Chapter I

TEACHING THINKING : A NEW MANDATE IN EDUCATION

1.0 Introduction

Five hundred years ago people believed not only that the earth was flat but also was the center of the universe. Fifty years ago respected scientists ridiculed those of their number who suggested that continents might move to great plates. Both examples show one sides of the nature of human progress namely resistance to change. Fortunately, there is another side that responds when observations and beliefs no longer agree. That side is willing to consider a new paradigm.

Education stands at such a crossroads today. Some people believe or want to believe that education achieves what it promises. This promise means that all children can hope to attain the mature and informed judgment needed to secure gainful employment and to manage their own lives. On the other side are those who claim that these beliefs are misplaced, that education does not achieve its promise because schools emphasize factual knowledge and facts alone do not build judgment, secure employment or manage lives.

The task, they say, is to produce a changed environment for learning - an environment in which there is a new relationship between students and subject matter, in which knowledge and skill become objects of interrogation, inquiry and extrapolation. As individuals acquire knowledge, they also should be empowered

to think and reason. Schools and collages must also expand the definition of what is basic to a quality education. That definition should include the ability to think critically, to analyze issues, to formulate solutions to problems and to ask and seek answers to questions. These critics call for a new paradigm based on the thinking skills that make knowledge useful.

Teaching thinking as an objective of education had been gaining momentum since early 1960`s and teaching students to think has already been one of the most commonly expressed aims of education. Education is not merely the imparting of knowledge but infusing the ability to think effectively that is to communicate thoughts, to make relevant judgments and to discriminate among values. It is this ability to think or to conceptualize that distinguishes man from most other animals in the animal kingdom. No normal human is without this capacity and no other animal is known to possess it to the same degree.

1.1 What is thinking?

The word `thinking` is used to mean almost any mental operation. All the time we are awake and sometimes when we are asleep, some thoughts or images as we say, go through our heads. When we are asleep we call that kind of sequences as dreaming. We also have daydreams, reveries (castles built in air) and mental streams that are even more idle and chaotic. To this uncontrolled coursing of ideas through our head the name of `thinking ` is given. It is automatic and unregulated. In contrast to this a `reflective thinking`, termed so by Dewy (1933), has a purpose beyond the entertainment afforded by a train of agreeable mental invention and pictures.

To Dewy, the train of thought must lead somewhere; it must tend to a conclusion that can be substantiated outside the course of images. There is goal to be reached and this sets a task that controls the sequences of ideas. It is

this substantial and regulated thinking that the education and researches are laying emphasizes on.

Muriel (1971) has defined thinking on basis of thinking individuals, who are able to be creative, analytical and critical individuals who can identify and specify problems, provide divergent possibilities as solutions, individuals who can synthesize solutions and are able to see new, unique relationships.

According to W.H. Burton, R.B. Kimball et al. (1961), thinking results when there is persistent effort to examine the evidence, which supports any belief, solution, or conclusion which is suggested for acceptance, together with the implications and further conclusions for the evidence. It has been further stated that thinking occurs when a problem is recognized, when any situation is unclear, when there is uncertainty as to what the problem means or what should be done. To solve it the hypothetical answers are set up which guide the gathering and analysis of facts and other type of data. Further evaluation and judgments take place with due recognition for logical relationships. Conclusions are developed and tested in action. The act of judgment or drawing of inference, all this and more is called thinking.

Lipman (1992) has defined thinking skills as a catchall phrase. It ranges from very specific to very general abilities; from proficiency in logical reasoning to the witty perception of remote resemblance; from the capacity to decompose a whole into parts to the capacity to assemble random words or things to make them well-fitting parts of a whole; from the ability to explain how a situation may come about to the ability to foretell how a process will likely eventuate; from a proficiency in discerning uniformities and similarities to a proficiency in noting dissimilarities and uniqueness; from a facility in justifying beliefs through persuasive reasons to a facility in generating ideas and developing concepts; from the power of discovering alternative possibilities to the power of inventing

systematic but imaginary universes; from the capacity to solve problems to the capacity to circumvent them or forestall their emergence, from the ability to evaluate to the ability to reenact. According to Lipman, the list is endless, because it consists of nothing less than an inventory of the intellectual powers of mankind. In short it can be concluded, for Lipman thinking ranges from critical i.e. analytical to creative.

According to Alex Osborn (1948), our thinking mind is mainly two-fold, (1) judicial mind, which analyses, compares and chooses and (11) a creative mind which visualizes, foresees, and generates ideas. Judicial thinking produces responses that are based primarily on knowledge and logic. While creativity is a special mental process through which an individual perceives the world in unique ways and organizes the events of the world experiences in an unusual manner, which has meaning and sense.

1.2 Dichotomy in the theory of thinking: A conception or a misconception

The above definitions confirm that there is dichotomy in the theory of thinking i.e. thinking is creative and critical and this has lead to a debate between two groups. One believes that critical and creative are polar opposite forms of thought while creative and critical thoughts are unitary and integrated.

(a) Critical And Creative : Polar Opposite Forms Of Thought

Almost all the writers on thinking have contrasted the two types of thinking. They generally reflect a division between creative or exploratory thinking and critical or logically analytical reasoning.

Alex.F.Osborn (1948) our thinking mind is mainly two-fold (i) judicial mind which analyzes and compares and chooses (ii) A creative mind which visualizes, foresees and generates ideas. Alex Osborn (1952) used the term `**critical intelligence**` and `**creative intelligence**. He further argued that these two kinds of intelligence could not function optimally at the same time.

Other creativity scholars and technologies have used similar sets of terms and talk about the same phenomena. Edward de Bono (1987), Harper & Row (1970) have used the terms `Lateral thinking` and `Linear thinking` or `vertical thinking`. Rollo May, W.W. Norton (1975) uses the term `Rational` and `Suprarational'.

The method of assessing hemispheric involvement in thinking is currently receiving the most attention. Each cerebral hemisphere is capable of functioning in a manner different from the other. The left hemisphere is involved in learning the 3 R`s (Hunter, 1976; Sperry, 1974;). Mathematical functions, particularly calculations (Dumas and Olson, 1977). Algebra (Hunter, 1976). The left hemisphere is considered to be rational-linear mind specializing in sequential processing, logical thinking (Brandwein and Ornstein, 1977; Salk, 1973). The right hemisphere houses spatial perception, holistic understanding, perceptual insight, tactile sensation, musical ability, visualization and intuitive ability. Bogen (1969); Torrance (1978) and many others have described the right hemisphere as creative.

(b) Creative And Critical Thinking Are Antagonistic - A Misconception

The partitioning of thinking into two types is an over simplification. It reflects the conceptual difference between analyzing the element of a problem in logical fashion- the critical approach and adding to the elements, recombining them or looking at the problem from a fresh angle- creative approach. It is

mistake however to think of these approaches to thinking as radically different or unconnected. Almost all problems require both types of thinking.

`Criticality` and `creativity` have an intimate relationship to the ability to figure things out. Whenever we succeed in designing or engendering, fashioning or originating, creating or producing results, it has a creative dimension. But to achieve any challenging end, we must also have criteria: gauges, measures, models, principles, standards or tests to use in judging whether we are approaching that end.

All intellectual products, in order to be intellectually assessed and validated, requires some logic, some order or coherence. This is true whether one is talking of poems or essays, paintings or choreographed dances, experiments or scientific theories, philosophies etc. A product of intellectual work that makes hardly any sense, cannot be rationally analyzed and assessed, and cannot be incorporated into other intellectual work or used, therefore cannot play a role in any academic tradition or discipline is unintelligible.

More over any creative thinking blossoms from a given knowledge and the very definition of knowledge lends itself to be a scientific, systematic body of information. Thus creative thinking cannot be independent of critical thinking.

According to David Perkins, 1985, *"if you're talking about really good critical thinking, you're talking about thinking that is insightful. It's not just nit-picking; it cuts to the heart of the matter and that rather plainly, is creative thinking..... one has to acknowledge that two are hand-in-glove and it can't be any other way. The better critical products are themselves creative, they represent profound insight into the nature of creative products".*
According to R.W Paul (1995), both creative and critical thinking are inseparable, integrated and unitary.

The researcher for her study has considered critical thinking in this light, that is critical and creative thoughts are integrated, fused and unitary. In short thinking is involved in any mental activity that helps formulate or solve problems, to make a decision or to seek understanding. It is through thinking that we make meaning out of life.

1.3 Education Based On Thinking

The very definition of thinking articulates the goals of education. Our schools have a variety of educational objectives ranging from the development of 3 R's to the promotion of self-direction, positive self- concept and human values and valuing. However, the central organizing forces of all these goal is one's ability to judge, evaluate, analyze information, i.e. one's ability to critical think about issues and problems objectively and without personal preferences or prejudice. Hence the development of the thinking process becomes the central operating goal which permeates all educational goals. It is the foundation skill of all learning and fundamental to the development of all other skills.

Education, understood in its real essence, is not merely imparting information to the learner but to help its learner to acquire and integrate knowledge. Knowledge, rightly understood, is viewed as a distinctive construction by the learner, something that issues out of a rational use of mental processes. To those who link knowledge to understanding and rational assent, it is implicitly assumed that `knowledge is of little value if it cannot be utilized in a new situation, in the original form, different from that in which it was originally encountered. It means that Knowledge is not something that can be given by one person to another nor it can simply be memorized out of a book. To expect

students to assent without reason, judgment and understanding are for that learner mere prejudice, and is to indoctrinate rather than to educate them.

This inadvertently begs the question as to whether blindly memorized belief can properly be called knowledge at all. Whether inculcation and indoctrination into belief is properly to be called education. If knowledge of any kind is to some extent a skilled or a rational achievement, then we ought not to confuse knowledge and education with belief inculcation and indoctrination.

According to J.H. Newman (1952) *".....Knowledge is not a mere extrinsic or accidental advantage..... which may be got up from a book, and easily forgotten again,.....which we can borrow for the occasion, and carry it about in our head.....it is something intellectual..... which reasons upon what it sees..... the action of a formative power.... making the objects of our knowledge subjectively our own".*

This requires that education must be such that it brings the learner to a personal association with knowledge so that he or she can make sound decisions. This kind of education lays emphasis on thinking operations such as comparing, contrasting, hypothesizing, verifying, evaluating, decision making, generating new ideas and problem solving.

One of the main imperative intentions of education is said to be fulfilled only when students are able to generate objectives or questions to verify or create their own understanding or to become a source of information which is then evaluated and when they move students from thinking dependence to thinking independence, from inability to ability; from reliance on authority to autonomy.

1.4 Rote-Learning: Present Day Educational Practice

Despite the fact that we have entered the period of renewed emphasis on education based on thinking, we sadly and miserably seem to persistently continue to cling to the age-old tradition of rote learning.

Majority of our schools have made little progress in promoting thinking. Traditional instruction is still the pervasive force, content-coverage is stressed and practiced. The schools' emphasize on teaching children what to think rather than how to think. Today much of what we call education is merely knowledge gathering and remembering at all levels of education, perhaps reaching its peak in college and graduate school. Intelligence and school achievement are, then ever correlated with facts, primarily remembered facts. Memorization and recall then become the fundamental modes of thought and students study to reproduce the `correct answers`, given to them by teachers or texts.

According to B.H. Bryce, (1971), teachers most often formulate instructional goals to emphasize mastery by their students of such factual information as `the cause of the First World War or the names of states and their capital cities`. Goals that concern students` abilities to draw inferences to evaluate argument or to generate alternative solutions to problem are seldom defined by teachers or are assumed to be the by-product of factual learning or a consequence of the students` increasing intellectual maturity. School children are viewed as empty vessels - to be filled to brim with information. The analogy can be drawn that our children's education resembles the programming of computer, where factual data and information are stuffed into the vessels (W. Glasser, 1917).

According to R.W Paul, A.J.A Binker et al. (1989), In the present educational system knowledge is unwittingly considered to be a thing that can be put into students` head as some objects might be put into their hands. Didactic instruction becomes dominant and instruction is reduced to giving students information to be accepted as facts and committed to memory.

1.5 Critical Thinking: Its Place in Indian Education.

(a) Critical thinking & Ancient Education System

Critical thinking in Indian education is not a foreign concept. The soul of Indian theory of education that lies in the teaching of Vedanta, Upanishad and Nyaya, is concerned with the condition of correct thinking and means of acquiring true knowledge of reality, logical thinking and rigorous criticism that is to inculcated in students.

In ancient India, then, all learning was based upon discussion method. The four sources of knowledge i.e. `perception`, `inference`, `comparison` and `trust worthy testimony' were put to test of objective standards in form of discussion.

In fact knowledge, then, grew by a series of reaction against and reflection upon the information material. Knowledge was then, not static fixed iron safe where in concrete bits of information and facts were stored.

So it befell, that with increasing rigidity that cropped up in the caste system and later with the introduction of British Education system, the ancient glory in education came to an end. All this and much more, paved way to indoctrination rather than teaching based on thinking as a means and an end to education.

(b) Present Educational practice

It has been very well perceived by those related to education that most instructional practice in most academic institutions around the world presupposes a didactic theory of knowledge, learning, and literacy, ill-suited to the development of critical minds and persons and the education scenario in India is no exception.

Krishna Kumar (1989), provides a glimpse of the Indian situation. According to him studies of adult-child interaction in Indian family setting indicates that questioning, criticism and independent decision-making are not among approved and encouraged behavior among children and youth. In the school context these norms are further enhance by fixed nature of syllabus and by the popular notion that textbook is `**the final authority**` and the pupils` job is to be modest, obedient and receptive. This leads us to believe that children naturally absorb the attitudes and opinion of the significant adults in their lives, thereby children learn to become dependent to the thinking of others.

Students are expected to receive the knowledge given to them and are not typically encouraged to doubt what they are told in the classrooms or what is written in their text. Students` personal point of view or philosophies of life are considered largely irrelevant to education. Classroom with teachers talking and students listening are the rule. Ninety percent of a teacher's questions require no more thought than recall. Dense and typically speedy coverage of content is typically followed by content specific testing, again based on recall and memory. Students are rarely expected to engage in dialogical and dialectical reasoning.

Further, our educational practice, closed book examination is based on the fallacy that knowledge remembered is better than knowledge looked up.

Most test depend upon memory. Highest grades are worth the most in term of honors and primarily measures of student's ability to remember designated facts rather than to think.

Factual answers, the counterfeit currencies of educational system are worthless unless they are integrated into ideas and thinking. In short the student is expected to develop into a literate, educated person through years of what is essentially content memorization and ritual performance. Students rarely grapple with content.

According to Sonu Mehra, a grieved parent (The Sunday Times of India, Ahmedabad, March 30, 1997) " *I would say the real villain is the syllabus which is so heavily loaded with facts that what is tested is not the students' ability to think but the ability to cram. It is time the entire syllabus was revamped to make it less cumbersome. The pressure to finish the syllabus before the deadline, especially, for the Board exams, leaves little time for the development of finer sensibilities and creativity, so necessary for a balanced personality.....The focus of our education system should be to prepare the base for a wholesome life. If lesson in civics cannot inculcate in them civic sense; sciences cannot develop scientific and rational thinking; language cannot teach politeness in their speech, then truly the system has destroyed the students".*

A strong growing need that is being felt among the educator is that educational focus must divert its efforts from that of being a replenisher of information to that of a facilitator in enabling the students to process information and to make meaning for themselves in all subjects.

Students need to learn how to precisely put question; how to define context and purpose, how to pursue relevant information, analyze questionable assumption, trace implications and think empirically within the different points of

view etc., for knowledge for sake of knowledge is not education in the true sense.

Knowledge is a tool one uses for many purposes: to explain, illuminate, answer, clarify, settle, solve, inform, and accomplish. Divorced from its use, from the skills entailed by getting and using it, knowledge is empty. Therefore it becomes mandatory on the part of educators to make sure that students learn how to gather, analyze, synthesize and assess information. They learn to recognize and define problems, learn to analyze the diverse logic of the questions and problems they face and hence learn to deal rationally with conflicting points of view, thereby become literate in the proper sense of the word.

1.6 CRITICAL THINKING AS A MODEL OF TEACHING-LEARNING: ALTERNATIVE TO DIDACTIC TEACHING

Today's education system has come under severe criticism for its undue emphasis on memorization of textbook knowledge by the students. Education, which is a process of making an all-round development of the human being, has been unfortunately reduced to a mere process of information gathering. In the process students just learn the ways and means to store the information and to reproduce as it is on demand to get good scores in examination. Thus, they fail to realize the value of real education beyond the purview of the school examination (G.C. Naik, 1994).

On the other hand `Critical thinking` as a model of teaching-learning is an alternative, to present educational shortcomings. Applied to instruction, critical thinking shifts our classroom design from a model that largely ignores thinking to one that renders it pervasive and necessary. When students study a subject in a critical way they take possession of new mode of thinking, which internalized,

generates new thoughts, understanding and generalization that are empirically testable. Thus students' thinking now driven by a set of new questions, become an instrument of insight and new point of view.

We need critical thinking in classrooms because we cannot simply order students to think. Students do not come with intellectual standards, geared up for action. They do not understand how and why they think the way they do, nor how to direct, redirect or assess their thinking. They do not naturally or spontaneously think critically or creatively. They are not accustomed to figuring things out or reasoning through the content they study.

1.7 What Critical Thinking Means

The term `critical ` as it is here does not mean thinking, which is negative or finds faults or censures, but rather thinking which evaluates reason. Here the term critical thinking is intended to highlight the intellectual autonomy.

The concept of critical thinking is best defined by Robert Ennis (1985), who states that critical thinking is reasonable reflective thinking that is focused on deciding what to believe or do. This definition allows flexibility and diversity of application. It includes decision making, problem solving, metacognition, value judgment and higher knowledge level of Bloom`s taxonomy.

Critical thinking as defined by Beyer (1985) is determining the authenticity, accuracy and worth of information or knowledge claims. According to Fisher (1990) critical thinking provides the context of justification, testing the acceptability of reason and proof. Paul, et al (1989) have spelt out in detail what critical thinking is about. According to them critical thinking is:

- ❖ Skilled thinking which meets epistemological demands irrespective of the vested interest of or ideological commitments of the thinkers.
- ❖ Skilled thinking that is characterized by empathy into diverse opposing points of view and devotion to truth as against self-interest.
- ❖ The art of thinking about thinking while one is thinking so as to make one's thinking more clear, precise, accurate, relevant, consistent and fair.
- ❖ The art of constructive skepticism.
- ❖ The art of identifying and removing bias, prejudice, and one-sidedness of thoughts.
- ❖ The art of self-directed, in-depth, rational learning.

According to Blair, Hitchcock (1983) being a critical thinker implies assessing the views of others and one's own views according to acceptable standards of appraisal; one must also be productive, in the sense of conceiving of alternative courses of action and candidates for belief, before critically appraising which alternative to choose; people must be able to produce reliable observations, make sound inferences and offer reasonable hypotheses; finally, one must have the disposition to think productively and critically about issues.

The critical thinking model embarks upon the task of fostering thinking skills in the students like making interpretation, application, analysis, synthesis, evaluation, making plausible inferences, exploring assumptions etc. It is a process, which allows one to question the validity as well as the understanding of information obtained. It enables one to establish a point of view upon which to analyze information received. It also encourages one to develop and utilize one's own thought process in a given situation.

1.8 EDUCATION CONCEIVED ON CRITICAL THINKING PARADIGM

Those who teach critically emphasize that only those who can think through content truly learn it; that content dies when one tries to mechanically learn it; that content has to take root in the thinking of students. When students study a subject in a critical way they take possession of new mode of thinking, which so internalized generates new thought, understanding, and generalization that are empirically testable. Retaining this as a focus of education the advocators profess the following:

1. That the fundamental need of student is to be taught how, not what, to think. Thus, significant content should be taught by stimulating students to gather and assess that content.

2. That all knowledge or `content` is generated, organized, applied, analyzed, synthesized and assessed by thinking. Gaining knowledge is unintelligible without engagement in thinking. Thus students should be given opportunities to puzzle their way through to knowledge and explore its justification, as part of the process of learning.

3. That an educated, literate person is fundamentally a repository of strategies, principles, concept, and insight embedded in progress of thought rather in atomic facts. Thus classroom activities should consist of questions and problems for students to discuss and discover how to solve. Teacher should model insightful consideration of questions and problems, and facilitate fruitful discussion.
4. That knowledge can rarely, and insight never, be transmitted from one person to another by transmitter's verbal statements alone. One person cannot directly give another what he has learned but one can only facilitate the conditions under which people learn for themselves by figuring out or

thinking things through. Thus students offer their own ideas, explore ideas given in the text, providing their own examples and reasons.

5. Students, who have no questions/ doubts/ querries to what the text or the teacher is stating, typically are not learning, while those who have pointed out specific questions are.

6. The basic skills of reading and writing are inferential skills that require critical thinking, the students who cannot read and write critically are defective readers and writers and that critical reading and writing involve process in which probing critical questions are raised and answered. Thus, teacher should routinely require students to explain what they have read, to reconstruct the ideas, and to evaluate written material. Student construct and compare interpretation, reasoning their way to the most plausible interpretation.

7. It is more important to cover a small amount of knowledge or information in-depth than a great deal of knowledge superficially. The `slowest` as well as the `brightest` students can and must probe the significance and justification of what they learn.

8. Students need to learn to distinguish for themselves what they know from what they don't know. Students should recognize that they do not genuinely know or comprehend what they have merely memorized. Teachers routinely allow students the opportunity to supply their own ideas on subject before reading their texts.
9. Students can often provide correct answer, repeat definition, and apply formula while yet not understanding those question, definition, or formula.

The proof of knowledge and understanding are found in the students' ability to explain in their own words, with examples, the meaning and significance of knowledge, why it is so, to spontaneously use it when appropriate.

10. The personal experience of the student is essential to all schooling at all levels and in all subjects, that is a crucial part of the content to be processed (applied, analyzed, synthesized and assessed) by students.

11. Most of what students memorize in didactically taught courses is either forgotten or inert, and that the most significant transfer requires in-depth learning, which focuses on, experiences meaningful to the students.

Majority of teachers and students currently approach content, not as a mode of thinking, not as a system **'for'** thought, not even as a system **'of'** thought, but rather as a sequence of stuff to be routinely 'covered' and 'committed' to memory. When content is approached in this lower order way, there is no basis for intellectual growth, there are no deep structures or knowledge formed no basis for long-term grasp and control.

Critical thinking in contrast approaches all content explicitly as thinking. It weaves new thinking into old, it assesses thinking; it applies thinking; it is thinking about thinking in order to make thinking better, more clear, more accurate, more relevant, more deep, more broad, and more effective.

1.9 SIGNIFICANCE OF PRESENT STUDY

Despite the fact that we have entered the period of renewed emphasis on education based on thinking, we sadly and miserably seem to persistently continue to cling on to the age-old tradition of rote learning. There is no explicit

teaching of thinking skills. The emphasis is on content teaching. With information explosion and the multitude of avenues open to students to access knowledge, it is not the content, which requires to be taught rather how to think on the content and interpret it should be the focus of teaching.

Although educators have unanimously vouched for thinking in education, yet, something so universally affirmed has so rarely become a dream fulfilled in the realities of education. To dream of constructing a curriculum that would nurture and sharpen such an array of thinking skills in students, still, is certainly considered quixotic.

According to NCERT (1988) suggestion, appropriate method and techniques which would facilitate interactive process of teaching and learning needs to be evolved. This implies replacement of existing teaching methods which predominantly based on rote learning, lectures and reproduction of information by interactive modes of teaching which would focus on `learning` and which would stimulate curiosity and independent thinking, develop problem solving skills and self learning. The teacher's role will be one of helping the pupil to develop skill in collecting information, their verification and evaluation for further processing for drawing inferences. In other words to develop critical thinking of students.

Mc Peck (1981) and Siegal (1980) argue that critical thinking is not just another educational option rather it is an indispensable part of education because being able to think is a necessary condition of being educated.

Learning to think critically is one of the most significant activities of adult life. When we become critical thinkers we develop an awareness of the assumptions under which others and we think and act. We learn to pay attention to the context in which our actions and ideas are generated. We become

skeptical of quick-fix solutions, of single answer to problems and of universal truth and become open to alternative way of looking at and behaving in the world. We come to our judgments, choices and decisions for ourselves instead of letting others do this on our behalf,

In the last few decades, studies to teach through models of teaching thinking have emerged in India. Fourth survey of Research in India (1983-1988) mentions many such studies on this line but out of the ocean only a few have been mentioned here. Buddhisagar (1979), Patania (1980), conducted studies using Advance Organizer Model; B.K Passi, L.C Singh & D.N Sansanwal (1986) conducted series of studies using Joyce & Weil's Models of teaching thinking. B.K. Passi, D.R Goel (1986) conducted work shop on Piagetian Model of teaching; Katyul (1985), Pani (1985), Das (1986) used the Concept Attainment Model in their studies and many more.

Notwithstanding from what has been mentioned above, the investigator is of opinion that there is a dearth of studies on critical thinking conducted in India. The investigator further strongly feels that education based on thinking is crucial for respecting human intellectual and individual autonomy. Hence it is in this direction that the researcher has endeavored to develop an intervention study to enhance critical thinking in students.

1.10 STATEMENT OF THE PROBLEM

The present study is an intervention program aimed at enhancing critical thinking in students. The statement of the problem reads as- **"A study of the effectiveness of a teaching-learning strategy for developing critical thinking in students of std. X1 using psychology subject as content ".**

1.11 TERMS DEFINED

(1) Effectiveness - The effectiveness of the study will be assessed by students' performance on the tool measuring critical thinking, prepared by the researcher.

(2) Teaching-learning strategy - A plan incorporating the methods and the techniques for developing critical thinking (mentioned in detail in chapter 1V).

(3) Critical thinking - Critical thinking as defined by Beyer (1985), is determining the authenticity, accuracy, and worth of information or knowledge claims. According to R.Fisher (1990) critical thinking provides the context of justification, testing the acceptability of reason and proof. Critical thinking in the present study will denote scores obtained on the test measuring critical thinking, prepared by the researcher.

1.12 OBJECTIVES

(1) To evolve a strategy for teaching-learning critical thinking in students of std. XI using the subject psychology as the content.

(2) To develop a tool, measuring critical thinking in students of std. XI.

(3) To find the effectiveness of the evolved strategy for teaching-learning critical thinking.

1.13 HYPOTHESIS

(1) The evolved strategy for teaching-thinking, aimed to develop critical thinking will lead to increase in the mean scores on the post-test measuring critical thinking. In short the evolved strategy will be effective in enhancing critical thinking in students.

1.14 DELIMITATION

2. The present study is applicable to the students of std. XI, belonging to the Arts stream from Navrachna Higher Secondary School, in Baroda. The school follows the Central Board of Higher Secondary Education.

1 For the present study Psychology subject is used as a content matter for developing critical thinking in students of std. X1.

2 The students belong to the higher socio-economic group.

3 The generalization for the present study and its findings will, therefore is restricted by the above factors.