CHAPTER II

A CONCEPTUAL REVIEW OF LITERATURE

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CHAPTER II

A CONCEPTUAL REVIEW OF LITERATURE

2.0 PREAMBLE

This chapter presents a Conceptual Review of Literature, which is expected to help in developing or enriching the theoretical framework of the study. It is explained here under three sections.

The first section presents the theoretical basis of models of teaching in general and Jurisprudential Inquiry Model in particular. This is a conceptual area, which directly falls within the orbit of the topic as handled by almost all the earlier investigators.

In Section 2, the historical and conceptual basis of discourse analysis and its consequences in judicial literary aspects are given. This follows from the attempt to enrich the model, particularly in linguistic refinement of the value and issue analysis, which is processed through language.

In Section 3 Environmental Education conceptualisations are analysed. The justification is that the episode *Bhūmiyute Avakāśikā* can be read from many perspectives, one of which is environmental conservation and sustainability. A dialectic of conservational concerns with developmental concerns can also be discerned in the text. When the text is analysed closely education through the environment echoes also can be read in the work.

2.1 MODELS OF TEACHING

In India during the last few decades, efforts have been made to study the classroom behaviour of teachers through Flanders Interaction Analysis
Category System, which equips them to change their teaching behaviour so that development in the cognitive and affective domains of pupils can be brought in. Efforts were also made to identify teaching skills for teaching different subjects. Also the microteaching technique was researched for improving upon general teaching competence. Later, different strategies of integration of teaching skills were tried out. Another group of researchers tried to find out the teaching patterns, which are conducive for developing cognitive and affective behaviour. It is generally agreed that the objectives to be achieved through the teaching learning process multi-dimensional in nature. It is also felt that a particular method or technique may not be appropriate for achieving the multi-dimensional objectives. This led researchers to explore the use of various methods and techniques in an integrated fashion, which resulted in the development of new instructional strategies. The greatest emphasis was on the development of cognitive domain. All these did little for achieving the all round development of the personality of the child. In other words, cognitive, affective and psychomotor behaviour must be developed in a balanced and integrated fashion. Models of teaching have great potentiality for achieving this goal of education.

Joyce and Weil (1980) developed about twenty models, which were grouped on the basis of their chief emphasis - the way they approached educational goals and means. They have classified models into four families. These are Information Processing Family, Social Interaction Family, Personal Family and Behaviour Modification Family.

Out of these, Social Interaction Family emphasizes the relationships of the individual to the society and to other persons. The criterion model selected for the present study, viz., Jurisprudential Inquiry Model falls within this family. The others in this family are: Group Investigation Model, Social Inquiry Model, Laboratory Method, Jurisprudential Inquiry Model, Role Playing Model, Value Discussion Model and the Social Simulation Model.
2.1.1 MODELS – DEFINITIONS

From the dictionary meaning, model is a pattern of something to be made or reproduced and a means of transferring relationship or process from its actual setting to one in which it can be more conveniently studied. Seen from this point of view, teaching is a plan or pattern that can be used to shape curricula to design instructional materials and to guide instruction in the classrooms and other settings. The most important aim of any model of teaching is to improve the instructional effectiveness in an interactive atmosphere and to improve or shape the curriculum.

Robbins (1996) defines model as “an abstraction of reality, a simplified representation of some real world phenomenon”.

Siddique (1991) defines it as “a pattern of something to be made or produced and means of transferring a relationship or process from its actual setting to one in which it can be more conveniently studied”.

Suckling and Suckling (1980) think of it as “Constructing alternative, usually simpler forms of objects or concepts, in the expectation that the study of the model will shed the light on the nature of those objects or concepts”.

Joyce and Weil and Showers (1992) define a teaching model as “a plan or pattern that we can use to define face-to-face teaching in classrooms or tutorial settings and to shape instructional materials”. They conceive of it as prescriptive teaching strategy designed to achieve specified objectives for student’s learning. Models of teaching are models of learning too, since they will strengthen the students to become more effective learners.
Silverman (2000) uses the term 'model' in a very deep sense, almost on par with "paradigm". To him 'model' is "an overall framework for looking at reality". He shows it at the top of a hierarchy of theoretical framework.

<table>
<thead>
<tr>
<th>Model</th>
<th>An overall framework for looking at reality (e.g. feminism)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Concept</td>
<td>An idea deriving from a given model (e.g. oppression)</td>
</tr>
<tr>
<td>Theory</td>
<td>A set of concepts used to define and/or explain some phenomenon</td>
</tr>
<tr>
<td>Hypothesis</td>
<td>A testable proposition</td>
</tr>
<tr>
<td>Methodology</td>
<td>A general approach to studying research topics</td>
</tr>
<tr>
<td>Method</td>
<td>A specific research technique</td>
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<tr>
<td>Findings</td>
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Kaplan (1964) has classified models into five types:

1. **Analogue models** are related to a physical system (it is rare in education)

2. **Semantic models** are expressed in verbal form and are referred to as **figurative models** and **metaphoric models**.

3. **Schematic models** integrate theory and real world situations. They help to cluster constructs into an ordered relationship (e.g., Guilford Model of Intelligence).

4. **Mathematical models** are generalised models applied to a measurement problem. Confluence model is a special application (by Zajone) of mathematical model.

5. **Causal models** whose essential role is in the building of a simplified structural equation model of the causal process.
operating among the variables under consideration. The model is written as a set of linear equations hypothesised to explain the relation between variables.

Kaplan adds that the term model is useful only when the symbolic system it refers to is significant as a structure—a system which allows for exact deductions and explicit correspondences. The value of the model lies in part in its abstractness, so that it can be given many interpretations, which thereby reveal unexpected similarities. The value also lies in the deductive fertility of the model, so that unexpected consequences can be predicted and then tested by observation and experiment. Kaplan adds that "Models can be built, tested and if necessary rebuilt in the course of the inquiry. They relate to theory and may be derived from theory, but they are conceptually different from theory itself."

In science, major constructs, hypotheses, and even mappings, such as the kinetic theory, atomic structure, and the periodic table are also called 'models'. They try to construct a picture of reality on the basis of empirical data, a picture that would permit further testing of the nature of the reality. Most of the major constructs of philosophers are mental models of the highest level. This also applies to educational theories.

A related concept, paradigm, has also been popularised by Kuhn. Paradigm is a philosophical model or framework originating in a worldview and belief system based on a particular ontology and epistemology and shared by a scientific community. The term has been popularised through the writing of Kuhn (1970). His concept of paradigm shift could be even more relevant in the present work. But the present researcher cannot claim to effect or even catalyse such a shift. But, as indicated in the Introduction, a shift is taking place in educational and social research methodology, from the dominance of quantitative methods in the positivist paradigm to more and more
qualitative approaches. This investigator may be one of those who make a partial use of qualitative approaches. But then it is not to the exclusion of quantitative approaches, but as a supplement.

2.1.2 SOME PRELIMINARY CONSIDERATIONS

2.1.2.1 Models-Based Teaching

There are varying instructional goals for different classes and different subjects. We can refer Bloom’s taxonomy of educational objectives, which are categorized into three domains. These are cognitive, affective and psychomotor. To achieve these educational objectives or goals, the teacher must practise different teaching strategies. Model approach to teaching was proposed by a number of educationists and psychologists.

Flanders puts his interaction analysis as a model of teaching and for this approach he categorized the statements of students and teachers into ten categories. Glaze developed his stripped down model of teaching which after some modification is well known as basic teaching model. He divided instructional materials in his model into four components. These are instructional objectives, the entering behaviour of the student’s instructional procedure and performance and assessment.

2.1.2.2 Models of Learning

Models of teaching are really models of learning. As we help students acquire information, ideas, skills, values, ways of thinking and means of expressing themselves, we are also teaching them how to learn. In fact, the most important long-term outcome of instruction may be the student’s increased capabilities to learn more easily and more effectively in the future,
both because of the knowledge and the skill they acquired and because they have mastered learning processes.

How teaching is conducted has a large impact on students’ abilities to educate themselves. Successful teachers are not simply charismatic and persuasive presenters. Rather they engage their students in robust cognitive and social tasks and teach them how to use them productively. Effective learners draw information, ideas, and wisdom from their teachers and use learning resources effectively. Thus a major role in teaching is to create powerful learners.

2.1.2.3 From Where do Models of Teaching Come?

A model of teaching is a description of a learning environment. For the last fifty years Joyce and Weil have been conducting a continuous and worldwide search for promising approaches to learning. They have found models of teaching in abundance. Some have broad applications, while others are designed for special purposes. They range from simple, direct procedures that get immediate result to complex strategies that students acquire gradually from patient and skillful instruction.

2.1.3 FAMILIES OF MODELS OF TEACHING

The next few sections deal with Joyce and Weil’s intense analysis of families of models of teaching

2.1.3.1 Social Family

When we work together we generate a collective energy that we call synergy. The social models of teaching are constructed to take advantage from this phenomenon by building learning communities. The development of positive school cultures is a process of developing integrative and
productive ways of interacting and norms that support vigorous learning activity.

The Social models include:
(1) Partners in Learning
(2) Positive Interdependence
(3) Structured Inquiry
(4) Group Investigation
(5) Role Playing
(6) Jurisprudential Inquiry (the criterion model taken up for the study)

2.1.3.2 The Information Processing Family

Information processing emphasizes ways of enhancing the human being's innate drive to make sense of the world by acquiring and organizing data, sensing problems and generating solutions for them, and developing concepts and languages for conveying them. Some models provide the learner with information and concepts, some emphasize concept formation and hypothesis testing and still others generate creative thinking.

The Information Processing Models include:
(1) Inductive Thinking
(2) Concept Attainment
(3) Mnemonics
(4) Advance Organizers
(5) Scientific Inquiry
(6) Inquiry Training
(7) Synectics

2.1.3.3 The Personal Family

The personal models of learning begin from the perspective of the selfhood of the individual. They attempt to shape education so that we come to
understand ourselves better, take responsibility for our education, and learn to reach beyond our current development to become stronger, more sensitive, and more creative in our search for high-quality lives.

Personal Models include:

(1) Nondirective Teaching
(2) Enhancing Self esteem

2.1.3.4 The Behavioural Systems Family

Behaviour modification theory is really the theory of social learning. The stance taken is that human beings are self-correcting communication systems that modify behaviour in response to information about how successfully tasks are navigated. Behaviour techniques are appropriate for learners of all ages and for an impressive range of educational goals. Behaviour therapy and cybernetics are typical designs used in the models in the family.

The teaching models under this category are:

(1). Mastery Learning and Programmed Instruction
(2). Direct Instruction
(3). Simulation

2.1.4 THEORETICAL FRAMEWORK OF JIM

Since JIM is the one model that is to be submitted to intense inquiry in this study, it would be worth analysing its theoretical framework.

Jurisprudence means the science of law, wherein certain legal issues are analyzed in the legal framework. Similarly, in the social situations, social problems involve values, which need to be analyzed logically under a value framework. The students can be made to think within a particular framework
and take decisions accordingly. How can it be done? In order to answer this question Donald Oliver and James Shaver (1966/1974) came out with a model of teaching called the Jurisprudential Inquiry Model of teaching.

This model is designed to help students learn to think systematically about contemporary issues. It requires them to formulate these issues as public policy questions and to analyze alternative positions about them. Essentially it is a high level model for citizenship education.

As our society undergoes cultural and social changes, the jurisprudential inquiry model is especially useful in helping people rethink their position on important legal, ethical and social questions. The citizenry needs to understand the current critical issues and share in the formulation of policy. By giving them tools for analyzing and debating social issues, the jurisprudential approach helps students participate forcefully in the redefinition of social values.

Oliver and Shaver's work encompasses many ideas: they present us with a model of the society, a conception of values, and a conception of productive dialogue. They also detail out curriculum and pedagogical considerations.

The Jurisprudential Inquiry Model, as the name shows, takes a person as a judge, who listens to the case, abstracts the evidences so presented, analyzes the legal position taken by both sides, assesses the provision of law, and, at the end, makes the best possible judgment. Similarly in the classroom, the teacher presents a controversial issue before the students. The students analyze the issue with respect to various values involved in it. They take a stand and the teacher challenges the stance so taken and helps the students to understand the logical basis on which he had taken a stand. In this way, teacher maintaining his authoritative role in the classroom, functions as a challenge to the stand taken by the students.
A conceptual Review of Literature

The Jurisprudential Model of teaching is based on a pragmatic philosophy of life. It considers that values are subjective and relative. Values change with the time and circumstances. Human experience is the main determinant of values in life. Men value different objects differently and may value the same object for different reasons. For example, if a person gets two appointment letters for two jobs with similar status at the same time, he will be in a state of mental conflict as to which of these jobs to select. Such a dilemma may continue to remain unresolved even after the decision has been made. The person will be discussing pros and cons over a long period of time because each type of job has its own benefits and limitations. In other words, the consequences or outcomes are the basis of selection of all types of values. If the consequences are useful, the value selection is appropriate, otherwise not. The values are dynamic and changing and are created by men with intelligence and creative power.

2.1.5 OBJECTIVES OF THE MODELS

The Jurisprudential Inquiry Model has the following objectives

1. To develop skill of dialogue, where the primary aim is clarification and problem solving.
2. To develop such skills in students where they look at discussion as a process for mutual inquiry and clarification rather than combat.
3. To develop such an attitude amongst the students that they begin to recognize that each person is entitled to have his or her own opinion.
4. To help students understand that values are complex and they can analyze the situation by rational thinking.
2.1.6 MAJOR CONCEPTS IN THE MODEL

Keeping in view the theoretical framework and the underlying assumptions and the functioning of the model, the major concepts developed in the model are described below.

The students are presented with a social situation. These situations are such that provide ample proof that some values or more than one value are legitimately in conflict; there is no one right solution. If one alternate is taken up, many other values will be violated. Thus dilemma will be projected before the students.

2.1.6.1 Socratic dialogue

The teaching strategy in JIM is built around a Socratic dialogue where the teacher’s role is that of an adversary. The teacher asks students to take a position or make a value judgment. Later on the teacher challenges the assumptions underlying the student’s stand. The teacher goes on probing the student’s position until they become clearer and more complex, reflecting consideration of alternatives. In the course of doing this, the teacher questions the relevance, consistency, specificity and definitional clarity of the student’s ideas.

In the Socratic dialogue, students take a position and when the teacher challenges the position with questions. The teacher’s questions are designed to push students thinking about their stand. The purpose behind such questions is;

(a) Does the student’s stand reflect the alternative in the social situation?
(b) Is the stand consistent across different situations?
(c) Does the student have ample reason for the stand?
(d) Is the position taken relevant to the situation?
(e) What are the assumptions underlying the position?

(f) Are these assumptions valid to the position?

(g) Do the students know the consequences of the position?

(h) Will the students hold on to the position in spite of the consequences?

2.1.6.2 Public policy Issues

The whole model rests on the public policy issue. It is a dilemma, quandary or a controversy. It may pose as a question involving a choice or a decision for action by citizens in affairs that concern a community. For example, Should the reservation seats for Muslims be fifty percentages in Aligarh Muslim University? Should India sign the autonomy of Jammu and Kashmir? Such question are controversial and do not have one straightforward answer. These present a choice for action. All such questions start with 'should'.

2.1.6.3 The Value Framework

In any social or political system people have a framework of values under which they form their opinions. The legal-ethical framework developed in a social system because of its cultural set-up governs the decision of an individual. An individual under the existing value framework solves any controversy that arises in a particular social or political situation faced.

When we speak of framework of values for analysing public issues, we imply the legal ethical framework that governs the social policies and decisions. Some basic social values suggested by Joyce and Weil are given below.

Rule of law: Actions carried out by the government have to be authorized by law and apply equally to all people.
Equal protection under the law: Laws must be administered fairly and cannot extend special privileges or penalties to any one person or group.

Due process: The government cannot deprive individual citizens of life, liberty, or property without proper notice of impending actions (right to a fair trial).

Justice: Equal opportunity.

Preservation of peace and order: Prevention of disorder and violence (reason as a means for dealing with conflict).

Personal liberty: Freedom of speech, right to own and control property, freedom of religion and freedom of personal associations, right to privacy.

Local control of local problems: Restriction of federal government power and preservation of state's rights.

Some of the problem areas and conflicting values identified by Joyce and Weil are:

Racial and ethnic conflict- Equal protection, Due process, Brotherhood of man. Vs Peace and order Property and contract rights Personal privacy and association
Religious and ideological
Conflict  Freedom of speech and conscience  
                      Vs.  
                      Equal protection  
                      Safety and security of democratic institutions  

Security of the individual  Standards of freedom  
                      Due Process  
                      Vs.  
                      Peace and order  
                      Community welfare etc.

2.1.6.3 a Valuing means, classifying things, actions or ideas as good or bad or right or wrong.

This is done not on the basis that certain consequences will occur and other consequences will be avoided. The process of consequences will come in because more than one value functions at a time and this value legitimately conflicts with one another. In short, value process is quite complex and it becomes difficult for an individual to stick to one value. He is always left with a dilemma, when engrossed with problems involving more than one value. Ideals are extreme forms of a particular value. Ideals do not have any dimension, that is why, they are judged on 'either/basis'. If equality is taken as a value then it has its own dimension or degree of desirability. In some cases or levels the equality will be sanctioned and in other cases or levels it will not be accepted. In simple words, it is difficult to cope with practical situations. A person can accept a compromise on the same value in different situations.

People in general and in a democratic society in particular differ in their views and priorities. In a social process values do not come singularly. These being complex phenomena generally provide controversies or
conflicts. These controversies are nothing but different priorities of different people. The priorities are generally value-based.

Compromising a little can negotiate all conflicting situations that arise because of values. What is required is that people sit together, analyze the value conflicts and find out the best possible solutions. During this process people have a tendency to understand the reason and assumptions behind each other's position. Only by way of such rational dialogues can useful compromises be achieved. Therefore, whenever controversies arise, the best solution is that in which each value is compromised a little.

2.1.6.4 Rational Consent

Rational consent means coming to a consensus through the reasoning process. When the students take a stand in favour of their viewpoint they start a dialogue so as to reach a decision. During this process all parties or students are committed to reason and reflect and everybody has the right to express himself. In other words, there is an open discussion on a controversial issue. Everybody tries to understand the rationale behind one another's position so as to negotiate their differences in values.

The process of rational consent or dialogue is based on three levels of analysis to define a controversial situation and four patterns of argumentation to develop a defensible stand.

2.1.6.5 Levels of analysis:

The process of discussion involves three levels of analysis so as to be fruitful, that is, discussion takes place in a cogent atmosphere if,

a) The participants are clear about definition of the terms used in public policy issue,
b) The participants are able to classify a particular idea, action or a thing as good or bad and
c) The participants are well aware of the facts of the case or issue.

In this model the levels of analysis are well taken care of before the discussion starts.

2.1.7 PROBLEMS INHERENT IN THE MODEL

2.1.7.1 Definitional problem

Ambiguous or confusing use of words is the basic problem in discussion. Unless all participants recognize common meaning in the words used during discussion it is very difficult to reach an agreement. To resolve definitional disagreements, the teacher first of all determines whether participants in a discussion are the same in different ways or the different terms for the different referent. Secondly, the teacher tries to establish a common meaning if there is a disagreement over a definition.

If the participants in a discussion seem to be using the same terms to mean different things, they are asked to give definition: (a) by example, or (b) by criteria, that is, listing the distinguishing characteristics of the terms being used.

If there is disagreement among the participants over a definition then the teacher helps to find out a common meaning by: (a) finding out how most people use a particular word; (b) by referring to the dictionary; (c) by stipulating the meaning of the word for the purpose of discussion by listing agreed upon criteria; and (d) by obtaining more facts about an example to see if it meets the agreed upon criteria for definition.
2.1.7.2 Value problems

Another problem during discussion is value conflict arising from the fact that people prefer different actions and ideas/things at different times. And each preference can claim validity on the basis of certain criteria. There is no single correct solution to any controversy.

So teachers should help students by making them understand that if any of the alternatives is taken up:

(a) certain consequences will occur;
(b) other consequences will be avoided;
(c) important social values will be violated if the decision is not made.

2.1.7.3 Factual problems

Still another problem during discussion is when both the parties involved in discussion are not clear about the facts of the case or issue. This is done by

(a) providing more evidences to clarify the facts, and
(b) by relating the issues to other general facts accepted as true.

2.1.8 SOCIAL SYSTEM

Structure ranges from high to low:

To begin the discussion the teacher initiates and gives full leadership and directs the group work. Gradually the teacher allows and encourages more responses. At certain points the students become hyper active and to some traditional observers it may appear as if the class is out of control. But it is in these free moments that students get the opportunity to present divergent points of view, conflicting views and even aggressive postures. Occasionally
even confusion emerges but it is gently under control. If the teacher assertively brings the group under control she may be suppressing children's original creative and free responses. In order to maintain an open and achieving climate it seems better to allow some opening out.

2.1.9 PRINCIPLES OF REACTION

These become particularly important in the light of the possibility for conflict and even chaos indicated in the last paragraph when students begin to react freely and actively. On this account it is necessary to spell out how the investigator followed the principles of reaction in her transaction of JIM in the present experiment.

In the plenary sessions the principles suggested by Joyce and Weil were followed. But the investigator had anticipated a certain amount of confusion that could arise when independent and creative responses are encouraged and when steps are taken to ensure that mutual acceptance of emerging ideas by pupils should be real instead of excessive teacher control and pupil passively accepting teacher-imposed control.

In the beginning itself some norms were established in discussion with pupils about the principles to be followed in speaking, listening, agreeing, disagreeing etc. Classroom seating arrangement was made as far as possible according to the principles of balance between sociofugal and sociopetal arrangements - within the limitations imposed by the classroom structure and type of furniture available in the participating schools.

Everybody agreed to follow some order and control without curbing the freedom of those who had an idea and wanted to express it. Small group work is an addition over the original model. This gives the opportunity to every pupil to react. Some pupil may not participate at all and some others
may dominate in the whole group. Even such pupils may come out and act with moderation in small groups.

The investigator had earlier seen some cases of working with models where democratic participation was first encouraged, but soon landed in chaos. In many of such cases the researcher-teacher restored the 'discipline', sometimes with the help of the regular teacher. She had also seen some cases where the Socratic dialogue was 'set up'; the teacher and a handful of pupils participated but the majority of the other pupils paid only polite attention. Hence 'doctored' Socratic dialogue is avoided. Multiple responses are encouraged even simultaneous responses from pupils are tolerated in the early creative faces. But gradually the interaction was got under control. Joyce and Weil's suggestions and analytical insights, but deviations were made to take in to account the wide variety of issues and value conflicts embedded in the lesson.

2.1.10 SUPPORT SYSTEM

There are plenty of writings by environmentalists, feminists and by traditionalists available. Similarly rights, duties etc. embedded in the lesson are exclusively written in Social Studies texts and collateral materials. Actually many students are informed of these ideas. So even without reference at every point they participate intelligently expressing their ideas. However the transactions in a particular lesson stimulate the pupil to refer to some of these materials. So they can participate confidently in the whole as well as subgroups. This helps to bring out the most heterodox and creative responses of the pupil. While the teacher appreciates the creativity of the pupil it is important that simultaneous speaking of pupils makes it impossible to make what is being said. So pupils accept that some control of social behaviour is necessary only one person talking at a time, others being trained to listen what is said and then respond in an ordered way. Later small group work is also encouraged and then the results are pooled in the plenary
sessions. The students themselves set up rules to ensure that small group work and plenary session work with maximum efficiency.

2.1.11 DESCRIPTION OF THE MODEL IN ACTION

The figure given below presents the different aspects of JIM in action along with the bounded theoretical aspects.

![Diagram of JIM model](image_url)

Figure II. 1

2.1.12 THE SIX PHASES OF THE MODEL

The six phases in JIM à la Joyce and Weil are summarised below. Since the precise details of the steps revisited under Methodology (Chapter IV) along with how the investigator proceeded with reference to then present
experiment, the steps are stated very briefly in the general form, not necessarily related to the present JIM episode. This pre-statement is necessary for completion of the conceptual review.

2.1.12. 1 Phase One: Orientation to the case

In this, the teacher introduces the case to the students. Reading a story, a historical narrative, a filmed incident, some feature in the lives of the students, or community can do it. The case may be an incident or a feature, which projects a dilemma of value conflicts. The case may arise from a newspaper clipping, hypothetical incident or real incident, etc. It must have three parts - the first narrating the background, the second highlighting the dilemma, and the third putting before the students the requirement to resolve the dilemma. The highlights of the case are noted on the blackboard for further analysis.

2.1.12. 2 Phase Two: Identifying issues

This phase involves the following sub-steps:

Teacher is assured that the students have followed the case. For this purpose, questions pertaining to the case are asked. Students are asked to identify controversies in the case. The process of identifying public policy issues, i.e., the questions starting with 'should', is explained to them. This will help students to make explicit the different values in conflict. There can be more than one 'should' question, in a case. The teacher may help the students to identify as many cases in a public policy issue. The objective of all these is to place many ideas before the group and to encourage analytical thinking about the case.

When the teacher feels that many public policy issues have been mentioned, the student selects one public policy issue. The choice can be made by the help of the group or even by the teacher. The selected public
policy is written on the black board and the students are asked to identify values involved in the issue with respect to the case. The teacher may allow the students to identify as many values as they feel. The teacher asks the students to find out those pairs of values, which are in conflict. In this way many pairs of conflicting values can be formed.

The teacher again takes up the public policy issue so selected and finds out the words or facts or values that needed to be clarified. All these are defined such a way that the groups come to common definition. The objective of these steps is to help students develop a strong stand on the public policy issue.

2.1.12.3 Phase Three: Taking positions

In phase three, the students are asked to articulate positions on the issue and state the basis for their positions.

Now the students know enough about the case to take a stand. However, it is explained to the students that taking a position means choosing a solution to a controversial situation so that the values in conflict are balanced as evenly as possible. Also the students are reminded that they should be able to defend their choice of position by explaining to the group how their position reflects a sensible balance between conflicting values. After this exercise, the students are asked to write down their positions. Then two or three volunteers are asked to read their position and the reason for holding that position. The purpose of this exercise is to help students develop the most defensible position for the case. Also to make the students that no single student can be expected to have all the right answers.

2.1.12.4 Phase four: Exploring the stand

The teacher asks the student to summarize the activities followed so far by the group. Following this the teacher explains to the students that the case
would be argued with respect to the stand taken. The purpose of arguing the case is to refine the position on the controversial issue and develop support and justification for it. The students should develop the strongest position possible of the issue in question. For arguing the case the following steps are taken.

Thus the positions are explored. The teacher shifts to a confrontational style as he or she probes the student's positions. In enacting the Socratic role, the teacher (or a student) may use one of four patterns of argumentation.

1. Asking the students to identify the point at which the value is violated
2. Clarifying the value conflict through analogies.
3. Asking students to prove desirable or undesirable consequences of a position.
4. Asking students to set value priorities: asserting priority of one value over another and demonstrating lack of gross violation of the second value.

2.1.12.5 Phase five: Refining and Qualifying the Position

This phase often flows naturally from the dialogue in phase four but sometimes the teacher may need to prompt students to restate their positions. For that students states positions and reason for that position, examine a number of similar situations and qualify positions.

2.1.12.6 Phase Six: Testing the Position

This phase tests the position by identifying the factual assumptions behind it and examining them carefully. The teacher helps the students to check whether their positions hold up under the most extreme conditions imaginable.
This phase is concerned with the quick check of the assumptions, consequences and the relevance of the final position. The teacher asks any one of the students to list the assumption on which the final position is based. Later he may ask another student if the assumptions given by his peer are reasonable.

Finally, the teacher discusses the relevance of the issue to the lives of the students, parents, society, citizens in general, etc.

2.2 DISCOURSE ANALYSIS

It was explained in the Introduction that in order to make the working of JIM, the model is supplemented with some other approaches. Since value analysis, issue analysis, conflict of values etc., are done with language as the medium. Hence analysis of some of the discourse analysis procedures could help to refine the practical transaction of JIM.

Discourse analysis is the examination of language use by members of a speech community. It involves looking at both language form and language function and includes the study of both spoken interaction and written texts. It identifies linguistic features that characterize different genres as well as social and cultural factors that aid in our interpretation and understanding of different texts and types of talk. A discourse analysis of written texts might include a study of topic development and cohesion across the sentences, while an analysis of spoken language might focus on these aspects plus turn-taking practices, opening and closing sequences of social encounters, or narrative structure.

2.2.1 DISCOURSE ANALYSIS: HISTORICAL DIMENSIONS

The development of discourse analysis is historically linked to the study of the strategic aspects of discourse. In the context of the first European
democracy, in classical Greece, those people who had the rights of citizens needed to be able to make their own cases in courts of law, and the systematic study of speech-making and persuasion arose originally as the underpinning of practical education in oratory. The earliest Western analysis of discourse were those underlying the methods of Greek sophists, who taught people how to make effective speeches, and the theoretical discussions of rhetoric by Aristotle (in the Rhetoric), Plato (in the dialogue "Phaedrus" and elsewhere) and their successors (Kennedy 1980). The study of the larger scale choices involved in the design of discourse (choices about topic development, organisation, style and delivery) were the subject matter of education in rhetoric which has been part of the Western educational tradition, in one form or another, for its entire history.

Discourse is the means by which people makes things happen, people use discourse to persuade to cause others to act, to change the world. Because of this, conscious, strategic choice has often been stressed over other aspects of how discourse is shaped and interpreted. In school, for example, students have been led to suppose that anyone, in any situation, can be eloquent and persuasive if he or she knows how to design discourse effectively. This focus on strategy was also characteristic of twentieth-century Saussurean linguistics, the immediate disciplinary context for linguistic discourse analysis, which developed in large part out of the concerns of philologists who studied literary texts.

During the old Greek period there were two public gymnasia, the Academy and Cynosarges, erected toward the opening of the sixth century B.C., outside the city walls. Here in the midst of beautiful groves and extensive gardens or parks, the son of pure Athenians at the Academy, others of mixed blood at the Cynosarges, passed two years in free association with elders and in physical contests and social political discussions that prepared from the life of the Athenian citizen.
Discourse study is the study of the situational uses of the potentials of language. Discourse is constituted by "text." Discourse is therefore characterized by individuals acting in a special time and place (Gardiner, 1932); it has a beginning, a middle, a closure, and a purpose; it is a language process, not a system and it has an "undivided and absolute integrity", it establishes a verbal context and it has a situational context and cultural context. These attributes are characteristic of Gardiner's "speech", Pike's "uttereme", Hjelmslev's "text", and Salama Cazacu's "context". In each case there is the stress on the whole, not just the isolated linguistic part. Discourse, therefore, is determined by the existence of a complete text. The definition of discourse, while consistent with the view taken of it by the tradition and some modern philosophers are larger than that advocated by some linguists, who, define discourse in terms of anything beyond sentence.

The contribution of the post-modern Discourse Analysis is the application of critical thought to social situations and the unveiling of hidden (or not so hidden) politics within the socially dominant as well as all other discourses (interpretations of the world, belief systems, etc.). Discourse Analysis and critical thinking is applicable to every situation and every subject. The new perspective provided by discourse analysis allows personal growth and a high level of creative fulfilments. No technology or funds are necessary and authoritative discourse analysis can lead to fundamental changes in the practices of an institution, the profession, and society as a whole. However, Discourse Analysis does not provide definite answers; it is not a "hard" science, but an insight/knowledge based on continuous debate and argumentation.

The basic signals of discourse are texts, which are spoken, listened to, written, or read. These divisions are determined by the kind of sense signal used (oral or written) and the operations of either encoder or decoder. More relevant to the domain of discourse as discourse is an answer to the question of what a thing is about.
Discourse Analysis is generally perceived as the product of the post-modern period. The reason for this is that while other periods or philosophies are generally characterised by a belief-system or meaningful interpretation of the world, post-modern theories do not provide a particular view of the world, other than that there is no one true view or interpretation of the world, that the world is inherently fragmented and heterogeneous, and that any sense-making system or belief is mere subjective interpretation - and an interpretation that is conditioned by its social surrounding and the dominant discourse of its time. Post-modern theories, therefore, offer numerous readings aiming at "deconstructing" concepts, belief-systems, or generally held social values and assumptions. Some of the most commonly used theories are those of Jacques Derrida (who coined the term "deconstruction"), Michel Foucault, Jacques Lacan, Julia Kristeva, Lyotard, and Fredric Jameson (this extremely brief listing of a few critical thinkers is neither comprehensive nor reflecting a value judgment; these are merely some of the most common names encountered when studying post-modern theories).

Numerous other theories or "readings" exist and the bibliography and list of links will provide further information to allow you to chose the most relevant or appealing to you. The bibliography of preparatory reading to the Module "Critical Theories" of the University of Wales Swansea might also be helpful.

Discourse or Critical Analysis always remains a matter of interpretation. As there is no hard data provided through discourse analysis, the reliability and the validity of one's research/findings depends on the force and logic of one's arguments. Even the best-constructed arguments are subjected to their own deconstructive reading and counter-interpretations. The validity of critical analysis is, therefore, dependent on the quality of the rhetoric. Despite this fact, well-founded arguments remain authoritative over time and have concrete applications.
Again, the purpose of Discourse Analysis is not to provide definite answers, but to expand our personal horizons and make us realize our own shortcomings and unacknowledged agendas/motivations - as well as that of others. In short, critical analysis reveals what is going on behind our backs and those of others and which determines our actions.

Throughout history, several terms have been used for the kinds of discourse to be studied in this chapter: rhetoric, oratory, persuasion, eloquence, elocution, and propaganda. The term most consistently used throughout history to refer to a study of persuasion was “rhetoric”. Etymologically, “rhetoric” was the adjective coming from rhetor, a speaker. Rhetoric, as an art is often said to have started in Sicily with Corax and to have spread to Greece with his disciples. Corax defined rhetoric as the art of persuasion. However, this quickly took on at least three quite different meanings, and rhetoric today still has these three basic meanings- stylistic, Aristotelian, and the communication approaches. All three have traditions through Western civilization. In a sense the first is a quite narrow view of rhetoric, the second wider but limited and the third a very broad view embracing nearly all discourse.

The justification for persuasion seems even more urgent today than in the Athenian democracy after Pericles. Rhetoric, finally, is necessary because man is not a creature with just an intellect. Rhetoric is necessary as long as man is a being with a body, with emotions, and with persistent character judgments. It would indeed be a cold and forbidding cosmos in which rhetoric did not exist. Literature and love among other things, would not find entrance there in, for rhetorical structures are among the most important tools of the dramatist, the poet, the novelist and the lover. For the ordinary person who rarely breathes the pure atmosphere of science or dialectic, the air of this universe has a heavy dose of rhetoric in it.
A persistent view of rhetoric is the Aristotelian. For Aristotle, rhetoric is not simply a matter of style. It involves, in fact, a special kind of thinking with a distinctly limited range of applicability. Aristotle restricted rhetoric to the kind of persuasion which he saw exemplified in the political speeches, informal legal pleadings and the ceremonial speeches of praise or blame in the festival or funeral oratory. Possibly the easiest way to define persuasive discourse is to point to obvious examples of it. Thus, it has been pointed out several times that political propaganda, religious preaching, and advertising are clear examples of persuasive discourse. From Aristotle to modern propaganda analysts like Harold Lasswell, legal pleading has been classed as one of the main categories of rhetoric discourse. But, of course, there are many other instances of persuasive discourse in ordinary life: safety warnings, education to citizenship or honesty. Persuasion was defined as discourse primarily focused on the decoder. This is one of the Aristotle's characteristics. Kenneth Burke also stresses the importance of the addressee in rhetoric; the decoder is presumably, divided in attitude from the encoder; otherwise there is a point of persuasion. Thus the purpose of persuasion is to achieve identification of speaker and hearer, according to Burke.

2.2.2 CONSEQUENCES OF DISCOURSE ANALYSIS

The study of discourse has developed in a variety of disciplines—sociolinguistics, anthropology, sociology, and social psychology. Thus discourse analysis takes different theoretical perspectives and analytic approaches: speech act theory, interactional sociolinguistics, ethnography of communication, pragmatics, conversation analysis, etc. (Schiffrin, 1994). Although each approach emphasizes different aspects of language use, they all view language as social interaction.

One of the achievements of post-structuralism is the radical way in which it has placed discourse analysis at the heart of the social-scientific endeavour. Its consequences for disciplines as diverse as anthropology, history, law;
social psychology, sociology, etc. have been enormous. For instance, post-structuralist logic advocates the view that "historic facts" or "legal facts" are discursive constructions. As a consequence, scientific historic writing falls within the scope of, say, narrative analysis, while judicial decisions can be viewed as outcomes of discursive practices which are socio-historically contingent (in this respect, post-structuralism shares a number of characteristics with conversation analysis and ethnomethodology - despite obvious differences in the underlying assumptions). Needless to add, a "truth/rationality"-crisis has been one of the effects.

Text linguists exponents have drawn attention to the various linguistic devices that can be used to ensure that a text "hangs together" (cf. the concept of textual cohesion). Such devices include the use of articles, lexical repetition and personal pronouns to refer back to entities mentioned earlier in a text and the use of linking words to establish a particular logical relationship of, say, contrast, concession or addition between two or more sentences in a text and the study of how sentences functionally interrelate within particular rhetorical schemata (e.g. types of textual sequencing such as top-down and bottom-up methods of proceeding).

Texts are divided into five functional types: argumentative, narrative, descriptive, expository and instructive. In some versions of this theory, the five types tend to be viewed as textualisation-strategies.

Post-structuralist thinkers conceive of the social space (organisations, institutions, social categories, concepts, identities and relationships, etc.) and the world of material objects as discursive in nature. This claim, also commonly known as there is nothing outside the text, has often been misconstrued, as if it would entail an idealistic denial of the existence of the material world.
Since the basic text under analysis has ecologism as its central theme statement such a statement coming from competent linguists is encouraging, since it is clear that they too do not consider discourse analysis as an empty exercise, but as having positive values for social living and transaction. Now we proceed to some major concepts and constructs:

Post-structuralist theory is conventionally (and, at times, almost stereotypically) associated with the work of Michel Foucault, Jacques Derrida and Jacques Lacan. Another name that stands out is M.M. Bakhtin. Although he is not a post-structuralist in the strict sense of the term (his writings date from the first half of the previous century), his work became very influential within Western Europe through the post-structuralist movement (from the late sixties onwards). Key-terms associated with the work of Bakhtin include *dialogicity* and *heteroglossia*. Michel Foucault is often called a philosopher and a social theorist, sometimes a historian and a literary critic, but also a post-structuralist thinker. One can see these identities merge into a single project, at least, if we can agree to call him "a critical historiographer of the humanist discourses of modernity". For Foucault, the humanist discourses of modernity are knowledge systems, which inform institutionalised technologies of power. Foucault's main interest is therefore in the origins of the modern human sciences (psychiatry, medicine, sexology, etc.); the rise of their affiliated institutions (the clinic, the prison, the asylum, etc.) and how the production of truth is governed by discursive power regimes. The latter, however, should not be understood exclusively in "language"-terms (cf. the attention he pays to the power-dimensions of the ways buildings are designed). Foucault's work can be divided into three stages: archaeology, genealogy and post-modern ethics. Note that the first two stages involve a metaphoric reading of a particular sub-discipline of history.
This progress is through definitely recognizable stages, each with its appropriate formulation of educational ends, means, and methods. It is in this tracing of this process as well as the analysis of the conditions actually attained that there lies the value of the study for guidance in our own educational activities.

One could, however, make use of the theories of Jacques Derrida, Michel Foucault, Julia Kristeva, or Fredric Jameson, as well as of other critical and post-modern thinkers. Discourse Analysis can be applied to any text, that is, to any problem or situation. Since Discourse Analysis is basically an interpretative and deconstructing reading, there are no specific guidelines to follow.

2. 2. 3 JURIDICAL-LITERARY EDUCATION FROM RHETORIC

The rhetorical and oratorical schools gradually got systematized as the school system, which provided both general-literary education and juridical education.

In Greece, education in the use of language came only after physical and musical education. It crystallized fairly early into three distinct stages, which can, with some distortion, be roughly paralleled to our elementary, secondary and college education. Since Rome almost bodily adopted most of this framework with a few adaptations, which will be pointed out, the two will be considered simultaneously.

- Secondary schools "were essentially literary schools" in which the teacher (grammaticus) taught the elements of literary analysis. In Greek the secondary teacher was sometimes called a kritikos (critic). This literary study was primarily intended as a preparation for the main function of education - the composition and delivery of speeches in rhetoric, the function of higher education. The secondary school was permitted to encroach upon this territory by having the students
do some preparatory composition exercises (progymnasmata). Only fairly late in Greek culture was what is now called “grammar” put into the secondary curriculum (on all of this. In new Greek education the sophists—the students—were of affairs who through wide travel and contact with Grecian and Oriental life in many centres had picked up the current learning concerning natural forces and phenomena, political life, social institutions, popular questions of the day, especially those concerning principles of conduct and morality. Possessing a rhetorical power in formal debate and private discussion that was a result of a training and experience, neither of which were to be obtained at Athens, these men quickly secured attention, built up a great reputation and through their willingness and ability to impart this knowledge and the rhetorical training its use, they soon came to exercise a tremendous influence in Athenian’s life.

But the Sophists—the new class of teachers have long been considered as teachers of immortality who were responsible for the disintegrating tendencies in Greek thought and the demoralizing tendencies in Greek life in the period we are considering now.

To be sure many of them gave merely a formal training that often consisted in furnishing their pupils with set speeches upon given topics to be repeated upon definite occasions, such as trials before the courts, or with smart saying and fragmentary information to be used whenever chance opportunity offered. Many, on the other hand, gave a more consistent and thorough course in the study of questions of the day and in the rudimentary natural, and historical sciences of the times and a training in dialectic power through discussion and in rhetorical power through public speech.

Systematic higher education began as a device for military training around 320 B.C. and continued well into the third century A.D. These colleges (ephibia) spread through out more than 100 Hellenistic cities. The student
entered at fourteen or fifteen and continued for several years. Two ideals dominated the college, the speechmaker and the debater. In a real sense they can be said to be the legacies of Isocrates and Plato, respectively. The first dominated all higher education in Greece and Rome. Historians are quite specific on the stylistic view sees rhetoric as a group of linguistic techniques by which one can ornament thought. Throughout history the list of these techniques for ornamentation became longer and longer. Because these techniques were early classified as either figures of sound, or figures of meaning, this view of rhetoric, is sometimes called “figurist” (Corbett). These figures include such techniques as hyperbole, synecdoche, simile, antithesis, insinuation, rime (initial and end), repetition, and so forth. Because many of the early sophists held this position, it has also been called the “sophistic” view of rhetoric.

Thus the present study is developed on the above conceptual basis.

2.3 ENVIRONMENTAL EDUCATION

In Bhumiye Avaksaka, the criterion text used to trigger the JIM debate, the surface dialectic is between the legal right of a man who has bought a land and the conservation rights of the primordial inhabitants of the geosphere. But underneath this surface debate, the issue of Environmental Education (EE) also seems to be embedded in subtle ways. Hence it was felt that a review of the major conceptualisations in modern environmental education would enrich the perspective in analyzing the issues involved in the criterion text, though the process may go beyond the Joyce and Weil steps. Some of the great national leaders, particularly Tagore and Gandhiji, have contributed to Environmental Education from Sriniketan, Santiniketan, Wardha and elsewhere. From the time of the Stockholm Conference on the Environment (1972), international attention too has been attracted towards this issue. Though falling within the purview of Education for the
Environment, Animal Rights Awareness is spelt out separately because Vaikom Basheer's text started with this issue and developed it into a value conflict stance, which precipitated the present JIM study.

This section is therefore divided into four subsections: Animal Right Awareness, Education for and through the Environment, Dialectic between Development and Environment, Tapping formal Educational components through the Environment.

2.3.1 ANIMAL RIGHTS AWARENESS

Animal rights in the earthly habitat have been pleaded eloquently by litterateurs, philosophers, scientists, humanists, pacifists and environmentalists all over the world. The Kerala Forest Department Publication on Silent Valley (Manoharan et al (ed), 1999) makes out its case for conservation through several scientific studies, but what is most appealing is their presentation of the pictures of a number of animals, big and small, which would have perished if a major developmental intervention programme had been launched in the valley. But do the animals have a right similar to that of men's legal rights?
The affirmative position was tacitly accepted by the investigator while taking Bhūmiyute Avakāśikā as the criterion text for JIM. But explicit justification of animal rights of a legal nature came to the investigator's notice after the submission of synopsis and before the submission of thesis, from an unexpected source.

Alliance Française Trivandrum had acquired in May 2005 a small but precious book from the point of view of this research, entitled *The French Foundation League for the Rights of the Animal: Its History, Its Work* (La Fondation Ligue Française des Droits de l'Animal: Son Histoire, Son Œuvre). The animals themselves may not be able to go to court to defend their rights. But agencies are developing at national and international levels to fight for their rights at several forums, including law courts. Incidentally this recently discovered friend validates the case of Vaikom Basheer in writing this text with prophetic foresight, though disguised in a humorous vein and the present investigator's decision to use this as the criterion text for testing JIM.

Suzanne Antoine and Jean-Claude Nouet (2003) have traced in this work the history and work of The French Foundation League for the Rights of the Animal. They have made out that the Foundation League for the Rights of the Animal (hereafter called the Foundation) has a double mission: (1) to spread the ideas favourable to animals; (2) to effectively work towards a juridical plan so that these ideas are translated into law.

The work presents the articles inscribed in the statutes of the Foundation to accomplish the double mission. It also traces the history of the cause of the
Rights of Animals, citing from or referring to the Code of Hammourabi (Babylon) early in the second millennium BC, the ideas of Pythagoras, Plutarch and Porphyries, the positive references to animals in the Bible, and the later writers such as Montaigne (1533-92) and Jeremy Bentham (1748-1832). The work also traces the movements, which worked for this cause such as the Society for the Prevention of Cruelty to Animals, and several such societies in France and elsewhere.

Following the arguments of the philosopher Peter Singer, the philosopher Tom Regan formulated *The Case for Animal Rights* (1983). The International League for the Rights of Animals was founded in Geneva in 1976. On 15 October 1978, the Universal Declaration of the Rights of Animals (*La Déclaration Universelle des Droits de l'Animal*) was proclaimed in the Assembly of UNESCO before 2000 distinguished persons. The articles of the Declaration are cited in the work followed by a very scholarly and committed discussion.

Many of the analysis and studies analyzed in the second section on Education through the Environment, also have an animal rights awareness component, but because of their integrated approach they are presented as a separate section.

Greening the environment and Ecotourism are trends gaining favour all over the world. Most nations in the world are developing nature parks and wild life sanctuaries to conserve nature including the soil, fauna, flora and other aspects.

Wild life clubs are very popular in Africa. In Kenya there is an association of 225 individual clubs with a total of over 11,000 members, drawn from secondary schools, teacher training colleges, and related institutions. Activities are organized both at individual clubs level and national level. Discussions on conservation and related topics, field trips, construction of
own museum and bird-feeding tables, organisation of seminars in National Parks or Reserves, game watching, bird watching, lectures and film shows are typical activities of the clubs. Similar activities are organised in the wildlife clubs of Zambia also. (Ananda Bose 2005)

2.3.2 EDUCATION FOR AND THROUGH THE ENVIRONMENT

The EE areas covered in the next three sub-sections may be revisited in Chapter III. The demarcation may roughly be on the following lines. The studies or analysis where the conceptual components predominate are placed in this chapter (Conceptual Review), and those where there is a clear empirical component the placement is in the next chapter, Review of Related Study.

Some exponents of Environmental Education (EE) make a distinction between Education for the Environment and Education through the Environment, and attempt to classify the studies along those lines. But the contribution of some environmental educators is integrative – it is difficult to factorize them as ‘for’ studies and ‘through’ studies. Tagore, Gandhiji and the crusaders for the Conservation of the Silent Valley and its inhabitant species have been upholding simultaneously the cause of education for and through the Environment.

2.3.2.1 Modern Indian thinking on EE has been triggered by the greatest national leaders. Tagore stresses education in nature through direct and first-hand experience. Education “divorced from the streams of life and confined within the four walls of the classroom” becomes artificial and loses its value. Tagore continues, “The young mind should be given an idea that it had been born in a human world, which is in harmony with the world around it. This is what our traditional schools ignore. They forcibly snatch away children from a world full of the mystery of God’s own handwork, i.e., Nature.
Tagore’s institution - “Shantiniketan” - has extensive open spaces, natural environments and atmosphere of joy and freedom, where natural capacity and abilities get expression. It is in such healthy and natural surroundings that physical, moral, intellectual and spiritual development takes place.

2.3.2.2 According to Gandhiji, education is both ‘for’ and ‘through’ life. “Education covers the entire field of life”, Gandhiji said, “There is nothing in life, however small, which is not the concern of education”. Gandhiji believed that the whole education of the body and the mind and the soul can be imparted through selected, useful handicrafts like Agriculture and Gardening, Spinning and Weaving and Wood and Metal work. They have been proved by experience to be most suited for children of basic school age, and most valuable for developing intelligence and general knowledge, and most adequate to serve as the chief centre of correlation for the “tool subjects” of language and mathematics, and for the study of general science and a considerable amount of social studies.

The argument for drawing out the academic components of the curriculum had to be emphasised in arguing the case for basic education because the academicians as well the general populace and most teachers felt that if integrated teaching is attempted, academic standards will fall. To counter this Gandhiji replied through his own proved experience even as an informal school teacher. He claimed that he could teach the whole of Euclidean geometry by correlating it with the charka.

But academic learning, to Gandhiji, was only a minor aspect of education. The more important thing is realisation of one’s best self, moral character, simple living, living in peace not only with all mankind, but with all creatures and commitment to national and spiritual values, of which truth and non-violence have an important part to play. In fact the stand taken by the protagonist in Bhāmiyāye Avakāśika echoes the philosophy and value system of Mahatma Gandhi.
2.3.2.3 In 1957, Dr. G. Ramachandran in his report on the Assessment of Basic Education, brought out an important insight. The craft is not to be an isolated and mechanical activity. It is the meeting point of the natural and social environment. Thus basic education was in essence education organised in relation to the natural and social environment of the child, approached in a productive way. The Gandhian education institute founded and developed by him in Gandhigram, Tamil Nadu is an embodiment of this principle. Dr. T.S. Avinashilingam who has been conducting a productive, environmentally sensitive, social reconstruction-oriented institution from 1934 also gave an impetus to the broader concept of basic education.

2.3.2.4 One of the most outstanding among the integrative EE studies is related to the Conservation of the Silent Valley [Manoharan et al (ed) (1999), Silent Valley: Whispers of Reason. (Thiruvananthapuram: Kerala Forest Department in Association with Forest Research Institute, Peechi, Trichur dt.) In the Foreword, Prof MGK Menon traces the history of the events which led to the deep study commencing in the early 1980s and the ‘Save Silent Valley Campaigns’.

Silent Valley was declared a National Park in 1984. Study connected with the book under review commenced to commemorate the tenth anniversary of the event. The first article is by Dr M.S. Swaminathan entitled “Silent Valley National Park: A Biological Paradise”. He had visited Silent Valley in 1979 when he was Principal Secretary, Union Ministry of Agriculture. He summarises the case made out by the Kerala Government for the Silent Valley.
Valley Hydroelectric Project. Then he summarises the arguments of the Scientists, Newspapers, Friends of the Trees and enlightened organisations like Kerala Sastra Sahitya Parishad, pleading the case of the fauna and flora in the Valley. The arguments are summarised under four heads: (1) Last chance for preserving an undisturbed rain forest; (2) Uniqueness of the flora and fauna endemic to Silent Valley; (3) The dangers of alterations in the macro-environment; and (4) 'Point-counterpoint' refuting the points made out by the pro-Hydro-Electric Project group.

This is followed by “Silent Valley – A Case Study - by Sugatha Kumari of Prkrti Samrakshan Samithi. She also summarises the arguments for and against, particularly highlighting those who fought to save the valley and its habitants from destruction. Rather than summarising her arguments, it would be more appropriate to capture the spirit of her love of nature through two citations. In the course of the paper she cites Dr Salim Ali: “Silent Valley is not just an evergreen forest, it is a very fine example of one of her richest, most threatened and least studied habitats on earth.” It is best to conclude the review of Sugathakumari’s paper by citing her first paragraph:

One falls in love with a forest. It happens easily, spontaneously; that love deepens, sends its roots deep into one’s being. It begins to hurt, leads to anguish and despair when one knows that the very existence of the beloved is threatened. A fight unto death alone brings relief. That was what happened to many of us in Kerala who got involved in the Silent Valley controversy.
Beetles are a macrophotographer's delight. A giant jewel beetle (*Sternocera nitidicollis*) shows off its scarlet elytra.

**Mrinalini Sarabai** appeals to “Give the Young Ones a Better World.” She opens with the words: “It is in silence hat one shall work. But I am happy that we did not remain silent when Silent Valley was facing threats of destruction. And the silent, solid friendship among those who stood up for the Silent Valley cause can never be broken.” She recalls the CHIPCO movement where simple village people, men and women, sacrificed their lives and saved the trees. She goes on to add:

Preservation of environment does not mean only preserving trees, animals and nature but also preserving its value within ourselves...Only non-violence can resist the growing violence in the present world...If we truly believe in non-violence we can't be violent even to a flower ... Preservation of environment really begins within ourselves. We should be environmentally aware of what is happening inside our own minds and souls.

Among several other treasures in the Silent Valley Collections, MK Prasad’s (Kerala Sastra Sahitya Parishad) “Silent Valley Crusade” is followed by K. Jayaram’s “A Photonaturalist in Silent Valley” which presents the most attractive pictures with a high aesthetic as well as scientific appeal.
A terrestrial orchid opens in a clash of red and yellow. The greenish beetle is a regular visitor to this amphora-shaped orchid.

While the dancer Mrinalini brings out the philosophy and spiritual dimensions, scientists have not only analysed and described the fauna and flora which faced extinction, but some have also shown extreme sensitivity to the dance of the animals and plants. Poets and orators of the calibre of Sukumar Azhikode, Ayyappa Panickar, Vishnu Narayanan Namboothiri, Kadambanitta Ramakrishnan, K. Velayuthan Nair and N.V. Krishna Warrior participated in this successful conservation dialogue.

2.3.2.5 Among the many case studies documented in Saveland (ed), many refer to Education for the Environment. Just one is reported here. Canberra City developed a captivating acronym INSPECT (Inquiry into the State of Pollution and Environmental Conservation by Thoughtful people). In this programme a public symposium or ‘teaching’ is held as a culmination of many weeks research by high school students on environmental issues.

2.3.2.6 C.V. Ananda Bose (1985), in his capacity as District Collector became aware of the pollution that degraded Sasthamcottah Lake and set up the Sasthamcottah Lake Protection Committee whose work soon snowballed into a movement for the protection of fresh water sources all over the state and triggered off a series of schemes and projects for conservation of water in the rural areas of Kerala.

The Sasthamcottah Lake Protection Project (Project Water save) was formally launched in 1985 by undertaking the following activities. To create
awareness in the public of the need and importance of protecting the local sources of drinking water, a campaign was launched involving opinion leaders, cultural leaders such as poets, painters, sculptors, decision makers such as legislators, government officials, local self government institutions like Panchayats and municipalities, NGOs, CBOs, students, youth and women. Poets composed poems about the lake, painters painted the waterscapes and the futurescapes of the lakes. Women's organizations campaigned from house to house and the media propagated this as the people's upsurge for protection of their drinking water sources.

Awareness was also created on the need to conserve the environment and biodiversity around the lake. The lake had to be protected for the present and the future. Scientists were repositioned to conduct limnological study and research and suggest ways and means to conserve these unique water bodies. The people got awakened and they worked hand in hand with the officials to protect and preserve the lake. A 'vanamala' or garland of trees was raised around the lake. Isolated patches which had degraded through soil erosion were brought under cluster planting under the project 'Panchavadi'.

An action plan was drawn up after the campaign for the protection and conservation of the lake. The highlights of the action plan include:

- Planting of trees around the lake to raise a permanent green belt
- Adopting measures for abatement of pollution such as treating waste water from domestic and community sources.
- Making available alternative sources for bathing and washing clothes.
- Introducing vermicompost to replace chemical fertilizers
- Desilting to reduce the sedimental load to the lake
- Weed control within the lake
- Conservation of flora and fauna

- Creating community management groups for implementation and monitoring of the action plan.

- Capacity building at grassroots level in scientific water management

Along with the protection of the lake it was also decided to identify the local sources of drinking water such as springs, tanks, ponds and wells and take measures for their conservation. This move later helped to formulate a new model Tourism Development Promotion Council, who was later adopted in all the districts in Kerala and also got nation-wise attention.

2.3.3 DIALECTIC BETWEEN DEVELOPMENT AND ENVIRONMENT

The presentations in this subsection denote a resolution between opposite poles. It will be seen that there is an inherent value conflict between environmentalism and development in their extreme forms. In real practice an optimal resolution is arrived at. Science is involved in the analysis and investigation of the physical parameters of both environment and development. When the conflict is noted the resolution is arrived at as a result of a JIM even in real life. Since it is science in its technological dimension that precipitates the conflict, a counterpoint of two models would be most relevant to resolve such cases: STS (Science-Technology-Society) – not in Joyce and Weil’s list – and JIM. One such paired model study is reviewed in the next chapter. It will be made clear with evidence that Joyce himself is not against such pairing.

The Environmental Education dialogue following the Stockholm, Belgrade and Tbilisi Conferences raised several forms which EE takes. In this section it would be appropriate to analyse cases where they are set as opposite poles and attempt made to resolve the conflict.
2.3.3.1 Sachs (In Saveland (ed) 1976), Director of the International Centre for Research on Environment and Development, has examined the theme of 'Environment and development - Key Concepts for a New Approach to Education': The radical ecological movements preach a self-imposed frugality. The industrialists and developers on the other hand attribute the growth of awareness about the environment to middle class sensitivity, a kind of reactionary neo-Romanticism deliberately ignoring the real unsolved problems of industrial society such as social inequality, racial discrimination and structural unemployment. The Stockholm Conference took a midway position between unrestrained development and the zero growth stand. The challenge is to find out "how to harmonise economic and social goals with ecologically sound management of resources and the environment". Sachs advocates an "ecologically prudent management of resources and the environment ... If there seems to be no justification for radical ecologism, there is still less reason for run-away economism. Control over economic growth is necessary in order to avoid over-spilling the limits and triggering off irreversible climate alteration processes lethal to man or exhausting the resources essential to his survival."

The ecologist is concerned with handing on to future generations a habitable planet; the economist is interested in putting it to immediate profit. This results in a conflict. Solution is sought in the use of solar energy in all its forms, renewal and recycling in the place of indiscriminate use of non-renewable resources like fossil and nuclear fuel, social control of technology to prevent environmental degradation, appropriate technology not limited to rural technologies alone, and the management of technological pluralism as an indispensable component in developmental strategy. The ecodeveloper takes a midway position between zero growth and indiscriminate exploitation of nature for immediate profit. He will not hesitate to alter nature, but while doing so, he will try to imitate and respect the laws of nature. While tapping renewable resources, he will strive to maintain the condition of their renewal. Ecodevelopment is thus a planning approach 'which carries over into both
cultural anthropology and ecology. Thus a new field cultural ecology emerges which seeks to synthesise the individuality of ecosystems, the uniqueness of cultural contexts and the many possible paths of development.

2.3.3.2 A very interesting case dealing with politico-ethical issues is given by J.P. Shaver and A.G. Larkin. This involves usage of definitions (meaning of clean air and clean water, emotional loadings in language), and value issues (conflict between values such as economic programmes and environmental quality) which are relevant for arriving at reasonable policies. *Newsweek* has presented a Socratic Discussion on “Delawere: Nature over Industry”. The positions of students favouring a law banning new coastline industry and those opposing such law are brought into a dialectic in this approach. Joyce and Weil have classified this approach under JIM.

2.3.3.3 Professor **M S Swaminathan** and the de facto development educators collaborating with him organised a very useful debate in their Institute in Chennai, centred around the concept of **ecotechnology** and rural employment. Ecotechnology itself is a concept which presents a dialectical resolution between exploiting technology for development, and doing minimum damage to the ecosystem. Swaminathan is firmly convinced that “Only the human intellect can help us to convert calamities into opportunities”. Some papers and points of view presented in the debate are summarised below:

2.3.3.3 a **Jian Song** from China, elaborating the proposition by Dr. Swaminathan in 1990 says: Development which is not equitable will not be sustainable, and a better common present is essential for a better common future ... Sustainable productivity is the only way to eliminate poverty and to make rural people wealthy ... There are two-fold responsibilities that confront the scientific community in developing countries: to search for and develop new science and technology, and to blend them with the wisdom of the
indigenous people to form a complete chain of technologies, for rural people to raise their productivity; to diffuse and propagate scientific and technological knowledge, foster and train environment-friendly entrepreneurship among rural people, particularly the youngsters.

2.3.3.3 b Bezanson brings out the close connection between poverty and environment degradation and quotes Sir Shridath Ramphal:

Poor people often destroy their own environment - not because they are ignorant, but to survive. They overexploit thin soils, overgraze fragile grasslands, and cut down dwindling forest stocks for fire-wood. In the context of short-term needs of survival, each decision is rational; in the longer term and wider context, the effects are disastrous...Poverty is both a cause and an effect of environmental degradation. In the end, however, the 'greening' of technology can, at best, buy us a little more time, can serve as 'necessary' condition to sustainability. The 'greening' of the public mind is the ultimate prerequisite to dealing with the real obstacles, which are psychological, social, institutional and political ... This calls for a new paradigm, one in which the process of technological change will be led by attention to social, political, structural and economic issues."

2.3.3.3 c Much of the discussion centred round the biovillage where the principles stated above and those which follow are to be applied. Heiter Gurgulino DeSouza highlighted the importance of the Three E's: Economics, Equity and Ecology:

A core challenge to sustainable development is the attainment of sustainable agriculture - which means productivity and the income of the poor 'without irreversibly despoiling the planet's critical life-support system'. He emphasised that much of the environmental degradation we witness - soil erosion, deforestation, loss of genetic strains - is a result of widening and desperate search by the poor for food and fuel.

2.3.3.3 d Bhalla discussing Scientific Research And Technology Blending observed that "To some extent one can argue that technologies are environment-friendly if they save energy, if they are less polluting and if they are resource-conserving ... they must be economically efficient too."
2.3.3.3 e Saleth called attention to the environmental impact matrix in evaluating technologies: "We take the technology, evaluate its impact on economics, on ecology, on equity."

2.3.3.3 f Joan Holmes pleaded for development policies with a pro-women, pro-poor and pro-nature bias. Lin Zhibin continuing on what Joan Holmes said about training and education said: "It is a two-way communication, not just giving technology from the point of view of a trainer. We have some experience in the rural areas. The farmers are poor but they are not stupid. They know what they are doing. So, we think the new way to train is the Participatory Training Approach."
Bezanson commented, "Control of the transformation itself, whether it is in bioengineering, biotechnology or microelectronics, is being brokered by a small range of participants; and of course, invariably they are entrepreneurs, private sectors and capitalists".
Swaminathan concluded that "blending traditional and frontier technologies is an essential component of ecotechnology... If we are to help attack the famine of jobs, it is essential that we preserve the employment intensity and ecological strengths of traditional technologies and enrich them with the consumer and market value of modern technologies. The PRATO experiment in Italy shows how this can be done."

2.3.3.3. g Ashok Khosla discussing "Ecosystem Health: Land And Water" said that it must be more equitable, more efficient and more ecologically sound, and more indigenous. He described the experiment that his group had done on biomass production. He was of opinion that "Structures of small scale water management unit, little dams, which do not compare with Narmada dam, can have a huge effect; not only on the local people but on the water table, on hydrological regimes". While favouring the small enterprises he remarked, "Much more interesting is the Gandhian component, local economy component, in which the amount of money that
stays within that economy is usually two to three times higher than in a large-scale enterprise".

2.3.3.3. Dr. Swaminathan, in the introduction of the session on Biodiversity And Ecotechnology, pointed out that diversity is the very foundation of all life, whether cultural or biological. In his paper on Biofertilisers, Kenneth Frey expressed his concern “about the fact that we are losing germplasm from the plant species ... The other thing ... is that, (plants) in capturing energy from the sun are what stand between us as human beings and extinction".

2.3.3.3 While talking on Biofertiliser And Biopesticides Technology For Sustainable Agriculture And Rural Development, Jayaraj said, “In ecological agriculture, manuring and fertilization should be an activity with long-term approach centring around the limitations and possibility of the soil”. On the pesticide scenario he explained integrated pest management: “It is an environmental-based pest control strategy offered as part of an overall crop production system”. He further enumerated the main advantages of biocontrol agents: “that they are least disruptive to the ecosystem, safe to the other flora and fauna, and compatible with other methods of control and offer permanent solution and long-term results.”

2.3.4 TAPPING FORMAL EDUCATIONAL COMPONENTS THROUGH THE ENVIRONMENT

The major conceptualizations and innovative practices and matching researches that followed from the three major UN conferences on Environmental Education (EE) - Stockholm (1972), Belgrade (1975) and Tbiasili (1977) - relating to education through the environment are summarized here.
2.3.4.1 Preliminary experiences leading to definition

According to the definition put forward and agreed under UNEP/UNESCO auspices, Environmental Education is "a permanent process in which individuals gain awareness of their environment and acquire the knowledge, values, skills, experiences, and also the determination which will enable them to act - individually and collectively - to solve present and future environmental problems".

The important events in the environmental movement started from the Imperial Forest Institute established in Stockholm (1972). The need for being rooted in a 'home environment' from which a scale of expanding awareness will develop - territoriality, communality, motherland and Mother Earth – is the basic starting point.

Cerovsky's definition forms a convenient starting point of the analysis: "Environmental education is the process of recognising values and clarifying concepts in order to develop skills and attitudes necessary to understand and appreciate the inter-relatedness among man, his culture, and his biophysical surroundings. Environmental education also entails practice in decision-making and self-formulation of a code of behaviour about issues concerning environmental quality."

Environmental education is a philosophy, a valutative and affective stance, a mode of inquiry, a way of progressively developing conceptual structures, cutting across disciplines and an instructive community. It is a way of approaching even the narrow tasks of schooling in a more interesting and meaningful way, it is an effective bridge between the school and the outer world; it is a way of envisaging and seeking to build a worthy future world.

Two of the major points of view in UN conferences on EE are now stated:
2.3.4.2 Johnson traces the stages through which awareness of 'International co-operation for environmental education' has developed. The Stockholm Conference (1972) wanted education to promote "new perceptions to guide the new patterns of behaviour between man and environment, and between man and man, which were required by the emergence of his capacity to use and alter his environment on a scale hitherto unknown. The UNESCO/UNEP International Programme for EE (1975) emerged as a follow-up of the Conference. The Belgrade International Workshop (1975) developed a global framework of goals, objectives, audiences and guiding principles for EE. It underlined the need to create balance and harmony between humanity and the environment, but also noted the inherent pluralism of societies in the satisfaction of that need. The Tbilisi Declaration (1977) stressed not only the need for ecological balance in nature, but also "solidarity and equity in the relations between nations as a basis for a new international order; a holistic approach to EE, noted in a broad interdisciplinary base, to produce a perspective of interdependence between the natural and man-made environments; and EE as a lifelong education for individuals as members of the community in an active problem-solving process, encouraging initiative, a sense of responsibility and commitment to build a better future".

2.3.4.3 Chiappo of Peru has presented effectively the third world point of view in EE. According to him the problem is not one of lack of resources, but that of an unjust exploitation and distribution of resources, where one-third of the human race uses up 80% of world's energy. Similarly environmental pollution is not caused only by poor people or induced by population explosion in the third world. He pleads that EE 'must pay critical attention to the economic, technological, socio-political and ethical factors that are at the root of ecological problems and their solution' and that 'the new ethic of liberated man should revise the terms of the relation between man and nature that has evolved in the course of the history of industrialised man in the Western Hemisphere'. Failure to face these issues can reduce EE to a
purely pedagogic and informative exercise. Chiappo presents the new ecological ethic: Man belongs to nature and is an integral part of its dynamic process, whose forces are greater than man and in which he is immersed. Nature is the expressive source of life. Man must find reconciliation and harmony with nature. EE should be both critical and creative. The anthropocentric world view should be replaced by an onto-centric world view. A transcendental humanism close to the view of Spinoza should be developed. The industrial capacity of homo faber has been a factor in human and cultural development, but an exclusive industrial mentality stunts the human being. The aim of EE is "to defend and improve the environment for present and future generation" (Stockholm and Tbilisi). Chiappo pleads that EE should promote critical awareness of the economic and political factors involved.

The Tbilisi Declaration appeals to member states to include in their educational policies measures designed to introduce environmental concerns. The simple alternative is to introduce a kind of 'course' on EE. The other alternative would be "a complete overhaul of educational and cultural policies in the light of EE and related contemporary problems, introducing an integrated programme of inter-disciplinary learning."

The important events in the environmental movement started from the Imperial Forest Institute established in Stockholm (1972). The need for being rooted in a 'home environment' from which a scale of expanding awareness will develop - territoriality, communality, motherland and Mother Earth - is the basic starting point.

2.3.4.4 EE in Indian Educational System

Environmental Education became the accepted policy for lower primary education in India from the early 1970s. The ten-year curriculum framework prepared by NCERT envisaged that in the primary classes, the sciences should be taught as environmental studies; in classes I and II as a composite
course including both the natural and the social environment, and latter on as tool subjects, viz., environmental studies (natural science) and environmental studies II (social science). One need not lay down how much of this should be covered in a particular class. The purpose should be not to stuff the minds of children with facts and information, but to sharpen their senses, to enable them to observe their environment and to enrich their experience.

The NCERT document makes it clear that the environment and the experiences of the children outside the school should vary from place to place and so the activities provided in the school should also vary so that the edifice of knowledge is built not on abstract concepts alone but also on the solid foundations of experience drawn from the environment of the child. In such a programme an inflexible syllabus cannot be drawn up for all the schools. Science education at this stage is based not on the principles of science as the focal point but on an understanding of the environment and its problems through the scientific method. The environment itself becomes a learning resource. The simple science processes of observation, measurement, classification and communication can be developed through these activities. Thus, the learning of both the product and the process of science may be achieved.

Though Environmental Education texts were followed in the central system and in many state systems the curriculum was not transacted environmentally. Except in some extraordinary cases, teachers used the EE textbooks for verbal transmission of content (vide the study by Manuel in Chapter III).

2.3.4.5 DPEP was introduced in many states by about 1995. Where the curricula were designed at district level, especially at District level in tribal and other areas, especially in the states dense with tribal population, the chance of developing curricula directly related to the local environment was
greater. But this requires great pedagogic competencies. Where such persons were not available at the periphery, the chance of confusion and total lack of structure was high.

Kerala was considered an advanced state and therefore it did not have sufficient number of 'weak' districts. But it did get the scheme at first for three districts, later raised to six. They had textbooks which were partially structured, leaving much scope for the local teacher to develop on it. For classes 1 and 2 there was just one book for Mother tongue, mathematics and environmental studies (which covered both science and social studies) In principle it was a good arrangement. In Class 3 and 4 there were four books, but still environmental approach was the preferred one in theory. Classes 1 to 4 in six districts were eligible for the scheme. The six DPEP districts had liberal provision for training – at state level, district level and block level. But the non-DPEP districts also had the same book with less expertise. It is very difficult to transact such an integrated curriculum. In spite of this a minority of teachers did extraordinarily good work attested by nationally and internationally famous observers. It is at these bright points that the environmental curriculum was really transacted even in weak localities. But where it was not transacted with competence and commitment, there was a lot of confusion, and even cases of leaving pupils to themselves. A lot of criticism was mounted against the scheme, some justifiable, but much of which was due to conservative and other tendencies.

2.3.4.6 Manuel (2001) in an officially sanctioned project analysed the transition of the integrated activity pedagogy, and brought out the relevant components of the text, subtext, inter-text and context. It is in the subtext and inter-text (what the pupils and teachers did to match the structure and the environment – context) that the creative transaction is effectively brought out. But it is invisible to most. The bare text and the overt mistakes are more visible. Some of the best products and processes in curricular transaction were brought not only in this report but also in an international conference in
2001. The Report pointed out the defects too with solutions for overcoming them.

2.3.4.7 There is not much evidence that the Report or the International Conference Proceedings were studied and used for further revisions. The upper primary curriculum was also revised with more environmental orientation. From about 2003 SSA came into effect, which had the advantage of extension to all the districts and up to class 8. But it did not have sufficient personnel to give guidance or conduct participant transactions of an environment-oriented curriculum. There seemed to be much more centralisation in SSA as compared to DPEP management. In any case in principle, environmental relation, activity and integration are accepted in SSA too. As teachers and other educational workers get real competence more effective transaction may be expected.

2.3.4.8. Structural Vs Environmental Curriculum: major dilemma
The orthodox school system is accustomed to transact the curriculum according to logically organised content in gong-regulated periods through book-regulated subjects. Everything seems to be ordered and systematic. But the learning is usually verbal, unrelated to the pupil's experience and environment. So the logical organisation is only in the text and not in the pupil's mind. So learning takes the form of meaningless memorisation of words, which is neither interesting nor useful for life. As Tagore said, "We rob the child of his earth to teach him geography and of his language to teach him grammar". Repeatedly attempts have been made (e.g. by the followers of Gandhi, Dewey) to teach directly from experience or from activity. Such learning is live but not systematic, and subject to criticism from conservative public and even from formally oriented educationists.
Some progressive educators have devised models by which education will be provided through the environment, but the objectives, content and other relevant components can be mapped, so that there can be periodical post-systematisation. The logic is thus constructed by the pupil. This logic will now be in the minds of pupils as well as in the book. The pupil will get real education. But it requires some application of pedagogical intelligence to understand and apply such models. Some foreign models developed following the UN thrust on EE are reported.

2.3.4.8. a Two cases from the United States of America represent well-formulated models. Rudolf Schafer has presented a model entitled “Ekistics: A guide to the Development of an Interdisciplinary Environmental Education Curriculum”. Ekistics is defined in this context as “that field of study, that area of knowledge, and those concepts and values through which man recognises his interdependence with the environment as well as his responsibility for maintaining a culture that will sustain a healthy and sanitary environment”.

This model attempts to integrate the disciplinary requirement with the environmental approach. In the conceptual framework from grades 1 to 6, three conceptual pathways - sciences, social sciences and humanities - are recognised. The concept of interdependence is explored in term of (1) interchange of matter and energy (2) social interaction (3) cultural components.

The science pathway, for instance is explored progressively at the six levels from common needs of living things, through differences in environment with characteristic features of life, interchange of matter and energy, conversion into characteristic life forms, constant change in environment, to man as agent of change in natural environment. A nearly balanced progression is seen in the other two pathways also. The cognitive-affective frameworks are extended further at the middle and high school stages.
2.3.4.8. b A still more structured model is developed in Balzac's "Environmental Education in the K-12 Span". A 3-dimensional grid is presented suggesting some major areas of objectives in EE. One of these dimensions is the effective objectives starting from attitude of inquiring through desire to achieve constructive solutions, sensitivity... valuing living things... to appreciation of natural beauty and enjoyment in interaction with environment. Another dimension explores the topical areas starting with soil, air, water, living things, diversity: through change, evolution, energy, technology, pollution and health to historical, social and cultural aspects and music, language and art aspects. The third dimension analyses the process aspects: Effective use of the senses, observation, description, measurement, communication, inferring, predicting... experimentation, data recording, data interpreting... to... environmental planning, appropriate social and cultural skills and language and artistic skills.

The K-12 Span also presents another model where the objectives (listed in the grid) are set against the educational techniques which include several activities and settings - like outdoor lab, EE centres, field trips, media and classroom. The activities are classified as specific-topical, topic-integrating, process-oriented, attitudinal, as aesthetic sensitivity etc., leading on to decision making and more complex activities.

2.3.4.8.c The Strand Approach to EE draws upon the advantages of both the taxonomical and investigative, open approaches. It uses five broad, universal concepts as a way of drawing the environment under a total, integrative, 'umbrella'. There are five such concepts of strands: variety and similarities, patterns, interaction and independence, continuity and change, evolution and adaptation. For each of these five strands, lesson suggestions and questions for student discussion have been developed.
2.3.4.8. d The EE Handbook also presents "A planner's view towards a co-ordinating framework for EE". The basic model in this framework is presented as ascending spirals with ascending spatial scale levels and increasing age of the pupils. The 'Years' noted in the model are simply time blocks which may last more or less than a calendar year. Seven activities are to be introduced in turn throughout each year and developed round the spiral: Residing, Working, Leisure, Goods, Information, Health, and Housing. With reference to each activity, learning is directed basically around two types of questions: (1) What does the environment look like? (Observations) and (2) What is the function? (Analysis). The observation questions are classified further into 'natural' features and man-made things. These are recorded mostly as drawings and notes. The analysis (function) questions are further classified as 'Location' and 'Design' and 'Jobs'. Maps and Discussions aid in the analysis. Three other aspects of study are also taken up with reference to each aspect: (3) The break-down signals (classified further as functional, e.g., overcrowding and visual, e.g., structural decay); (4) Unwelcome residents (natural, e.g., swamp too near houses and man-made, e.g. chemical works fumes). (5) Absentees (natural, e.g., no trees or shrubs, man-made, e.g., lack of open space about buildings). Questions 4 and 5 about unwelcome residents and absentees are followed by elaborate discussions about what to do. The most difficult aspect of the model is the evaluation part.