CHAPTER I

INTRODUCTION

We live in a remarkably prolific and hospitable world. Today; however our beautiful and bountiful planet, the earth is becoming inhospitable for human beings. Though we may not feel minute changes in global temperature, personally witness the disappearance of species, or understand the effects of deforestation on individual livelihood, the danger to planet earth is real and significant. For the health of the planet, we need to foster holistic paradigm that highlights the dynamic interconnectedness of everything in the modern world. Our world is natural as well as the “built” or technological, social and cultural; all constitute important parts of our environment. It results from the interactions of social, economic and political systems with biophysical systems. This integrated perception helps us in better understanding of environment related issues, improved management of natural resources and concerns about their degradation.

Humans and environment are in constant interaction. Every human action has an impact on environment both immediately and globally leading to environmental problems. There is a complex array of problems like global climate change, shrinking natural resources, pollution, ozone depletion, solid waste management etc. The current environmental crisis has even heightened the possibility of man’s own extinction from the planet earth. The IPCC (Intergovernmental Panel on Climatic Change Report, 2007) projects that one- fifth of all the animal and plant species are threatened with extinction, if global warming continues at current pace. It predicted that earth would heat up between 1.8 and 4 degree Celsius by the end of this century. Any rise above 2 degree Celsius could result in “major ecosystem collapses”. Imagine The Amazon Rainforest which took million years to evolve, could all be gone within our life time!

No amount of preaching to the citizenry about the perils of a polluted environment, the dangers of irresponsible disposal of wastes or deforestation and the benefit to mankind of greening the environment will make people act to seek to forestall environmental degradation unless they are imbued with a deep concern for the
common good, a sense of responsibility for maintaining a balanced and healthy ecosystem and a strong drive to achieve harmony with nature (UNESCO, 1990, as cited in Clover, Follen & Hall, 1998). With the perception of environmental degradation as a major threat to the survival of any kind of living organism including man, education has been once again called upon to respond to this complex and intricate problem. For our environmentally destructive ways to stop we need a kind of education that will open our eyes to another path; we need a radical, dynamic and holistic environmental education to permeate our society. By the ages of 13 and 14, adolescents are in a stage called moralism; they have an increasing awareness of themselves, and their decisions are based on a combination of cognitive and affective components (Rejeski, 1982). Environmental educators must ensure that their practices are congruent with the philosophical aims of the discipline. The resulting practical concern, therefore, is what teaching/learning strategies will be most effective in promoting this type of education to bring change in the environmental behaviour of our adolescent population.

The educator should have a warm relationship with participants; there should be opportunities for children to express their feelings; there should be an integration of cooperative learning structures; and there should be forms of interactive and experiential learning integrated into the program (Selby, 1996). Thus existing classroom practices in Environmental education (EE) need to be supplemented with more innovative and participatory techniques to produce young concerned citizens practicing pro-environmental behaviours.

1.1 Environmental Education

Education can play a pivotal role in preparing our society for these ecological challenges of 21st century. Participants from all sectors – education, government, NGOs and business should identify strategies and build partnership to make the shift to sustainability. Rachel Carson’s book ‘Silent Spring’ in 1962 highlighted the need of education for environment and led to development of environmental education (EE) as an instructional discipline. Since 1970’s, this educational initiative was strengthened through various workshops and conferences, all of which aimed to define the discipline of environment education, along with setting forth its goals and
objectives. Environmental Education as practiced today is largely based on two founding documents in the field, the Belgrade Charter (UNESCO- UNEP, 1976) and the Tbilisi Declaration (UNESCO, 1978). Since 1978, bodies such as Brundtland Commission (Brundtland, 1989), the United Nations Conference on Environment and Development in Rio de Janeiro (UNESCO, 1992) and the Thessaloniki Declaration (UNESCO, 1997) have emphasized the important role of Environmental Education (EE) in the improvement of world’s environment, as well as in the sound and balanced development of world’s communities. Defining this new vision of environmental education can be a great challenge as it is often used broadly and has various meanings for different teachers, facilitators and practitioners. The following are some of definitions:

Environmental education is learning that develops a productive relationship with the natural world (Randle, 1989); Environmental education is both a vision and a process that involves learning for change (Clover, Follen & Hall, 1998); Environmental education is a process for aiding people to become environmentally knowledgeable and skilled in working towards achieving a dynamic equilibrium between quality of life and quality of the environment (Hungerford, Peyton & Wilke, 1980); and Environmental education is the process of recognizing values and clarifying concepts in order to develop skills and attitudes necessary to understand and appreciate the inter-relatedness among humans, their culture and their biophysical surroundings (IUCN 1970).

Environmental education has been defined as a life-long interdisciplinary process through which people gather awareness of natural processes (Disinger, 1983; Stapp et al., 1996), understand their connection with the natural world, become knowledgeable about human impacts on the environment (Elder, 2003), develop skills to address environmental issues and are motivated to act (Disinger, 1983; Stapp et al., 1996; President's Council on Sustainable Development, 1996).

Lucas (1972) suggested that EE is education in, about, and for the environment. This simple description reinforces the different purposes that EE often serves: programs provide opportunities to explore nature in the outdoors, information about conservation and environmental issues, and opportunities to gain knowledge and skills that can be used to defend, protect, conserve, or restore the environment. This
multidimensional definition was confirmed by the delegates at the Tbilisi Intergovernmental Conference in Georgia, USSR in 1977 (UNESCO, 1980) in their three goals for EE. This conference established the following definition, goals, and objectives for the field of environmental education, which are still widely accepted.

“Environmental education is a process aimed at developing a world population that is aware of and concerned about the total environment and its associated problems, and which has the knowledge, attitudes, motivations, commitments, and skills to work individually and collectively toward solutions of current problems and the prevention of new ones.”

1.1.1 Goals of Environmental Education

- To foster clear awareness of and concern about economic, social, political, and ecological interdependence in urban and rural areas.
- To provide every person with opportunities to acquire the knowledge, values, attitudes, commitment, and skills needed to protect and improve the environment.
- To create new patterns of behaviour of individuals, groups, and society as a whole toward the environment.

1.1.2 Objectives of Environmental Education

**Awareness:** To help social groups and individuals acquire an awareness of and sensitivity to the total environment and its allied problems.

**Knowledge:** To help social groups and individuals gain a variety of experiences in and acquire a basic understanding of the environment and its associated problems.

**Attitudes:** To help social groups and individuals acquire a set of values and feelings of concern for the environment and motivation for actively participating in environmental improvement and protection.

**Skills:** To help social groups and individuals acquire the skills for identifying and solving environmental problems.
Participation: To help provide social groups and individuals with an opportunity to be actively involved at all levels in working toward resolution of environmental problems.

Since the Tbilisi Conference, many changes have taken place in the environment and at the same time many efforts at the international, regional and national levels have been made to meet the challenge.

1.1.3 Programmes under formal EE

- Environmental Education in school system.
- Environmental Appreciation Courses
- Environmental concepts in management and Business studies.

1.1. 4 Programmes under Non-Formal Environmental education

- Eco-Clubs (National Green Corps)
- GLOBE (Global learning and observations to benefit the environment)
- Mass Awareness.

The Hon’ble Supreme Court vetoed the infusion method for EE and directed NCERT to prepare a clearly defined syllabus and lay out a policy for all Education Boards to follow. NCERT in collaboration with other organizations prepared EE Course material and CBSE directed all the State Boards to make it imperative to implement an appropriate EE Strategy. Environmental Sciences have now been introduced as a compulsory subject (SAKAL, 2004) at 1-XII levels in the formal education. The Curriculum has been developed including the suggested activities but the question remains the effective delivery. The difficulties faced in teaching the subject are already cropping up in discussion in academic circle. Its Multidisciplinary area, overlaps and inter linkages are intricate. The complex nature of subject emphasizes EE methodology to be focused on learners’ interests and needs. The methodology of teaching- learning of environmental concepts, problems and issues is not completely new. However, the appropriateness and relevance of EE methodology to encourage pro-environmental behaviour (PEB) should be viewed in light of massive global challenges.
The teacher has to achieve more challenging and set goals of changing attitudes, infusing commitment, clarifying values and ensuring participation and action on the part of learners. The techniques for imparting EE must ensure maximum involvement of learners and provide enough opportunities for students to experience the environment, actual or simulated. “If the techniques framed for environmental education programs are allowed to be related to learners and integrated within a students’ life, they become more effective”(Heimilch, 1991).

Experiential approaches help to direct the course of EE towards the goals of Tbilisi Declaration (1978) such as creating “new patterns of behaviours of individuals, groups and society as a whole towards the environment and guiding principles such as utilizing diverse learning environments ………… and approaches to teaching learning about and from the environment with due stress on practical activities and first-hand experience”. So evolving new patterns of behaviour emphasizes experience-based new types of learning methods in EE.

1.2 Experiential Learning

Aristotle once said, “For the things we have to learn before we can do them, we learn by doing them”. Experiential learning is learning through reflection on doing, which is often contrasted with rote or didactic learning. Experiential learning focuses on the learning process for the individual (unlike experiential education, which focuses on the transactive process between teacher and learner). An example of experiential learning is going to the zoo and learning through observation and interaction with the zoo environment, as opposed to reading about animals from a book. Thus, one makes discoveries and experiments with knowledge first hand, instead of hearing or reading about others’ experiences.

The essence of experiential education was captured by the philosopher John Dewey. He argued “Events are present and operative; anyway what concerns us is their meaning”. Experience happens; it is unavoidable. Ford (1986) called it “Learning by doing or experience”. The 1994 Association for Experiential Education (AEE) definition expanded the understanding “Experiential Education is the process through which a learner constructs knowledge, skill and value from direct experiences.” The AEE definition embraces constructivist learning theory as well as traditional practice
of learning by doing. Itin (1999) adds that experiential education requires “the learner to take initiative, make decisions and be accountable for results”. Taken together these definitions suggest that experiential education is a “process” or “method” that can be used to teach. Experiential education differs from tradition education in that teachers first immerse students in action and then ask them to reflect on the experience (action and reflection). Psychologist Carl Rogers (1994) is credited with making significant contributions to the field of adult education with his experiential theory of learning. Rogers maintained that all human beings have a natural desire to learn. He defined two categories of learning: meaningless or cognitive learning (e.g., memorizing) and significant or experiential learning (e.g., applied knowledge which addresses the needs and wants of the learner).

Experiential Learning occurs in relationship to interest and motivation. Experiential learning thus involves a 'direct encounter with the phenomena being studied rather than merely thinking about the encounter, or only considering the possibility of doing something about it.' (Borzak 1981: quoted in Brookfield 1983). This sort of learning is sponsored by an institution. The second type of experiential learning is 'education that occurs as a direct participation in the events of life' (Houle 1980, quoted in Smith, 2003). Here learning is not sponsored by some formal educational institution but by people themselves.

In general, authentic experiential-learning experiences have some common characteristics (taken mostly from Eyler and Giles 1999).

- They are positive, meaningful and real to the participants.
- They involve cooperative rather than competitive experiences and thus promote skills associated with teamwork and community involvement and citizenship.
- They address complex problems in complex settings rather than simplified problems in isolation.
- They offer opportunities to engage in problem-solving by requiring participants to gain knowledge of the specific context of their service-learning activity and community challenges, rather than only to draw upon generalized or abstract knowledge such as might come from a textbook. As a result, experiential-learning offers powerful opportunities to acquire the habits of
critical thinking; i.e. the ability to identify the most important questions or issues within a real-world situation.

- They promote deeper learning because the results are immediate and uncontrived. There are no "right answers" in the back of the book.
- As a consequence of this immediacy of experience, experiential-learning is more likely to be personally meaningful to participants and to generate emotional consequences, to challenge values as well as ideas, and hence to support social, emotional and cognitive learning and development.

1.2.1 Experiential Learning Cycle models

Experiential Learning models are for understanding how the process of learning works. These are represented in the form of Experiential Learning Cycles (ELCs) which treat the learner's subjective experience as of critical importance in the learning process. ELCs draw on experiential education principles, which are largely based on the educational philosophy of John Dewey (1920's-1950's). Experiential Learning Cycle Models are commonly used to help structure experience-based training and education programs.

Descriptions of the Experiential Learning Cycle Models

- 1-stage model

The first model, a 1-stage model (experience), depicts simply that experience alone is sufficient for learning. The goal of education from this point of view then would be to structure and organize learning activities in which experiences themselves facilitate learning.

- 2-stage model

The second model, a 2-stage model (experience-reflection), is that experience followed by periods of reflection is an effective way to structure and facilitate experiential education.
• 3-stage models

At least two major, 3-stage models exist.

The first model is experience-reflection-plan, which suggests that following an experience and reflection, it is helpful to develop a plan for future experience.

The second 3-stage model is based more directly on Dewey's (1938/1997) theory of experience, involving: "observation of surrounding conditions-knowledge obtained by recollection-judgment, which puts together what is observed and what is recalled to see what they signify" (Dewey, 1938/1997, cited in Priest & Gass, 1997)

• 4-stage model

The fourth model, a 4-stage model (experience-reflection-abstraction-experimentation), is Kolb's (1984) classic "Experiential Learning Cycle". Kolb drew on Dewey's philosophy in proposing a 4-stage experiential learning cycle.

Kolb created his famous model out of four elements: concrete experience, observation and reflection, the formation of abstract concepts and testing in new situations. He represented these in the famous experiential learning cycle (see figure 1.1 below).

Figure 1.1 The Kolbian 4-stage model
The Kolbian 4-stage model is widely known and used in education and training circles, and continues to grow in popularity.

- **5-stage models** A variety of 5-stage Experiential Learning Cycle models have been proposed, including:


  Pfeiffer & Jones (1975) = experiencing-publishing-processing-generalizing-applying

- **6-stage model**

  Priest (1990) and Priest and Gass (1997) describe a 6-stage model, called the "The Experiential Learning and Judgment Paradigm", consisting of:

  experience-induce-generalize-deduce-apply-evaluate.

### 1. 2. 2 Experiential Learning Theory Model

Kolb includes 'cycle of learning' as a central principle in his experiential learning theory, typically expressed as four-stage cycle of learning, in which 'immediate or concrete experiences' provide a basis for 'observations and reflections'. These 'observations and reflections' are assimilated and distilled into 'abstract concepts' producing new implications for action which can be 'actively tested' in turn creating new experiences. Kolb says that ideally (and by inference not always) this process represents a learning cycle or spiral where the learner 'touches all the bases', i. e., a cycle of experiencing, reflecting, thinking, and acting. Kolb's model therefore works on two levels - a four-stage cycle:

1. Concrete Experience - (CE)
2. Reflective Observation - (RO)
3. Abstract Conceptualization - (AC)
4. Active Experimentation - (AE)
and a four-type definition of learning styles, each representing the combination of two preferred styles, rather like a two-by-two matrix of the four-stage cycle styles, (see Figure 1.2) for which Kolb used the terms:

- Diverging (CE/RO)
- Assimilating (AC/RO)
- Converging (AC/AE)
- Accomodating(CE/AE)

Figure 1.2 Experiential Learning Theory based on Kolb’s Learning Styles, 1984

Whatever influences the choice of style, the learning style preference itself is actually the product of two pairs of variables, or two separate 'choices' that we make, which Kolb presented as lines of axis, each with 'conflicting' modes at either end:
A typical presentation of Kolb's two continuums is that the east-west axis is called the Processing Continuum (how we approach a task), and the north-south axis is called the Perception Continuum (our emotional response, or how we think or feel about it).

Kolb notably in his experiential learning theory model (ELT) defined three stages of a person's development, and suggests that our propensity to reconcile and successfully integrate the four different learning styles improves as we mature through our development stages. The development stages that Kolb identified are:

- **Acquisition** - birth to adolescence - development of basic abilities and 'cognitive structures'
- **Specialization** - schooling, early work and personal experiences of adulthood - the development of a particular 'specialized learning style' shaped by 'social, educational, and organizational socialization'
- **Integration** - mid-career through to later life - expression of non-dominant learning style in work and personal life.

Kolb's learning styles model and experiential learning theory are today acknowledged by academics, teachers, managers and trainers as truly seminal works; fundamental concepts towards our understanding and explaining human learning behaviour, and towards helping others to learn.

### 1. 2. 3 The Experiential Learning Process

The process is usually described in a four or five step cycle or sequence: 1. Create the opportunity; 2. Involve the learner in an experience; 3. Process (discuss) the experience; 4. Generalize the experience to other situations; 5. Apply the knowledge.

These stages are often expanded/contracted and sometimes follow in a different progression. Yet writers on experiential education all tend to stress the similarities
more than the differences. The dominant belief is that the experience does not teach, but prepare the learner for understanding the outcomes of the experience. The “learning” occurs in the processing and application that follow the experience. Learning through an experiential process means taking a learner through each step of the experiential learning cycle. The 4-H Program has adopted a process that allows youth to first learn by doing before being told or shown how and then process the experience. This process is based on experiential learning model developed by Kolb (1984) and modified by 4-H (Heart, Hands, Health, Head) Youth Development Program and includes five specific steps –

![Figure 1.3 The Experiential Learning Process by 4-H Youth Development Program](image)

The steps of the experiential process (fig. 1.3) are:

1. **Experience**: Participant(s) experience the activity; perform or do it.
2. **Share**: Participant(s) share the results, reactions and observations publicly.
3. **Process**: Participant(s) process by discussing, looking at the experience analyzing and reflecting. They relate the experience to the targeted life skills being taught.

4. **Generalize**: Participant(s) generalize to connect to experience to real world examples.

5. **Apply** Participant(s) apply what was learned, to a similar or different situation. They use the new life skills experiences in other parts of their lives.

When this model is used, youth both experience and process the activity. They learn from thoughts and ideas about the experience. Each step contributes to their learning. Providing an experience alone does not create experiential learning. Experiences lead to learning if the participant understands what happened, sees patterns of observations, generalizes from those observations and understands how to use the generalization again in a new situation.

According to Rogers (1994), the role of the teacher is to facilitate experiential learning by:

- Setting a positive climate for learning.
- Clarifying the purposes of the learner(s).
- Organizing and making available learning resources
- Balancing intellectual and emotional components of learning.
- Sharing feelings and thoughts with learners but not dominating.

Experiential Learning uses various tools like environmental games, simulations, role-plays, stories in class rooms, field visits, group discussions, problem-solving and enquiry approach etc. which bring about maximum learner participation. The techniques of experiential education help students and staff to adjust to team work, an important part of reforming schools. Environmental based experiential education should provide the experiences to students that help them to develop the feeling that their efforts and actions can make a difference with real issues and problems. This type of approach involves students in their communities and utilizes teaching strategies which are student centered actively involving them in the learning process. They become knowledge creators (for themselves) as well as knowledge generators. Most importantly experiential learning emphasizes life skills that students will continue use in their future work and throughout their lives.
1.3 Life Skills

A skill is a learned activity to do something well. Life skills are abilities individuals can learn to help them to be successful in living a productive and satisfying life. Life skills are the non-academic abilities, knowledge, attitudes, and behaviours necessary for successful living and learning and enhance the quality of life and prevent dysfunctional behaviour (DuTiot et al., 1997; Rooth, 2000; Junge et al., 2003). Furthermore, life skills refer to any skills that enable a person to adapt to and master life situations at home, school and in any other context in which they may find themselves (Donald, Lazarus and Lolwana, 2002). Although life skills are described as non-academic in nature, these skills can be taught and learnt in a formal educational setting, such as the classroom. Life skills education is therefore an important aspect of any learner’s holistic education. Life skills education includes skills that:

- Enhance self-empowerment (e.g. developing self-esteem, self-concept, identity, critical thinking skills and assertiveness)
- Promote personal health (e.g. HIV/AIDS prevention and health education)
- Are future-oriented (e.g. career education and goal-setting skills) (Du Toit et al., 1997; Rooth, 2000; Kadish et al., 2001; Bender and Lombard, 2004).

Life skills have been defined by World Health Organization (WHO) as “the abilities for adaptive and positive behaviour that enable individuals to deal effectively with the demand and challenges of everyday life.

UNICEF defines life skills based education as behaviour change or behaviour development approach designed to address a balance of three areas: knowledge, attitude and skills.

UNICEF and WHO agree that life skills are generally applied to the various aspects of life such as in the context of health problems, human relationships, learning social influences on behaviour and about rights and responsibilities. They can be utilized in many content areas such as prevention of drug abuse, sexual violence, teenage
pregnancies, HIV/AIDS prevention etc. UNICEF has extended their use further into consumer education, environmental education, peace education and education for development, livelihood and income generation.

1. 3. 1 Kind of Life Skills

The World Health Organization promotes Life Skills school-based programs as a means to develop skills among young people that lead to healthy lifestyle choices and optimum physical, social, and psychological well-being. Depending on the culture, different specific abilities are emphasized. WHO considers the following Life Skills to be the most essential (WHO, 1993):

- **The ability to make decisions** helps students assess their options and carefully consider the different consequences that can result from their choices.

- **The ability to solve problems** helps students find constructive solutions to their problems. This skill can significantly reduce anxiety.

- **The capacity to think creatively** is essential to decision making and problem solving. It enables students to explore all possible alternatives together with their consequences. It helps students look beyond their personal experience.

- **The capacity to think critically** helps students objectively analyze available information along with their own experiences. It is this ability that helps students recognize the factors that influence their behaviour, such as societal values, peer influence, and influence of the mass media.

- **The ability to communicate effectively** helps students to express their feelings, needs, and ideas to others—verbally or otherwise.

- **The ability to establish and maintain interpersonal relations** helps students to interact positively with people whom they encounter daily, especially family members.

- **Knowledge of self** is the capacity of students to know who they are, what they want and do not want, and what does and does not please them. It also helps students recognize stressful situations.

- **The capacity to feel empathy** is the ability to imagine what life is like for another person in a very different situation. It helps students to understand and
accept diversity, and it improves interpersonal relations between diverse individuals.

- **The ability to handle emotions** enables students to recognize their emotions and how they influence their behaviour. It is especially important to learn how to handle difficult emotions such as violence and anger, which can negatively influence health.

- **The ability to handle tension and stress** is a simple recognition by students of the things in life causing them stress.

UNICEF, UNESCO and WHO list the ten core life skill strategies as problem solving, critical thinking, effective communication skills, decision-making, creative thinking, interpersonal relationship skills, self-awareness, building skills, empathy, and coping with stress and emotions.

The World Health Organization (WHO, 1996) categorizes the life skills into the three components.

- Critical Thinking skills/Decision making skills
- Interpersonal / Communication skills
- Coping and Self Management skills

**Critical Thinking Skills/Decision making skills**: include decision making / problem solving and information gathering skills. The individual must also be skilled at evaluating the future consequences of their present actions and the actions of others.

**Interpersonal/Communication Skills**: Include verbal and non-verbal communications, active listening, and ability to express feelings and give feedback, negotiation skills and assertiveness skills. Also in this category, are negotiation/refusal skills and assertiveness skills that directly affect one's ability to manage conflict. Empathy, which is the ability to listen and understand others' needs, is also a key interpersonal skill. Teamwork and the ability to cooperate include expressing respect for those around us. Development of this skill set enables the adolescent to be accepted in society.
**Coping and Self management Skills:** Refer to skills to increase the internal locus of control so that individual feels that they can make a difference in the world. Self esteem, self-awareness, self-evaluation skills and the ability to set goals are also part of the more general category of self-management skills.

UNICEF promotes the understanding that the life skills approach can be successful, if the following are undertaken together:

a) **The Skills** - This involves a group of psychosocial and interpersonal skills which are interlinked with each other. For example, decision making is likely to involve creative and critical thinking components and values analysis.

b) **Content** - To effectively influence behaviour, skills must be utilized in a particular content area. "What are we making decisions about?" Learning about decision making will be more meaningful if the content is relevant and remains constant. Whatever the content area, a balance of three elements needs to be considered: knowledge, attitudes and skills.

c) **Methods** - Skills-based education cannot occur when there is no interaction among participants. It relies on groups of people to be effective.

1.3.2 Targeting Life Skills Model (Hendricks 1996)

Life skills are tools youth (and adults) use to cope with daily circumstances, make important decisions and enhance the quality of their daily lives. Life skills help youth become competent, capable and contributing individuals. The 4-H (head, heart, hands and health) program helps youth develop important life skills that they can use every day.

Some life skills for the four H’s - head, heart, hands and health - are shown in the Targeting Life Skills Model (Hendricks 1996) See Figure 1.4
1. 3. 3 Choosing a Method for learning life skill/s

Many teaching methods can be adapted to almost any subject matter. The methods depend upon the learners, the life skills targeted and the way the learners can become involved with the content. UNICEF promotes the understanding that the life skills can developed desirably only if the skills, contents and methods are undertaken together. Interactive methods are the absolute essential for the learning of life skills. The method selected should be one that allows the youth to learn-by-doing, discover, practice the life skill and project skill targeted for the activity and have fun. Here are some popular methods (see Table 1. 1) used in 4-H to promote life skill development. Following each method is one or more life skills that could be targeted with the method.
Table 1.1
Choosing a Method for learning life skill/s

<table>
<thead>
<tr>
<th>Method</th>
<th>Life Skill</th>
</tr>
</thead>
<tbody>
<tr>
<td>Playing a game</td>
<td>Team work, Risk taking</td>
</tr>
<tr>
<td>Giving presentations</td>
<td>Communicating</td>
</tr>
<tr>
<td>Judging activities</td>
<td>Communicating, Decision making</td>
</tr>
<tr>
<td>Planning activities</td>
<td>Team work, Planning, Leadership</td>
</tr>
<tr>
<td>Role playing</td>
<td>Communications, Relating to others</td>
</tr>
<tr>
<td>Experiments</td>
<td>Decision making, Problem solving</td>
</tr>
<tr>
<td>Interviewing others</td>
<td>Communications, Relating to others</td>
</tr>
<tr>
<td>Solving a problem</td>
<td>Decision making, Problem solving</td>
</tr>
<tr>
<td>Making models and products</td>
<td>Problem solving, Leadership</td>
</tr>
<tr>
<td>Learning a skill</td>
<td>Many life skills</td>
</tr>
<tr>
<td></td>
<td>Utilizing resources</td>
</tr>
</tbody>
</table>

Experiential methods of EE offer learners opportunities to practice critical thinking processes such as problem definition, forming hypothesis, collecting and organizing information, analyzing information, synchronizing drawing conclusions, formulating possible solutions and identifying opportunities for action. Learners also practice interpersonal and communication skills including oral and written communication, group cooperation, leadership, conflict resolution and others. They assume personal responsibility for realizing their values. Such a sense of responsibility increases confidence and self-esteem. It also helps them feel part of “Something larger than them” (Iozzi, Laeveault and MarcinKowski; 1990; Liberman and Hoody, 1998). EE provides developmentally appropriate opportunities for students to experience life skills. The life skills that could be targeted with the experiential method undertaken in this study are:

- Problem Solving Life Skill
- Critical Thinking Life Skill
1.3.4 Problem Solving Life Skill

Problem solving forms part of thinking involving the exercise of cognitive abilities of a high order and continuous and persistent struggling on the conscious as well unconscious levels.

Considered the most complex of all intellectual functions, Goldstein & Levin (1987) have defined problem solving as higher-order cognitive process that requires the modulation and control of more routine or fundamental skill.

Problem solving involves goal-directed thinking and action in situations for which no routine solutions exist. The problem solver has a more or less well defined goal, but it is not immediately obvious how to make a difficult decision to attain the goal. The incongruence of goals and admissible operators constitutes a problem.

Skinner (1968) defined Problem solving as a process of overcoming difficulties that appear to interfere with the attainment of a goal. It is a procedure of making adjustment in spite of interferences.

Bruner (1985) contends that cooperative learning methods improve problem-solving strategies because the students are confronted with different interpretations of the given situation. The peer support system makes it possible for the learner to internalize both external knowledge and critical thinking skills and to convert them into tools of intellectual functioning.

Meyer (1992) defined “Problem solving is cognitive processing directed at achieving a goal when no solution method is obvious to the problem solver.”

A general and widely accepted definition of problem solving is (from Reeff, 1999): Problem solving is (goal directed) thinking and action in situations for which no routine solution procedure is available. The problem solver has a more or less well-defined goal, but does not immediately know how to reach it. The incongruence of goals and admissible operators constitutes a problem. The understanding of the problem situation and its step-by-step transformation based on planning and reasoning, constitute the process of problem solving.
1. 3. 4. 1 Process of problem solving

The understanding of the problem situation and its step-by-step transformation based on planning and reasoning, constitute the process of problem solving. This approach may not work perfectly for all difficulties, but it may help with many of the problems confronted in life. It includes the following steps:

**Step 1: Problem Orientation**

This step involves recognizing that a problem exists and that solving the difficulty is a worthwhile endeavor. It is important to approach the decision-making process with a positive attitude and view the situation as an opportunity or challenge.

**Step 2: Problem Definition**

This step really involves thinking about the difficulty, understanding the problem, and contemplating why the situation is distressing. It is useful during this stage to think about how the current situation is different from how one would like it to be, and what goals are for the state of affairs.

**Step 3: Generation of Alternative Solutions**

During this stage, one should ask, "What have I done in this situation in the past, and how well has that worked?" If one finds that what have been done in the past has not been as effective as one would like, it would be useful to generate some other solutions that may work better. One can always discard implausible ideas later and coming up with new options may help generate even better solutions. Write a list of possible options, or ask others what some solutions they might have for your problem.

**Step 4: Decision making**

During this stage narrow down some of the options that have been generated in the previous step. It is important to examine each of the options, and think about how realistic each is, how likely one would be to implement that solution, and the potential drawbacks of each.
Step 5: Solution Implementation and Verification

During this stage continue to examine the chosen solution and the degree to which it is "solving" problem. If solution is too hard to implement or it is just not working, one may revise it or try something else.

1. 3. 4. 2 Phases of Problem-Solving in a group situation

There are five key phases to problem-solving followed by evaluation in a group situation. These phases are represented in the figure 1. 5 and described as following:

1. Consider the Task

   • To reach group agreement on the nature of the task and commitment to resolve it.
   • To limit the issue being tackled.
   • Accepting individual perceptions vs. agreeing with them.
   • Accepting that some view it as a problem while others may not.
   • Getting at the emotional parts of issue: "Can you tell the group how you feel about facing this issue every day?"
   • What's the real problem?

2. Consider the Resources

   • Who, what, why, when, where, how: "When do we have to complete the task?"
   • Focusing on parts of the problem: "Is there a limiting factor here?"

3. Consider the Alternatives

   • To examine as many alternative solutions or responses to a problem or situation as possible.
   • To create a variety of ideas and systematically evaluate them.

4. Write Plan Down

   • To provide oversight responsibility as a project is carried out.
   • Provide guidance for merging the twin priorities of keeping the group together and getting the job
5. **Put Decision into Effect**

- Carry out the plan as developed.
- Keep track of your progress and be ready to implement alternative plans when unexpected events occur.
- Take notes during the implementation so as to follow your evaluation.

6. **Evaluation**

Evaluation is a competency in its own right. It involves to purposefully examining:

- What happened and how lessons learned can be passed on within the group and to other groups?
- How the task was accomplished and how the group worked together to get it done?

![Figure 1.5 Five key Phases to Problem-Solving in a Group Situation](image-url)
1.3.4.3 Environmental Problem Solving

Before students can address global environmental issues, they must be knowledgeable about problem identification, interrelationships and alternatives. Examples of environment students who have increased knowledge about the causes of environmental problems are generally more positive about being able to correct and prevent future problems. They are also more confident about their own effectiveness in problem solving (Hoody, 1995; Champeau, 1997).

Monroe and Kaplan (1988) suggest following elements which are important in problem solving:

- Knowledge of the environment and of issues
- Familiarity with solutions to problems
- Knowledge of action strategies that help resolve issues
- Skill in action taking
- Locus of control and empowerment
- Attitudes and values
- Sense of responsibility and commitment
- Group process skills
- Communication skills
- Problem solving.

Problem-solving offers a general conceptual framework to integrate different skills, such as Planning, Scheduling, Time Management, Performance Appraisal, Negotiation, and Conflict Resolution. It often involves decision-making, and decision-making is especially important for management and leadership. The effective use of problem-solving will do more than any other competency for getting the job done as well as keeping the group together. Leaders who are explicitly skilled in interdisciplinary problem solving will be essential if humanity is to solve the species and ecosystem loss problem (Clark et al). In those situations where human beings need to solve problems, make decisions, or decide in a reasonable and reflective way what to believe or what to do, critical thinking is found to be useful.
1. 3. 5 Critical Thinking Life Skill

Critical thinking is a type of thinking that helps a person in stepping aside from his own personal beliefs, prejudices, and opinions to sort out the facts and discover the truth, even at the expense of his basic belief system. In this way it presents a challenging thought process which leads a person to new avenues of knowledge and understanding. Here one resorts to a set of higher cognitive abilities and skills for the proper interpretation, analysis, evaluation and inference, as well as explanation of the gathered or communicated information resulting in a purposeful, unbiased and self-regulatory judgment.

Although there are several definitions of critical thinking, the common purpose uniting them is the need to prepare citizens to understand and evaluate complex arguments about current issues. Robert Ennis was one of the first researchers to define critical thinking as “reasonable, reflective thinking that is focused on deciding what to believe or do” (Ennis, 1987). Although this definition focused on the end product, Paul and Elder’s definition focused on perfecting the quality of the process. Critical thinking is based on concepts and principles, not on hard and fast, or step-by-step, procedures (Paul & Elder, 2008).

The disposition to think critically includes the motivation of a person (i.e., a matter of choosing to engage in effortful thinking or not) and it accounts for how critical thinking is triggered, “good timing—attempting the right kind of thinking at the right moment” (Perkins & Ritchhart, 2004). The changes of how theorists define critical thinking reflect the emergence of a more holistic view on the conceptualization of critical thinking: besides the ability to engage in cognitive skills, a critical thinker must also have a strong intention to recognize the importance of good thinking and have the initiative to seek better judgment. In other words, cognitive component and dispositional component together determine a person’s actual thinking performance (Ennis, 1987; Facione, Sanchez, Facione, & Gainen, 1995; Halpern, 1998).

1. 3. 5. 1 Critical Thinking Process (Skills and Dispositions)

In 1990, a group of 30 experts convened in a Delphi study and determined that critical thinking is a process divided into skills and dispositions (American Psychological Association, 1990). The six skills defined by the Delphi study include:
• Interpretation: The ability to understand information.
• Analysis: The ability to identify the main arguments presented.
• Evaluation: The ability to judge whether this argument is credible and valid based on the logic and evidence given.
• Inference: The ability to decide what to believe or do based on solid logic, and to understand the consequences of this decision.
• Explanation: The ability to communicate the process of reasoning to others.
• Self-Regulation: The ability to monitor one's own thinking and correct flaws in logic.

Seven dispositional elements were also identified by this panel of experts (Facione, 1998):

• Inquisitiveness: Concern to become and remained well-informed.
• Truth-seeking: Willingness to face one’s own biases and reconsider views.
• Self-confidence: Trust in one's ability to reason.
• Open-mindedness: Flexibility in considering alternative viewpoints.
• Systematicity: Systematic thinking that follows a linear process.
• Analyticity: The willingness to pick apart your own and others' logic.
• Cognitive Maturity: Being persistent in seeking the truth.

However, the Delphi study explicitly excludes the role of ethics, or “right vs. wrong” decision making. Martin (1992) and Fox (2002) are among those who criticize this characterization and urge for a moral element to be added to critical thinking.

Paul, Binker, Jensen, and Kreklau (1990) have developed a list of 35 dimensions of critical thought:

A. Affective Strategies

S-1 thinking independently
S-2 developing insight into egocentricity or sociocentricity
S-3 exercising fair-mindedness
S-4 exploring thoughts underlying feelings and feelings underlying thoughts

27
S-5 developing intellectual humility and suspending judgment
S-6 developing intellectual courage
S-7 developing intellectual good faith or integrity
S-8 developing intellectual perseverance
S-9 developing confidence in reason

B. Cognitive Strategies—Macro-abilities

S-10 refining generalizations and avoiding oversimplifications
S-11 comparing analogous situations: transferring insights to new contexts
S-12 developing one's perspective: creating or exploring beliefs, arguments, or theories
S-13 clarifying issues, conclusions, or beliefs
S-14 clarifying and analyzing the meanings of words or phrases
S-15 developing criteria for evaluation: clarifying values and standards
S-16 evaluating the credibility of sources of information
S-17 questioning deeply: raising and pursuing root or-significant questions
S-18 analyzing or evaluating arguments, interpretations, beliefs, or theories
S-19 generating or assessing solutions
S-20 analyzing or evaluating actions or policies
S-21 reading critically: clarifying or critiquing texts
S-22 listening critically: the art of silent dialogue
S-23 making interdisciplinary connections
S-24 practicing Socratic discussion: clarifying and questioning beliefs, theories, or perspectives
S-25 reasoning dialogically: comparing perspectives, interpretations, or theories
S-26 reasoning dialectically: evaluating perspectives, interpretations or theories.

C. Cognitive Strategies—Micro-Skills

S-27 comparing and contrasting ideals with actual practice
S-28 thinking precisely about thinking: using critical vocabulary
S-29 noting significant similarities and differences
S-30 examining or evaluating assumptions
S-31 distinguishing relevant from irrelevant facts
S-32 making plausible inferences, predictions, or interpretations
S-33 evaluating evidence and alleged facts
S-34 recognizing contradictions
S-35 exploring implications and consequences.

1.3.5.2 Steps in Critical Thinking

Paul (1995) Chair of the National Council for Critical Thinking, identifies ten steps in Critical Thinking

• What is the purpose of my thinking?
• What precise question am I trying to answer?
• Within what point of view am I thinking?
• What information am I using?
• How am I interpreting that information?
• What concepts or ideas are central to my thinking?
• What conclusions am I aiming toward?
• What am I taking for granted; what assumptions am I making?
• If I accept the conclusions, what are the implications?
• What would the consequences be, if I put my thoughts into action?

Critical thinking skills are common desired outcomes and can bridge environmental education with state and national standards; when taught explicitly in the context of environmental issues, these skills can become integrated into student behaviour and help to create the environmental citizenry that environmental educators envision (Ernst & Monroe, 2004). In 1977 the Tbilisi Declaration stated the importance of preparing students to wrestle with complex social and environmental issues by teaching critical thinking skills (Intergovernmental Conference on Environmental Education, 1978). Critical thinking comprises a series of skills and dispositions that can help citizens make sense of their world and participate in a democratic dialogue.

EE provides developmentally appropriate opportunities for students to experience life skills, to practice them until they are learned, and be able to use them throughout life.
time. Ultimately education should focus on development of lifelong learning skills: communication, problem solving, decision making, critical thinking, evaluation, participating citizenship, valuing, aesthetic appreciation and a sense of ethics (Hug, 1995)

Behaviours are rooted in skills, which cluster to become tasks (Norton 1997). It is difficult to teach behaviour, per se, as behaviours are complex combinations of skills. The teaching of individual skills, while possible, involves teaching about the affect and cognition that support the behaviour as well as the skill. Hence each student’s environmental behaviour will be a result of his or her progression through development of life skills.

1. 4 Pro-Environmental Behaviour

In view of competing needs and pressures affecting the quality and sustainability of ecological systems, an environmental responsible citizenship is the most crucial challenge of educational efforts. There is growing need to change the human behaviour in an ecological direction if we have to develop human societies less exploitive in their use of earth’s natural resources. The ecological crisis is really a crisis of maladaptive behaviours and not a technological problem (Newhouse, 1990) In order for EE to be effective, it needs to help to shift attitudes and behaviours to be more environmentally mindful.

Environmental education aims to produce environmentally literate citizens who have the necessary skills and awareness to address challenges and to take environmentally friendly actions (Hungerford and Peyton 1976; UNESCO 1980). Attainment of this goal, however, is challenging and requires setting objectives at the cognitive, metacognitive, affective and behavioural levels (Sanera 1998). Many researchers including Hines, Hungerford and Tomera (1986) and Hungerford and Volk (1990), have advocated that environmentally friendly behaviour is the ultimate goal of environmental education. Understanding how and why behaviours occur is perhaps the greatest barrier to affecting behavioural outcomes in educational programs. Human behaviour and motivation are enormously complex and non-linear. In addressing environmental behaviours, it is important that environmental educators
understand individual motivations and differences in behaviour rather than assuming a single, 'right' or even 'best' behaviour (Heimlich and Harako 1994).

Pro-environmental behaviour is the behaviour with the largest potential benefits for the environment. Pro-environmental behaviour has been defined by Kollmuss and Agyeman (2002) as such behaviour “consciously seeks to minimize the negative impact of one’s actions on the natural and built world e. g. minimize resource and energy consumption, use non-toxic substances, reduce waste production”. According to De Groot & Linda (2008) in most cases, pro-environmental behaviour does not maximize individual interests, but mainly benefits other people or the environment.

The lesson for environmental education is that desired behaviours need to be specifically targeted and paired with learning events. The more distant or removed the desired behaviour is from the learning event, the more likely the message being conveyed will be lost over time (Pearce and Hall 1992). When teaching people about recycling, for example, some environmental educators might encourage them to recycle and teach them to use a recycling bin to separate plastic, paper and glass. The eventual desired outcome for that approach to teaching behaviour is that the individual will recycle used items; however, this desired behaviour risks breaking down if the person becomes reliant on the bin rather than committed to the recycling behaviour. If that person is in a situation without the recycling bin, he or she may decide to throw recyclable items in the trash because the first-order behaviour (sorting items into bins) is absent. McKenzie-Mohr and Smith (1999) explain that a behaviour is a specific action, while 'most environmental activities are made up of several discernible behaviours' (cited in Monroe 2003). Therefore, we must consider each of the individual behaviours and actions that add up to the larger environmental behaviour we encourage people to undertake.

In essence, few behaviours are conscious and most are learned habits. Those habits - or isolated acts - are sequenced into routines that allow the individual to consciously apply thought when necessary. The challenge, then, for educators seeking behaviour change is not to change the behaviour, but rather to change the routine that exists around that behaviour. In other words, changing behaviours is not about changing one act; it is about altering the routines in which the acts are embedded.
With regard to attitude specificity, while generally positive attitudes toward the environment do not predict whether an individual will take specific environmental behaviours, specific attitudes toward particular problems do have predictive value (Bell et al. 1996). A general pro-environmental outlook, for example, does not ensure that a person will purchase a fuel-efficient vehicle, but a specific concern with climate change may link with behaviours to mitigate that effect, including driving a vehicle that minimizes carbon dioxide emissions.

Behaviour does not refer only to a physical activity, but rather represents a complex intermingling of affective and cognitive processes that guide decisions in the short- and long-term. Considerable research across a range of disciplines has contributed to ideas about how people change their own behaviour. This research, as well as the interpretation and use of it, is based on the theories outlined in Figure 1.6.

**Figure 1.6 Psychology Theories underpinning Models of Learning**

In behavioural theories knowledge is viewed as nothing more than passive, largely automatic responses to external factors in the environment. In cognitive theories knowledge is viewed as abstract symbolic representations in the head of individuals. In the constructivist theories knowledge is viewed as a constructed entity made by each and every learner through a learning process. Knowledge can thus not be
transmitted from one person to another; it will have to be reconstructed by each person. This means that this view of knowledge differs from the 'knowledge as given and absolute' views of behaviourism and cognitivism. Thus the cognitive-constructivistic perspective is beginning to underpin contemporary efforts to help people learn about, and change their behaviour towards, the environment. Teaching therefore is the process that supports this construction and reconstruction of new knowledge, rather than being the communication of knowledge. This research suggests that approaches to facilitate behaviour change are most effective when used to enhance constructivistic or learner-centred instructional strategies because they emphasise interactivity, and learner control and engagement.

1.4.1 Predicting Pro-Environmental Behavioural Change

To fully understand the mechanisms behind behaviours and to move people more effectively toward environmentally friendly behaviour, it is critical to explore the interplay among the cognitive and affective components, which are nearly inseparable.

Many research efforts are directed to investigate the motivations of individuals to engage in Pro-Environmental Behaviour (PEB). There are both internal and external variables that explain actual instance of PEB. Various theories or models are based on these variables impacting behaviour in different combinations and to different extents.

1.4.2 The Theory of Planned Behaviour by Fishbein and Ajzen (1975); Ajzen (1985)

This theory holds that 'behavioural intention' is the key determinant of behaviour. This is influenced by three components:

- A person's attitude toward performing the behaviour.
- The perceived social pressure to adopt the behaviour, called the subjective norm.
- Perceived behaviour control.

Background variables, as demographical factors, are supposed to influence the behaviour through the three determinants and the intention. As shown in figure 1.7,
attitudes, subjective norms and the perceived behavioural control, explain the behavioural intention before the behaviour takes place. The intention is a good predictor of the actual behaviour. Theory also says that the perceived behavioural control is an estimate of the skills needed for expressing the behaviour and the possibility to overcome barriers. Therefore, a direct influence of perceived behavioural control on behaviour is supposed. The actual behaviour leads to feedback about the expectations of the behaviour.

Figure 1.7 Theory of Planned Behaviour

1.4.3 The social Cognitive Theory (SCT): Bandura, 1986 suggests that new actions or skills whether directly experienced or learned by modeling, may be necessary to behaviour change. In SCT, human behaviour is explained in terms of three-way theory in which personal factors, environmental influences, and behaviour continually interact.

1.4.4 Hungerford and Volk (1990) Hypothesis
They hypothesized that there are three corresponding categories of variables i.e., entry level variables, ownership variables and empowerment variables that contribute to behaviour. Variables of each category are divided into major and minor variables.
1.4.5 Theoretical Model of Responsible Environmental Behaviour

Building upon this conceptual framework a theoretical model for responsible environmental behaviour (REB) was constructed to operationalize hypothesis (Figure 1.9).

In a Meta-analysis of REB, Six variables were identified as associated with REB: knowledge of issues, knowledge of action strategies, locus of control, attitudes, verbal commitment and an individual sense of responsibility (Hines, Hungerford and Tomera 1986/87)
However, increased knowledge concerning the environment does not guarantee more responsible activities toward the preservation of nature. Numerous studies in this field have failed to demonstrate a strong relationship between environmental knowledge and behaviour (e.g., Kuhlemeier et al. 1999; Makki et al. 2003), but the knowledge base may help individuals gain a variety of experience and acquire a basic understanding of the environment with its associated problems. Furthermore, knowledge may enable individuals to make informed decisions and take appropriate actions (UNESCO-UNEP 1991). Ecological behaviour appears to be susceptible to a wide range of influence beyond one's control (Hines et al. 1986-87). Social–Cultural Constraints determine, to some extent which ecological behaviour is easier to carry out and which is harder. For instance, recycling opportunities affect the amount of recycling behaviour (Williams, 1991; Vining & Ebreo, 1992; Guagnano et al., 1995).

1.4.6 Social-psychological Model (Stern et al., 1995)

Related research by Stern, Dietz and Guagnano (1995) constructs a comprehensive social-psychological model of environmental concern. The model posits a series of
sequential relationships. First, social and institutional structure exerts early and strong influences upon the formation of individual psychological variables. From social and institutional structure values are derived, which then shape more general beliefs and worldviews such as environmental concerns and altruistic norms. More specific beliefs and attitudes evolve from these general beliefs and worldviews. Specific beliefs and attitudes lead to formation of behavioural intentions and ultimately behaviour.

1. 4. 7 Triandis 'Theory of Interpersonal Behaviour

Triandis (1977) proposed a Theory of Interpersonal Behaviour (Figure 1.10) in which intentions – as in many of the other models – are immediate antecedents of behaviour. But habits also mediate behaviour in Triandis' model, it can be noted that habit is shaped by the frequency with which a given behaviour is undertaken. Behaviour in any situation is, according to Triandis, a function partly of the intention, partly of the habitual responses, and partly of the situational constraints and conditions. The intention is influenced by social and affective factors as well as by rational deliberations. Social factors include norms, roles and self-concept. Norms are the social rules about what should and should not be done. Roles are ‘sets of behaviours’ that are considered appropriate for persons holding particular positions in a group' (Triandis, 1977). Self-concept refers to the idea that a person has of his/herself. Emotional responses to a decision or to a decision situation may include both positive and negative emotional responses of varying strengths. Affect has a more or less unconscious input to decision-making, and is governed by instinctive behavioral responses to particular situations.
This study noted that it is possible to trace a move from Simple linear 'information deficit' models (see Figure 1.11), to those that recognise that holding positive (pro-environmental) attitudes doesn’t automatically lead to undertaking positive (pro-environmental) individual behaviours. This is commonly referred to as the 'value-action' gap. The revised model has identified principal external barriers as well as internal barriers to behaviour change (Figure 1.12) There are both internal (personality traits, value system etc) and external factors (infrastructure, political, social, cultural factors, economic situation etc) influencing pro-environmental behaviour.
1.4.9 Ballard’s ‘5As Model’ (2005)

This model has far broader applications in identifying the prerequisite qualities of pro-environmental behaviour change among individuals. The ‘5As’ blend internal attributes with external factors, brought together through the medium of action learning or experiential activities undertaken by individuals in groups.

5As are as follows:

1. **Awareness** - of what is happening and what action is required. Awareness is a progression through three levels,

   **Level 1** is simple (factual) awareness, not linked to personal action.
Level 2 is awareness including a sense of urgency and priority - the beginnings of personal engagement.

Level 3 is 'mature awareness', incorporating a sense of the context for and barriers to action, including recognition of key moments for effective action.

2. **Agency** - agency unlocks action by providing individuals with a sense that they can take meaningful action to address the immense issues of which they are aware.

3. **Association** - undertaking action through the medium of a group or collective.

4. **Action and Reflection** - working in groups, individuals address the issues (and barriers) collectively, undertaking continuous cycles of action and reflection allowing them to open up new possibilities for meaningful action.

5. **Architecture** - architecture represents the external context (both societal and organisational) within which behaviours occur. Architecture comprises both structures (e.g. infrastructure) and processes (e.g. professional development or decision making).

All models or theories have a common starting point: determinants or factors that influence the behaviour. Therefore internal and external determinants of specific behaviour must be analyzed.

The wide array of models has presented myriad factors, which are essentially internal to individual, in that they are psychological or dispositional. Variables such as control of locus, commitment, and challenge, which are dimensions of psychological hardiness, may determine pro-environmental behaviour change in students.

**1.5 Psychological Hardiness**

Changing the patterns of behaviour requires the knowledge of influence of psychological variables - commitment, control and challenge as the ingredients of what we call; Psychological Hardiness.
Hardiness is a combination of an internal locus of control, appreciation of challenge as opportunity and commitment to self. Hardiness develops in an early childhood and emerges as the result of rich, varied and rewarding life experiences (Maddi & Kobasa, 1984). The three dimensions of hardiness are:

1.5.1 Control: The psychological construct of locus of control predicts that an individual's behaviour is guided by his or her perception that a certain behaviour will lead to an expected reinforcement (Rotter 1954, 1966). The locus of control concept has been widely discussed and leveraged within the environmental education arena. Locus of control is based on internal versus external control, referring to the degree to which an individual believes that a desired outcome can be achieved through one's own behaviour or personal characteristics. If the desired outcome occurs, that outcome serves as a reinforcement of the belief in one's internal efficacy.

Locus of control also considers the degree to which individuals expect that reinforcement or outcome is a matter of chance, luck or fate; under the control of (powerful) others; or simply unpredictable (Rotter 1990). Internal locus of control or self-efficacy and perceived Control refer to attributions of controlling factors in one's life (internally through one's own actions or externally through powerful others, external events, chance or fate). An internal locus of control is both a mark of mental health and an antecedent to mental health. Control is measured by absence of powerlessness that an individual feels (Bigbee, 1985). It refers to the belief that one can control or influence occurrences in one's life that personal efforts can modify stressors so as to reduce them into more manageable state (Maddi and Kobasa, 1984; Bigbee, 1985; Pollock 1989; Wagnild and Young, 1991; Taratsky, 1993; Huang, 1995) or that is contingency exist between one’s actions and external events (Sullivan, 1993). Bandura (1977) posits self-efficacy as a person's expectations related to his or her efficacy beliefs influences whether that person undertakes a new behaviour and, if so, how likely it is that the behaviour will be maintained.

Ramsey (1993) subdivided internal locus of control into individual and group-oriented locus of control to form a broader understanding of internal locus of control. Individual locus of control involves individuals' perception that their behaviour alone will bring about change. Group oriented locus of control refers to individuals' perception of their ability to orchestrate change as a group member. Most participants
articulated group-oriented locus of control for environmental issues. This related to Ramsay's (1993) research, which showed that grade 8 participants had stronger affinity to group oriented locus of control.

The theory of planned Behaviour (Madden et al., 1992) notes that the locus of control, the perceived ability to influence the situation, is important in determining the behaviour of an individual.

Verbal reinforcement of child’s own effectiveness, enhancing decisions making skills and allowing to contribute for motion of rules contributes to belief that one has some control over what is occurring in one’s life (Brooks, 1994).

EE methodology has the potential to stimulate students’ locus of control. Students experience and develop an internal locus of control through activities that empower them to make decisions. Experiential approaches in EE may contribute towards making such a change in the students’ behaviour. Some environmental education studies have recommended a focus on helping learners develop internal loci of control (e. g. Riechard and Peterson 1998; Hwang, Kimand, and Jeng 2000; Yerkes and Beiederman 2003) One of the challenges with targeting locus of control is that accurate measurement of locus of control related to a specific behaviour must be created for each individual situation or behaviour.

1.5.2 Commitment : Commitment is the tendency to involve oneself in, rather than experience alienation from, one’s activities or encounters. Committed individuals have the type of cognitive appraisal that provides a general sense of purpose which allows them to identify with the events, things, and persons in their relevant environment and find meaning in them (Kobasa, Maddi, & Kahn, 1982)

Commitment is the ability to feel actively involved, with others and a belief in the truth, value and importance of one’s self and one’s experience (Wagnild and Young, 1991; Tartasky, 1993; Haung, 1995 )It is measured or indicated by the absence of alienation (Bigbee. 1985). This dimension represents a fundamental sense of one’s worth, purpose and accountability which protects against weakness while under adversity (Bigbee, 1985; Pollock, 1989; Sullivan,1993). To engender a sense of ownership and pride within children, the adults should provide them opportunities
which encourage them to feel as though they are making contribution to school, family or the community.

Commitment encompasses the need to be involved with and contribute to familial and school endeavours and reflects a capacity to feel a responsibility to assist others (Weissberg et al., 1991). Commitment tends to predict greater likelihood of pro-environmental behaviour. Fostering commitment also involves asking oneself “What does this experience really mean for me”.

1.5.3. Challenge: The third dimension reflects the belief that change is not the threat to personal security, but an opportunity for personal development and growth (Maddi and Kobasa, 1984; Bigbee, 1985; Pollock, 1989; Wagnild and Young, 1991; Tartasky, 1993; Haung 1995). Challenge represents individual’s positive attitude towards change and the belief that one can profit from failure as well as success. Fears surrounding potential mistakes and failures present an obstacle to overcome challenges and prevent the individuals from confronting the challenge (Brooks, 1994). The expression of the challenge disposition is a belief that change rather than stability is the norm of life. The anticipation of change is an interesting incentive to personal growth rather than a threat to one's security. Hardy People should be able to face change with confidence and self-determination and the eagerness of seeing change as an opportunity.

Experiential learning in EE can reinforce within the child that mistakes and failures are an opportunity for learning and growth. Fostering challenge includes asking oneself “what can I learn from this experience”.

Hardy persons are more likely to engage in problem-focused, active and support seeking coping strategies in comparison to less hardy individuals who engage in distancing and avoiding (Pollock, 1989; Williams et al, 1992)

Hardiness is a personality disposition, and on a psychological level, dispositions have aspects of both cognitive appraisal and action. Personality dispositions at the cognitive appraisal level provide bases for experiencing stimuli in a unique manner and for giving the stimuli a particular meaning. After a given perception has occurred, at the action level, personality dispositions energize some set of actions which are
deemed appropriate. Attaching appropriate meanings to stimuli and responding with appropriate actions is desirable and it may serve the basis of pro-environmental behaviour.

1.6 Operational Definitions of the Variables

1.6.1 Experiential Learning

It is learning through experience. It may be defined as the process of acquiring knowledge directly; the learner applies theory and concepts in a real world situation and learns from outcome. It refers to set of activities as used by the investigator for giving treatment to one of the two groups.

1.6.2 Life Skills

Life skills refer to abilities, knowledge, attitudes and behaviours that enable a person to adapt to and master life situations at home, school and in any other context. Two life skills targeted by experiential learning methods undertaken in this study are:

- Problem Solving Skill
- Critical Thinking Skill

1.6.2.1 Problem Solving Skill

Problem solving skill is defined as goal directed sequence of cognitive operations which enable a person to adapt to internal/external demands or challenges. Operationally Problem solving skill is defined as the scores obtained by the students on The Problem Solving Inventory (PSI) by Heppner (1988) which assesses one’s perception of problem-solving abilities.

1.6.2.2 Critical Thinking Skill

Critical thinking skill includes higher cognitive abilities and skills which enable a person to interpret, analyse, evaluate and infer on the basis of information to make unbiased and self-regulatory judgement. Operationally Critical thinking skill is defined as the scores obtained by the students on critical thinking Essay test evaluated by using Critical Thinking Skill Rubric devised by Hofreiter et al. (2007)
1.6.3 Pro-Environmental Behaviour

Pro-environmental behaviour is the behaviour with the largest potential benefits for the environment. Pro-environmental behaviour may be defined as the extent to which a person consciously seeks to minimize the negative impact of his actions on natural and built world.

Operationally it may be defined as the scores obtained by the students on Pro-Environmental Behaviour Scale developed and standardized by the investigator.

1.6.4 Psychological Hardiness

Psychological Hardiness is defined as a constellation of three dispositions-control, commitment and challenge and summation of three determines global hardiness. Operationally it is defined as the scores obtained by the students on Psychological Hardiness Scale constructed and standardized by Nowack (1990)