1993; Reed-Danahay, 1996; Vincent, 1996; Yao, 1993). These barriers include differences between parents’ and schools’ goals for children’s education, language differences and varied structural constraints (e.g., school accessibility limited to workday hours).

Parents may also experience barriers due to intervening family commitments (e.g., infant or elder care) or practical and personal issues (e.g., access to transportation, limited skills for helping in specific learning areas, a legacy of low efficacy for school tasks derived from personal educational history).

Lack of time, information and training, external support for family-school partnerships; school organization and practices especially in secondary schools, often discourage family members from becoming involved; family-school differences are the major kinds of barriers that hamper parental involvement.

According to Lareau (1987) & Moles (1993), some of the barriers that inhibit parents in becoming fully involved in their children’s education include lack of child care, inflexible work schedules, income and transportation to participate in school programs and events, confidence interacting in a culture and/or language different from their own, parental shame of their own educational failure, written literacy skills, insufficient information on home-school collaboration, different expectations of the school role, discomfort in higher-class settings, and fear they are not educated enough to be helpful in the classroom or to their own children. These barriers might affect parents differently according to parents’ personal and cultural backgrounds and characteristics.

Baker (1997) conducted a qualitative study with parents which explored barriers to parental involvement. Among the barriers frequently identified by parents in this study were practical issues such as time constraints due to working outside the home, being a lone parent, and having younger children, lack of money required for some parent activities offered by schools which require a financial commitment, such as book fairs, cake sales and social events, nature of the relationship between the home and school.

Smith, Wohlstetter, Kuzin and DePedro (2011) argue that barriers to parental involvement also arise when parents and teachers have different expectations or
beliefs about how parents should be involved. They cite Lawson (2003) who found that a lack of consensus on this issue led teachers to blame parents, and to parents feeling underappreciated by teachers. Hornby and LaFaele (2011) also argue that parents and teachers have different agenda and different goals for parental involvement, which lead to tensions and conflicts, which can in turn limit type, extent and success of parental practices.

It is expected that a variety of different psychological and socio-cultural factors may influence the nature of involvement and that parental involvement in such a context thus merits study in its own rights. Understanding each community’s unique barriers and resources is important for establishing and maintaining effective collaborations between families and schools.

1.3.4 Enhancing Parental Involvement in Practice

Desforges and Abouchaar (2003) in their research report stated that attempts to enhance parental involvement in education involving governments, administrators, educators and parents’ organizations across the countries. It is anticipated that parents should play a role not only in the promotion of their own children’s achievements but more broadly in school improvement and the democratization of school governance. They also further mentioned in their report that the European commission, for example, holds that the degree of parental participation is a significant indicator of the quality of schooling which might take place through:

- Statutory advisory and decision making bodies
- Evaluation of their schools
- Voluntary associations
- Voluntary involvement in after school activities
- Voluntary involvement in classroom activities
- Communications with the school

The English Government has promoted parental involvement through a wide range of activities including the enhancement of parent governor roles; involvement in inspection processes, provision of annual reports and prospectuses, the requirement for home/school agreements; provision of increasing amounts of information about
the curriculum, school performance and other matters (Desforges and Abouchaar, 2003).

The connection of partnerships between home and school curriculum puts the focus on student learning and development (Epstein, 1995). School leaders can influence parental involvement in curriculum by establishing roles, procedures, and beliefs that support the practice of learning activities at home. Through strategies such as encouraging students to talk with their parents, involving parents in homework and goal setting, posting homework and course syllabi on the Internet, and communicating progress to parents, home involvement may increase, thereby increasing student achievement.

Pettit (1980) described enhancement according to three types of Parental Involvement.

- **At Monitoring Level**, schools make parents aware of the school situation. This is done through informal conversations (e.g., open houses, school programs), announcements regarding the school’s activities, and questionnaires. This type of contact helps to establish parental feelings of assurance, confidence, and acceptance.

- **At Informing Level**, means keeping parents informed about the policies, procedures, aims, and expectations that exist in the school, but particularly in the classroom. The contact is more formal and direct. This is done through (1) parent-teacher conferences, (2) home visits, (3) class newsletters, (4) bulletin boards, (5) reporting, (6) phone calls, and (7) take-home packets.

- **At Participation Level**, parents become actively involved in the classroom with teachers. Teachers solicit the assistance of parents in helping the school and/or classroom with instructional support. Parents might act as aides or volunteers in classrooms, helping with bulletin boards, checking assignments, or making games and activities.

Strategies found to be effective in promoting parental involvement covers communication approaches, interventions with different target audiences, parent participation in decision making at the school; alignment of the school’s policies and procedures regarding homework and parent-teacher conferences with research-based practice standards; explicit discussion of the roles of parents, teachers, and students.
in relation to compacts, learning standards, and homework policies; home reading programs aligned with state standards and in-class instruction; parent education focused on home reading and study habits; and outreach through home visits, family nights, and a family resource library (Redding et al. 2004).

Thus, the parental involvement (of various kinds) has a positive impact on many indicators of students’ educational achievement as well as students’ development as shown in the international research (Pushor, 2007; Harris and Goodall, 2007; Desforges and Abouchaar 2003). These indicators include higher grades and test scores, enrolment in higher level programs and advanced classes, higher successful completion of classes, lower drop-out rates, higher graduation rates, a greater likelihood of commencing post secondary education, more regular school attendance, better social skills, greater engagement in school work, and a stronger belief in the importance of education.

Thus, positive results of parental involvement in schooling include improved achievement, reduced absenteeism, improved behavior and restoring confidence for parents about how their kids are doing.

1.4 ENVIRONMENTAL ETHICS

“To live ethically is to think about things beyond one’s own interests. When I think ethically I become just one being, with needs and desires of my own, certainly, but living among others who also have needs and desires” (Singer 1993).

An "environment" comprises of everything in our surroundings and surroundings are defined by a central entity. In ecology, environment refers to the surroundings of humankind. Generally, environment refers to the biological, physical and social things on the earth or in inhabitable space outside the earth's atmosphere. In contrast, it can also prompt an individual to focus on his self-interest, at the cost of others” (Rowe, 1989). The more an individual is academically accomplished, the higher position he has. The higher position he has achieved, the more power he possesses. The greater power he has, the greater is his capacity for ethical discretion. He can use his power in the right way or he can use it to achieve his interests directly and blatantly, impairing and harming others in the process. Therefore, ethics needs to be discussed and deciphered at all levels to help an individual stay on the right path.
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Ethics cannot be enforced on adult learners, but young children can be helped to appreciate, reason, internalize and practice ethical behavior. Fundamentally, people want to be happy and to be helpful to others. As children grow, they want to take charge of their behavior and want to make decisions that have positive outcomes for themselves and others. In the final analysis it can be construed that people differ in their ethical awareness and moral sensitivity, yet they always want to enhance it and live as sentient, sensitive, and supportive beings. Thus, ethics is meant to help an individual to lead his life more meaningfully and happily. In a broad sense, it should integrate higher aims, tall aspirations and practical actions.

“Ethics is the explicit, philosophical reflection on moral beliefs and practices. The difference between ethics and morality is similar to the difference between musicology and music. Ethics is a conscious stepping back and reflecting on morality, just as musicology is a conscious reflection on music. It is defined as a set of rules or principles that are followed by a broadly recognized race or group (lawyer, writers etc.). So in environmental ethics certain set rules and principles are followed keeping the environment into consideration” (Hinman, 1998).

Today, man has to combat many blunders committed by his brethren in the name of progress that have harmed Mother Nature in numerous ways over the years. Alarming climatic changes, deforestation, destruction of habitat and extinction of species, rising pollution levels are only some of the current environmental issues we are faced with today. The interaction between man and environment has been smooth for a long time. However, the rapid growth and expansion today in all fields has caused a lot of problems and the interaction between man and environment has become a matter of great concern today. Therefore the knowledge of environmental issues, skill in analyzing these issues and possession of attitudes and values related to taking action are also necessary before an individual will act and act responsibly (Hines, Hungerford and Tomera, 1987).

Also, these environmental issues became international priorities though they were seen as local or regional concerns, because they have become unexpandable to economic growth, health, nature and aesthetics.

Every individual born has the right to live a decent life but there are various elements and factors in the environment which deprive them from enjoying such life.
To lead a better quality of life there is need of joining hands together in order to curb the toxification of the earth. This is possible only through the re-orientation of the citizens’ values, i.e. imbibe them with proper attitudes and ethics, especially those that will lead to a greater concern for preserving balance in the ecosystem. “Hence it becomes obligatory on the part of each individual citizen to develop environmental ethics that, while one aspires for good life, one should not sacrifice the future of the generations to come” (Sutaria and Tan, 1990).

The field of environmental ethics concerns human beings’ ethical relationship with the natural environment. It is a view that respects ecological stability and promotes the idea that human must live in harmony with the natural environment. While ethical issues concerning the environment have been debated for centuries, environmental ethics did not emerge as a philosophical discipline until the 1970s. Its emergence was the result of increased awareness of how the rapidly growing world population was impacting the environment as well as the environmental consequences that came with the growing use of pesticides, technology, industry economic expansion and population growth.

Ancient Indian literature such as Vedas, Samhitas also mentioned environmental ethics of the non-human world. Today, environmental ethics is one of the major concerns for mankind. Environmental ethics builds on scientific understanding by bringing human values, moral principles, and improved decision making into conversation with science. The academic field of environmental ethics grew up in response to the work of scientists such as Carson’s (1962) Silent Spring. It was first Earth Day in 1970 that helped to develop environmental ethics in the US, and soon thereafter the same ethics were developed in other countries.

“Environmental ethics in outdoor recreation has only recently received critical attention from the research community” (Borrie & Harding 2002). A number of factors have combined to inhibit detailed, statistical analysis of this topic; specifically the persistent debate on the appropriate scope, scale, and dimensions of environmental ethics.

“In other words, even among environmental philosophers there continues to be disagreement on the very nature of environmental ethics” (Callicott 1980). “Indeed a cursory review of the table of contents of any environmental ethics textbook reveals a
A wide range of ethical theories, philosophical commitments, and moral community members” (Des Jardins 2001, Pojman 1998, Van de Veer and Pierce 1998). This then, is the starting point for research into the field of environmental ethics—research which considers degrees of non-anthropocentricism, zoo-centrism versus eco-centrism, tensions between a deontologically-based system of duties and a utilitarian calculus analyzing benefits and costs.

1.4.1 Meaning of Environmental Ethics

The global concept of environmental ethics is of recent origin because of rapid industrialization, urbanization and globalization which forced man to think that he should develop a keen concern and high degree of sensitivity towards the environment and develop a moral responsibility towards the natural resources in general and environment in particular.

Environmental ethics is a branch of environmental philosophy, which studies the ethical relationship between human beings and the environment. It has given a new dimension to the conservation of natural resources (Elliot, 1995).

“Environmental ethics is the scientific study of various issues related to the rights of the individual with regard to the environment. It is the moral relationship of human beings with the environment. It is concerned with the dos and don’ts of human being interaction with the environment. It deals with ecological rights of all creatures present today as well as those that will follow on the earth” (Tajpuria, 2015).

Environmental ethics refer to the responsibility to understand the environmental consequence of our consumption and need to recognize our individual and social responsibility to conserve natural resources and protect the earth for future generations (Raju, 2007).

Environmental ethics believe that humans are a part of society as well as other living creatures, which includes plants and animals. Every creative is a very important part of the world and is considered to be a functional part of human life. Thus, it is essential that every human being respect and honor them and use morals and ethics when dealing with these creatures.
“Environmental ethics is a branch of applied philosophy that studies the conceptual foundations of environmental values as well as more concrete issues surrounding societal attitudes, actions, and policies to protect and sustain biodiversity and ecological systems” (Source: Nature.com http://www.conserve-energy-future.com/environmental-ethics.php)

With environmental ethics, it is ensured that one is doing one’s part to keep the environment safe and protected. “With the rapid increase in world’s population, the consumption of natural resources has increased several times. This has degraded the planet’s ability to provide the services human beings need. The consumption of resources is going at a faster rate than they can naturally replenish” (Gayford, 1996).

An environmental ethics is basically a human ethics based on social justice for all without discrimination of race, sex, religion, ideology, caste, region or nation. Most current environmental problems are essentially a result of people’s activities and their attitude towards the socio-cultural and natural environments. The present day crisis demands a change in attitude, in order that initiatives can be taken to rescue the environment from destruction. (Natural Environment Research Council, UK, 1989).

“Environmental ethics is concerned with the issue of responsible personal conduct with respect to natural landscapes, resources, species and non-human organisms. Conduct by persons is the direct concern of moral philosophy. Man’s relationship to nature has changed from harmony to hostility, to man’s attempt to re-design nature’s formation and order” (Jeffery, 2005). When man lived in harmony with his environment, everything was regarded as good but when man started manipulating nature, the relationship turned sour. “A new ethics that is based on accountability and commitment must be revitalized so that life can be preserved and the beauty of natural environment restored. The concept of environmental ethics does not just provide opportunity for spirited debate on the value of sustainable development. It has played an important role in influencing the growth of ideas and opinions, representing something new in global governance, that seek to express genuine beliefs and values that should ideally govern decision-making for the benefit of humans and the rest of the living world” (Sylvan, 1973).

Environmental ethics is the discipline in philosophy that studies the moral relationship of human beings to, and also the value and moral status of, the
environment and its non-human contents. It covers the challenge of environmental ethics to the anthropocentrism (i.e., human-centeredness) embedded in traditional western ethical thinking; the early development of the discipline in the 1960s and 1970s; the connection of deep ecology, feminist environmental ethics, and social ecology to politics; the attempt to apply traditional ethical theories, including consequentialism, deontology, and virtue ethics, to support contemporary environmental concerns; and the focus of environmental literature on wilderness, and possible future developments of the discipline (Brennan and Lo, 2015).

“Environmental ethics apply ethical thinking to the natural world and the relationship between humans and the earth. Environmental ethics are a key feature of environmental studies, but they have application in many other fields as human society grapples in a more meaningful way with pollution, resource degradation, the threat of extinction, and global climate disruption” (Warner & DeCosse, 2009).

“Environmental ethics is that which reflects a commitment and responsibility toward the environment, including plants and animals as well as present and future generations of people. Today, environmental ethics is one of the major concerns of mankind. It is oriented toward human societies living in harmony with the natural world on which they depend for survival and well being” (Martin-Schramm and Stivers, 2003).

“It is an integration of the themes of ecological ethics, global warming and climate change, environmental and ecosystem health, nature bonding, ecological principles, environmental solutions, and sustainable development and demonstrates to students that life and learning are connected and holistic, like "the real world" outside the four square walls of school” (Jhonston & Carter, 2003).

The field of environmental ethics is also concerned with beliefs about the human environment relationship, particularly the moral aspects of those beliefs. Van De Veer and Pierce (1998), in a view that is common among those in environmental ethics, define environmental ethics “as the proper beliefs and behaviors of humans towards the environment, and state that the purpose of the field (of environmental ethics) is to advance individual and societal adoption of an environmental ethic”. This view can be sharply distinguished from environmental ethicists such as Rosen (1996), who state that “environmental ethics is the study of moral phenomenon concerning
the human environment relationship, showing that there are many beliefs about environmental ethical theories, some of which are more plausible than others”. This difference in views, has important implications for environmental education.

Negra and Manning (1997) developed a sophisticated instrument to define a range of environmental behavior, values and ethics of park visitors in Vermont in order to analyze how these visitor characteristics affected park programming. Their analysis of environmental literature identified seventeen environmental ethics, which they grouped into five categories: Stewardship, Utilitarian/conservations, Benign indifference, Radical environmentalism, and Anti-environment; and then developed a questionnaire to measure fourteen of these, using three general concepts. They found three subgroups: spiritually based stewardship, religiously based anthropocentrism, and secular ethical extensionism. These categories provide comprehensive assessments of complex ethical worldviews, particularly the religious and spiritual aspects.

According to UNESCO (1978) environmental education should constitute a comprehensive lifelong education, responsive to changes in a rapidly changing world. It should prepare the individual for life, through an understanding of the major problems of the contemporary world, and the provision of skills and attributes needed to play a productive role towards improving life and protecting the environment with due regard given to ethical values.

UNESCO, Tbilisi Declaration (1978) states that environmental education is a learning process that increases people's knowledge and awareness about the environment and associated challenges, develops the necessary skills and expertise to address the challenges, and fosters attitudes, motivations, and commitments to make informed decisions and take responsible action.

The world is warned that environmental education cannot be transformative if we don't give it a solid ethical foundation. The Tbilisi Declaration states that "environmental education should ... encourage those ethical ... values which ... will further the development of conduct compatible with the preservation and improvement of the environment" (UNESCO, 1978).

Culturally imposed ethics can constrain human destructiveness. The Golden Rule would work, if applied inter-generationally, by conserving and replenishing Nature for future generations. Einstein's ethics was to expand the circle of compassion
to all living things. Albert Schweitzer's "fundamental principle of the moral" was that the good is to preserve life and the evil is to destroy life. Des Jardins (2001) asserts that moral norms can and do govern human behavior toward the natural world.

Environmental ethics aims to develop awareness, sensitivity and a positive attitude towards environment; knowledge and understanding of the ecological processes; greater participation in activities that help to overcome environmental challenges.

"Ecological ethics is not new. Jainism, the ancient Indian religion, prohibits needless harm to all life" (Chapple, 2001). "The individual life is good when it is in harmony with Nature," wrote Zeno of Citium in 300 BC. "And African indigenous traditions, like those of North American first peoples, contain ethical messages that are passed from generation to generation to ensure respect for other living creatures" (Kelbessa, 2005). Teachers can turn to many cultures and other eras in order to teach ecological ethics.

It is essential that teachers ground their teaching in the ethics of sustainability. A strong foundation in ecological ethics will help the students to develop the values, attitudes and perspectives necessary for creating environmental, social and economic sustainability, thereby contributing to a healthy planet for themselves and their children, and a future for the human species.

1.4.2 Need of Environmental Ethics

Environment problems are not the problems of developing countries like India but it is concerned with the whole globe. It is the need of hour to make the whole society conscious about the ecosystem and ecological balance. Education is a powerful medium for changing our behavior. Recommendations of the Stockholm conference in 1972 declared that there was close link between the society and the environment and that the relationship between them was at a critical stage, saying that "a point has been reached in history when we must shape our action throughout the world with a more prudent care for their environmental consequences" (Basu, 1991).

Earth is, perhaps, the only planet endowed with an environment and all individuals share it. One day this legacy has to be passed to our future generation. When they will inherit such a polluted environment, life will be misery for them. Men
using their intelligence have developed new technologies which are necessary for increasing production of wealth and for this purpose have squandered the wealth of the nature without thinking of its implication for the future generation. Increase in industries in the urban area resulted in migration of rural people to the urban area which in turn resulted in degradation and deterioration of environment.

Before modern civilization came into existence man lived and flourished amidst a perfect balance of multiple biological processes. As the most intelligent being on earth, man has constantly tampered with the nature making use of his inventive genius to disturb the ecological balance. Thus, air, water and soil, all have got polluted and pose a threat to the substance of mankind. Checking of environmental pollution has become absolutely necessary. If it is not checked, the earth will become a graveyard. So we must give due attention to protect it from our own abuses. That is why education is very important and every individual should have the awareness towards protection and conservation of environment.

Ethics plays an important role in our society today, and environmental ethics must be considered for leaving a safe and healthy world for our future generations. This has become more essential in today’s society.

“Some authorities believe that if children don’t develop a sense of respect and caring for the natural environment during their early years, they are at risk for never developing such attitudes” (Wilson, 1997).

Burroughs (1919) cautioned that “knowledge without love and empathy will not stick”. But if love comes first, knowledge is sure to follow. “The problem with most environmental education programs for young children is that they try to impart knowledge and responsibility before the children have been allowed to develop a loving relationship with the earth” (Wilson, 1997). “Children’s emotional and affective values of nature develop earlier than their abstract, logical and rational perspective” (Kellert, 2002). We need to allow children to develop their biophilia, their love for the earth, their ethics and concern for the environment, before we ask them to save it. Nature itself is children’s best teacher (Coffey, 2001). Young children tend to develop emotional attachments to what is familiar and comfortable for them (Wilson, 1996).

According to Fong (1993) report on environmental awareness and action at elementary level in Taiwan, it was reported that environmental education is the
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subject for everyone. The earlier one starts, the better are results. It is really essential
to make the students ethically attached towards their environment by generating
proper awareness of its importance.

Encouraging and good opportunities for interaction with natural environment
during an individual’s early life is important in developing ethics for environment
(Scott, 2000).

Thus this is a crucial time to realize that environmental ethics and
environmental friendly behavior should be cultivated among masses particularly
among youths. For the awareness of the society, it is essential to work at grass root
level. So that the whole society can work to save the environment, if we want to
impart environmental ethics in our children, we have to catch them young as over the
course of time, the seedlings of environmental love will sprout in the form of
adolescents who will ultimately mature as trees i.e., citizen having responsibility
towards environment. For his purpose it is essential to educate and train the children
regarding significance of healthy environment through teaching activities.

1.4.3 Tenets of Environmental Ethics

The environmental ethic assumes that the earth’s resources are not unlimited
and that humans must use and conserve resources in a manner that allows their
continued use in future. It also assumes that humans are a part of the natural
environment and that we suffer when the health of a natural eco system is impaired.
An environmental ethic reflects the tenets viz. humans are a part of nature and they
are affected by natural laws. They share the earth’s resources with other living things.
The earth has a limited supply of resources. Thus humans must conserve resources.
They should use resources wisely to prevent ecological damage is in accord with the
environmental ethics. Humans could succeed best when they maintain the integrity of
natural processes and cooperate with nature.

Environmental ethics builds on scientific understanding by bringing human
values, moral principles, and improved decision making into conversation with
science. Environmental ethics is necessarily inter-disciplinary, meaning it draws on
other fields of academic inquiry; it cannot stand by itself. Often, the simple question,
"What is the right thing for us to do?" can open up fresh perspectives on
environmental problems. Thinking ethically about the environment has the potential to help anyone contribute to creating environmental solutions.

In the most general sense, environmental ethics invites us to consider three key propositions viz. the earth and its creatures have moral status, in other words, are worthy of ethical concern; the earth and its creatures have intrinsic value, meaning that they have moral value merely because they exist, not only because they meet human needs; drawing from the idea of an ecosystem, human beings should consider "wholes" that include other forms of life and the environment.

There are different trends, voices, and diverse opinions within the field of environmental ethics. Environmental ethics invites individuals to consider that ethics is not only about the personal rather, it may be about how groups treat their members, or and how nations treat each other. Also, to consider that ethics pertains as well to how we act - not only toward ourselves and others - but also toward the natural world itself.

In the past, the natural world was often the unseen participant in many situations of ethical significance. Humans treated it as a passive backdrop, when in fact nature played an active role in shaping human society.

1.4.4 Barriers to Environmental Ethics

There is great debate in support of determination of ethics. The lives of children today are much different. Children today have few opportunities for outdoor free play and regular contact with the natural world. Their physical boundaries have shrunk due to a number of factors (Devereaux, 1991; Kyttä, 2004). This leads to barriers to environmental ethics and these are:

- "A 'culture of fear' has parents afraid for their children's safety. A 2004 study found that 82% of mothers with children between the ages of 3 and 12 identified crime and safety concerns as one of the primary reasons they don't allow their children to play outdoors" (Clements 2004).

- "Due to 'stranger danger,' many children are no longer free to roam their neighborhoods or even their own yards unless accompanied by adults" (Pyle 2002, Herrington & Studtmann 1998, Moore & Wong 1997).
• “Fears of ultraviolet rays, insect-borne diseases and various forms of pollution are also leading adults to keep children indoors” (Wilson 2000).

• “Children's lives have become structured and scheduled by adults, who hold the mistaken belief that this sport or that lesson will make their young children more successful as adults” (Moore & Wong 1997, White & Stoecklin 1998).

• Brooks (2004) says “A childhood of unsupervised loitering, wandering and exploring has been replaced by a childhood of adult supervised and scheduled improvements.”

Also, many educators have already started saying that our schools have become devoid of ethics and hence irrelevant. The observations made by Postman and Weingartner (1969) in this regard are summarized below.

The school has become irrelevant because it shields children from reality, educates for obsolescence, is based on fear, avoids the promotion of significant learning, induces alienation and punishes creativity and independence.

By analyzing some specific cases, it is found that teachers are responsible to some extent for erosion. For example, teachers encourage students to cook up the result without verifying it practically. However the need of the day is that the teachers are required to relate facts and concepts to life to understand and refine the art of living, to explore the connection of subject matter with feelings, opinions and behavior and to derive personal life-related lessons— the facts and concepts of the subject matter.

1.4.5 Enhancing Environmental Ethics

The educational institutions must provide the right platform to the students for interpreting what they have learnt within their own experiences. Besides this, the school can also provide opportunities to students to think about and clarify their own value and compare with others, to recognize human action/s something more than statistical expectations, to understand that valuing is also a way of thinking, to be inquisitive and have courage to ask questions, to be honest and be open-minded.

There are several techniques of integration of ethics and values in curriculum through schools and parents that include group discussion, debates, seminars, role-play, prayer, participatory activities and other experimental exercises.
Wilson (1997) believes, “Developing children’s empathy with the natural world should be the main objective for children of age four to seven. Children’s experiences during the childhood should nurture the conception of the child as a part of nature. It is during the childhood when children’s experiences give form to the ethics, attitudes and basic orientation towards the world that they will carry with them throughout their lives.”

“The extent to which an individual believes she/he is a part of nature, their connectiveness to nature, has been shown to be correlated with positive environmental attitudes” (Schultz, et al. 2004). “Research has also demonstrated that children’s positive encounters with nature can lead to development of an environmental ethics” (Chawla, 1998).

While transfusing the ethics in lesson the teacher is required to perform two functions first, to create a classroom environment as an essential preserver of the socialization process with cultural norms, second, the teacher is to transact new knowledge and skills along with ensuring that the value system works as an agent of social change. The teacher in the classroom has to act as a facilitator for learning ethics. The role of a teacher in the classroom involves developing warm relationship with students which help to form the atmosphere conducive for learning ethics, observing and identifying the needs of students particularly in the problem areas of learning, allowing the students to put questions and repeat experiments, instructing the students to record the observation carefully, patiently and honesty, developing self-expression, self-realization among the children.

Therefore, a major test in the teaching environmental ethics to students is to arouse the interest of students and to relate different ethical dimensions to the real life. They should understand that ethics is about feelings and convictions. It is also about moral reasoning and judgment. Finally, it involves the art of doing the right thing. Lines (1971) reported that although many teachers are convinced of the value of environmental studies, they often are not fully confident of their ability to plan and carry out a firsthand approach to learning. Learning by experiences makes the students ethical towards environment problems; also it raises the confidence level of teachers. There is just a need to plan it properly.
Having decided the learning outcomes and instructional materials and methods, the instructor can work on developing the course outline. He is not there to make students ethical, but to help them see ethical issues in various situations, do moral reasoning and decide to change their inner core. The ethical choice is an individual’s decision. The teachers cannot decide for their students. Nor can they be blamed for unethical behavior of their students. But if they have kindled ethical awareness and honed ethical skills of their students, they indeed have done a virtuous job.

Thus the teachers, parents and community have an important role to play in nurturing, sensitizing and adding value-based issues so that students start respecting the environment in each and every step of their life. Efforts should be made to maximize the environmental ethics at all stages of education through variety of teaching activities like correlating topics with environment and its importance.

1.5 SIGNIFICANCE OF THE PROBLEM

The existing system of education is largely confined to knowledge transmission, while the need of the day is for students to learn and acquire wisdom to use knowledge for their own growth, character building and contributing to society. This view has been supported by the Delor’s Report (1972) which emphasizes that education must contribute to social and economic development ‘as also to bring out the treasure within the human beings’ and it can also be seen as a system for gainful employment resulting in sidelining the development of a holistic personality. Education therefore, holds faster, deeper and more harmonious form of human development which could help in inculcating a respect for tradition, loyalty, culture and ideals of service to humanity. As formal education is one of many ways that children learn and develop. Learning begins well before children enter the school, and once children are attending school they continue to learn both inside and outside the classroom. Parents play a critical role in providing learning opportunities at home and in linking what children learn at school with what happens elsewhere. By participating in learning interactions and activities outside the school, parents become important actors in a child’s learning.

“As learning is subject to many influences, the most commonly accepted contemporary framework for viewing parental involvement was inspired by the
ecological model of Bronfenbrenner (1979, 1986) and designed from a social and organizational perspective” (Epstein, 1987, 1992, 2001). Also, some researchers make reference to an ecological theory of child development which emphasizes multiple interacting systems of influence and dynamic interactions between the child, the education system and wider social contexts over time (Brofenbrenner 1979; AIHW 2012).

So, there is an urgency to reorient out existing teaching methods from ‘chalk and talk’ and lecture methods to problem-solving methods, from activity and issue-based approach to field work and case studies, from didactic to advise-based approach, and from rote learning to attitudes and skills development and learning through participation and educational training in order to deepen the experience and involvement with the natural surroundings. Our students learn what they live. If they spend all their school days in sterile classrooms, prison-like buildings and lifeless playgrounds, they will not become creative and critical thinkers, and they will not learn that human beings are a part of the beautiful web of life. Why should schools, by their very design, be allowed to kill the wonderful spirit of our youngest citizens?

Our students must learn some good things about the environment in school. Thus, educating for sustainability offers innumerable opportunities for integrating ecological literacy and an environmental ethic into the curriculum. This integration shows students, in a holistic way, that we value the earth and their future.

Mathematics is one important area of education for the child’s development. It is a subject quite like the Alladin’s Magic Lamp. The subject that can take scores of individual to heights or depths- be it in SSC, ICSE, CBSE, or competitive exams. Further, in today’s increasingly technological (and technologically dependent) society, more and more jobs are related to mathematics and science. It is also true that in each and every sphere of our daily life, mathematics provides us its help and patronage without which we cannot do anything. The knowledge of mathematics is very versatile and required in all the day to day life activities beginning from awakening to sleep in night. Thus we can say that in our daily life mathematics is as essential as the oxygen in the air. Each dealing of our life begins and ends with mathematical thinking and reasoning. For example, daily household problems, food, clothing, idea of quantity and quality, daily account of income and expenditure etc.
Such type of day to day problems cannot be solved without the knowledge of mathematics. Hence without the proper knowledge of mathematics literate as well as illiterate people cannot solve their daily life problems. Thus, knowledge of mathematics is closely related with our day to day life activities. Each and every individual needs the knowledge of mathematics at every moment. Also, all mathematical concepts are present in nature, although they are not directly perceivable, but, they can be experienced. It is thus important to make child feel the presence of mathematics around him. So, we need to integrate theoretical aspects with practical implications of using mathematics in real life situations and natural world. But as Hart (1997) and Moore (2004) discussed that the culture of childhood that played outside is gone and children’s everyday life has shifted to the indoors. As a result, children’s opportunity for direct and spontaneous contact with nature is disappearing. Also, according to Kellert (2002), society today has become so estranged from its natural origins, it has failed to recognize our species’ basic dependence on nature as a condition of growth and development.

In these days as children’s lives disconnected from the natural world, their experiences are predominately mediated in media, written language and visual images (Chawla 1994). Pyle (2002) supported this view by stating that the virtual is replacing the real. Also Chipeniuk (1995) supplemented it by specifying that TV, nature documentaries, National Geographic and other nature TV channels and environmental fundraising appeals are conditioning children to think that nature is exotic, awe-inspiring and in far, far away, places they will never experience. Children are losing the understanding that nature exists in their own backyards and neighborhoods, which further disconnects them from knowledge and appreciation of the natural world.

Lack of outdoor activities not only hampers the growth and development of the child but also affect the natural environment. Research is clearly substantiating that an affinity to and love of nature, along with a positive environmental ethic, grow out of children’s regular contact with and play in the natural world (Bunting & Cousins 1985; Wilson 1993; Pyle 1993; Chipeniuk 1994; Sobel 1996; Hart 1997; Moore & Wong 1997; Kals et al. 1999; Moore & Cosco 2000; Kellert 2002; Bixler et al. 2002; Schultz et al. 2004).
But we need to incorporate conceptual knowledge of mathematics with its procedural knowledge, school mathematics with real world mathematics and with the changing needs of society. With this students will learn to look at mathematics as a whole, rather than piecemeal. Also, they will come to know that how the different mathematical concepts are connected to each other and to the real world. In mathematics, teaching with ecological approach means helping students staying connected with the rest of nature. It includes a rich variety of interactive practices where by participants have opportunities to learn from their own and others experiences. The individual is actively and personally engaged in the processes like role playing and storytelling.

So much energy, time and money are spent in overcoming the phobia of mathematics which apparently appears as a jungle of abstract concepts. The mathematics subject, if taught in an organized way in classroom works wonders for students in the understanding the concept from childhood itself. In today’s world of education, where we are focusing on all-round development of child, ecological approach has been designed to make mathematics related to life and understanding of mathematical principles easier by integrating them with life practices. Once the fear is overcome the achievement scores are bound to rise. An integrated approach works only when content is well planned, assignments are ready and varied, and teachers are enthusiastic and willing to make mathematics livelier, more practical and more useful. We need to balance our approach to create a rich and novel learning experience for pupils. We can’t consider it to be an independent entity to be acquired or transmitted. Use of ecological approach in the present study aims at unlocking human potential within the classroom settings. Through this teachers will improve their practice, students will gain from an important paradigm shift in education, and ultimately society will be the greatest beneficiary. As suggested by one of the thought leaders of the emerging field “no one will consider educators as true professionals until they act like professionals in applying and analyzing the research (Wolfe, 2001). The present study is designed to research and collate empirical evidence of effectiveness of this new approach in Indian context.
1.6 STATEMENT OF THE PROBLEM

EFFECT OF ECOLOGICAL APPROACH TO MATHEMATICS ON ENVIRONMENTAL ETHICS AND ACHIEVEMENT IN MATHEMATICS IN RELATION TO PARENTAL INVOLVEMENT.

1.7 OBJECTIVES

The objectives of the present study can be stated as follows:

1. To develop and validate instructional material for implementing ecological approach for Class VI students in Mathematics.
2. To study the effect of ecological approach and conventional approach on achievement in mathematics of Class VI students.
3. To study the effect of ecological approach on achievement in mathematics of Class VI students with high and low parental involvement.
4. To study the interaction between instructional approaches and parental involvement of mathematics students with regard to achievement in mathematics of Class VI students.
5. To study the effect of ecological approach and conventional approach on environmental ethics of Class VI students
6. To study the effect of ecological approach on environmental ethics of Class VI students with high and low parental involvement.
7. To study the interaction between instructional approaches and parental involvement of mathematics students with regard to environmental ethics of Class VI students.

1.8 HYPOTHESES

In the light of above formulated objectives, following hypothesis were formulated in the present study:

Hypotheses for Achievement in Mathematics of Class VI students:

H$_1$ The two instructional approaches will yield equal mean gain scores on achievement in mathematics of class VI students.

H$_2$ The students with low and high parental involvement will yield equal mean gain scores on achievement in mathematics.
H₃: There will be no significant interaction between instructional approaches and parental involvement of mathematics students with regard to achievement in mathematics.

**Hypotheses for Environmental Ethics of Class VI students:**

H₄: The two instructional approaches will yield equal mean gain scores on environmental ethics of class VI students.

H₅: The students with low and high parental involvement will yield equal mean gain scores on environmental ethics.

H₆: There will be no significant interaction between instructional approaches and Parental involvement of mathematics students with regard to environmental ethics.

1.9 **DELIMITATIONS OF THE STUDY**

The present study was delimited to following areas: -

1. The study was conducted on Class VI students only.

2. The lesson plans for Ecological Approach to mathematics were developed for fractions, decimals, lines & angles, perimeter & area, symmetry and data handling from prescribed syllabus of Class VI of CBSE/NCERT

3. The experiment was limited to forty seven days of the academic session.

4. The study was delimited to a Shivalik Public School, Phase-6, Mohali

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