

## Chapter VII

### SUMMARY, FINDINGS AND CONCLUSION

#### 7.1 Introduction

Teaching thinking as an objective of education had been gaining momentum since early 1960's. Teaching students to think has already been one of the most commonly expressed aims of education, since education is not merely the imparting of knowledge but cultivation of certain aptitudes and attitudes in the minds of the young. The ability to think effectively 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.

#### 7.2 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 Rs to the promotion of self-direction, positive self-concept and human values and valuing. However, the central organizing forces of all these goals 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 the 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 or it cannot simply be memorized out of a book. To expect students to assent without reason, judgment and understanding are for that learner mere prejudices, 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 can be properly 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.

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.

### **7.3 Rote-Learning : Present Day Educational Practice**

Despite the fact that we have entered this 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 and 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.

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). 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.

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 enhanced by fixed nature of syllabus and by the popular notion that text book is 'the final authority'. 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 on 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 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 who are gifted with a good memory are considered to be scholars and achievers and those who fail to memorize are condemned. 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 tests depend upon memory. Highest grade in term of honors and primarily measures student's ability to remember designated facts rather than to think. Factual answers, the counterfeit currency of educational system is 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.

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.

## **7.4 CRITICAL THINKING AS A MODEL OF TEACHING-LEARNING: AN 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. 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 a new mode of thinking, which internalized, generates new thoughts, understanding and generalization that are empirically testable. Thus their 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.

## 7.5 WHAT CRITICAL THINKING MEANS

The term 'critical' as it is used 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 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.

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.

R. Paul, A.J.A Binker, D. Martin et al. 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.

In short critical thinking 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. Critical thinking 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.

Critical thinking is not an isolated, unrelated to other important goals in education, rather it is a seminal goal which, done well, simultaneously facilitates a rainbow of other ends. It is best conceived, as the 'hub' around which all other educational ends cluster - it is a vehicle to train children, to think, reason, analyze, and to articulate logically; To develop in a student well defined abilities and values such as the spirit of inquiry, creativity, objectivity, the courage to question, setting up conditions of learning which makes for self-direction and for self-initiated learning, increase self-confidence in other words educate the whole person.

## 7.5 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 that requires to be taught, rather it is how to think on the content and interpret 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 should not be 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) argues 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 other 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 India during the last few decades, studies have been conducted to teach through models of teaching thinking. Fourth Survey of Research in Education (1983-1988) mentions such studies on this line but a few have been mentioned by the researcher, 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 .

Nevertheless the researcher is of an opinion that there is a dearth of studies, on critical thinking conducted in India. The researcher, 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.

## **7.6 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 EFFECTIVENESS OF A TEACHING-LEARNING STRATEGY TO DEVELOPING CRITICAL THINKING IN STUDENTS OF STD. XI USING PSYCHOLOGY AS CONTENT".

## **7.7 TERMS DEFINED**

- Effectiveness - The effectiveness of the study will be assessed by students' performance on the tool measuring critical thinking, prepared by the researcher.
- Teaching-learning strategy - A plan imbibing the methods and the techniques for developing critical thinking.
- 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), it 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

## **7.8 OBJECTIVES**

- (1) To evolve a strategy for teaching-learning critical thinking in students of std. X1 using the subject psychology as the content.
- (2) To develop a tool, measuring critical thinking in students of of std. X1.
- (3) To find the effectiveness of the evolved strategy for teaching-

learning critical thinking.

## **7.9 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.

## **7.10 DELIMITATION**

- (1) The present study is applicable to the students of std. X1, belonging to the Arts stream from Navrachna Higher Secondary School in Baroda. The school follows the Central Board of Higher Secondary Education.
- (2) For the present study Psychology subject is used as a content matter for developing critical thinking in students of std. X1.
- (3) Students belong to higher socio-economic group.
- (4) Generalization from present study is, therefore, limited.

## **7.11 DESIGN OF THE STUDY**

The present investigation is an intervention study carried out for 4 months. The study aims at enhancing critical thinking in students using psychology subject as a content matter. The study is developmental in nature. The subjects for the present study are 12 students - all who have opted for Arts stream at the Higher Secondary level and also have Psychology as one of their subjects.

For the present study the content (a few lessons from psychology text of std. X1) to be taught has been restructured into lesson plans using techniques and methods aimed at enhancing critical thinking in students. Plus, Minus and

Interesting (PMI), Other People's Point of View (OPV) and Consider All Factors (CAF) are some of the techniques used from deBono CoRT lessons. Methods used for infusing critical thinking are Case study method and Socratic questioning method.

A tool measuring critical thinking in students (prepared by the investigator) was administered to the subjects before and after the intervention programme.

The study aims at evaluating changes (if there is any at all) on the same sample of subjects as a result of intervention strategies employed to enhance critical thinking in students of std. XI using the psychology subject as content matter. Therefore the design employed for the present study is 'ONE GROUP - PRE-TEST, POST-TEST DESIGN'.

## **7.12 DATA ANALYSIS AND INTERPRETATION**

The objective of the present study has been to determine the effectiveness of the methods and techniques used for enhancing critical thinking in the students of std. XI using the subject psychology as content. In order to assess effectiveness of the evolved strategy for teaching-learning critical thinking qualitative and quantitative analysis is done.

Under Quantitative analysis, the investigator has employed 'Single group t-test' to find out the difference (if any) between the pre-test and post -test scores on the critical thinking tool, administered to the students during pre-intervention phase and post - intervention phase.

The investigator has used qualitative analysis to understand the dynamics of thinking in students during the classroom instructional. The investigator has also endeavored to study students' overall improvement on various dimensions of critical thinking through qualitative analysis.

### **7.13 MAJOR FINDINGS**

1. The result of the t-test shows that the evolved strategy for teaching-learning critical thinking has been effective in developing critical thinking in students. There is a significant difference in the mean scores on the critical thinking tool before and after the intervention program.
2. Students demonstrated their ability to think independently through logical reasoning and justification.
3. Students show the ability to evaluate arguments/beliefs/opinion, using PMI technique.
4. A few students learnt to compare and contrast analogies using CAF technique.
5. Students showed the ability to think dialectically.
6. Students were able to apply knowledge in a new situation.
7. Almost all Students demonstrated critical reading skills.
8. Majority Students show improvement in questioning skill.
9. Students show improvement on their ability to think reflectively.
10. Students imbibed affective dimensions of critical thinking like Intellectual autonomy, Intellectual empathy, Intellectual courage and Intellectual humility.

## **7.14 Overall Observation and Conclusion**

The quantitative and qualitative analysis of data goes to reveal that the strategy to develop critical thinking in students of standard XI using the subject of Psychology as content has been successful.

From students' active participation in the intervention program, their improved post-test scores on critical thinking tool goes to say that students had learnt the art of critical thinking. Scanning through students post-test answers makes known that many had also imbibed critical thinking techniques, as their critical thinking was based on the techniques like PMI, OPV and CAF.

Looking back at students' level of interaction, involvement and visible enthusiasm in the instructional process, it would not be considered vainglorious to state that almost all students found the instruction process very interesting and exciting. Might be for the first time, many students had the opportunity to think on the content for themselves and examine what they were to learn and understand. Many students had expressed that working on thinking tasks had been a novel experience. It was through these tasks that the students had the opportunity to debate, reflect, relate, analyze, evaluate, judge and apply what they were being taught.

A lot of student had voiced that learning by thinking not only helped in easy comprehension of the subject but also made the instructional process lively and interesting. Learning by thinking certainly creates a sense of knowing. Here 'knowing' is not merely retention, a storing up for possible recall which is the ability to define learning/motivation or simply mentioning various theories on learning/motivation. This knowing by itself is useless knowledge unless meanings cluster around these theories. Only when a student find a theory meaningful in terms of its knowledge, relevance, and application, student may

experience and appreciate an awareness of knowing. It is this 'knowing' that endows the object of previous knowing with a value that comes almost entirely from self. This kind of knowing was definitely made possible for students during the instructional process, as students were given the opportunity to relate to, explore, analyze and evaluate concepts on their own and draw meaning for themselves. This opportunity was availed by almost all students, which is evident from their classroom participation, assignments, and their post-test performance on the critical thinking tool.

A true education is that which brings the learner to a personal association with knowledge that he or she can make a sound decision. This kind of education lays emphasis on thinking operations such as comparing, contrasting, hypothesizing, verifying, evaluating, decision making, generating new ideas and problem solving. We need to formulate a comprehensive philosophy of education focused on critical thinking, one that makes clear that knowledge can be achieved only through thinking and hence it is important to infuse critical thinking into the curriculum rather than treating it as a separate subject.

Teaching of Psychology based on critical thinking paradigm was not only challenging but also very gratifying for the investigator. It was an experience by itself to see students grappling the content through their own questioning, analysis, and judgment.

Making critical thinking the essential mode of instruction for all subjects, all students and all grade levels is not a task that requires a mastermind nor it requires Herculean efforts. All that is required from a teacher is little more of interest, coupled with a bit of creativity and right intention.

For the present study the main important components for facilitating thinking in classroom included-

- (1) Classroom climate: a classroom plays an important role either in facilitating or impeding thinking process in students. The investigator's attempt was directed towards creating a more permissible, nurturing, open, non-censorious and non-threatening atmosphere allowing students to examine and reflect on issues under consideration. The investigator had also worked towards providing students latitude where they can gain insight into their own prejudices and resolve them on their own. The investigator's task was to play an important role in propelling students to think for themselves.
- (2) Method of teaching thinking: Lecture method at its best can only provide students with information and infuse rote learning and memorization. On the other hand methods like Socratic questioning, Discussion method, Case study method, Role-play method and many more assist in thinking process.
- (3) Techniques of teaching thinking: Numerous techniques of teaching have been and are being developed which facilitates teaching thinking. For this study the investigator had used a combination of techniques.

## **7.15 Conclusion**

Teaching-learning process can and ought to be on critical thinking paradigm, not only to make learning process interesting but to make it more meaningful and relevant to the learners. Any sound education must emerge from a principle that teaching-learning process should not confine to mere learning of concepts and principles that are memorized and stored, but must lead instead to an understanding, which a student can and must intellectualize to create in them a sense of "knowing". 'Knowing' in this context is not retention but where one may be able to experience and appreciate an awareness of knowing. This can be made possible when students are allowed to reflect, to think, and to draw meaning for themselves on the given information and experience. This has been the approach taken in this study and has been shown to be effective.

## 7.16 Suggestions

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. On the other hand 'Critical thinking' as a model of teaching-learning is an alternative to present educational shortcomings. Only when the student is involved in processing information and not just memorizing factual material the student makes meaning for himself /herself and not passively accepts the ideas which are given to him/her. An opening to understand and think on the content gives a student an opportunity to intellectualize on what he/she is suppose to know, thereby the instructional process become interesting and stimulating, as experienced by this student.

The education system has to relinquish the emphasis on memorization of textbook knowledge by students. It has to break free from the usual pattern followed for teaching-learning wherein fixed content gets transmitted from teacher to student. The critical thinking approach in teaching psychology subject has facilitated the student to understand and relate to the concepts under consideration through her own analysis, evaluation and judgement.

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.

Based on her study, the investigator has rendered a few recommendations for further researches.

- ❖ The realm of teaching thinking has remained highly unexplored, especially in Indian education system and hence this area needs to be explored and researched.
- ❖ Present study is confined to teaching thinking using Psychology subject to std. XI. Studies need to be carried out using other subjects and at all levels.
- ❖ For the present study only a certain dimensions of critical thinking have been taken into consideration. A lot many other dimensions of critical thinking need to be explored and incorporated into future studies.
- ❖ Teaching thinking course could be given to teacher trainees so they may make a transition from a didactic paradigm of education to teaching thinking paradigm.
- ❖ Preparation and standardization of thinking tool is another area that needs research.