CHAPTER 1
INTRODUCTION

“Teaching your children to think may well be the most important thing you can do for your children” de Bono (1994)

1.1.0 Introduction about Thinking

Thinking is essentially a cognitive ability and ultimate human resource. It (thinking) is not just about – philosophical reflections and analysis, but about getting things done, making things happen and making progress. It is the process of establishing association among the attributes of different entities or same entity, and involves cerebral manipulation of information as we form concepts, engage in problem solving, reason and make decision. It may be taken as the deliberate exploration of experience for a purpose. The purpose may be understanding, decision making, planning, problem solving, judgment, action etc. involving the employment of any kind of cerebral activities. Ross (1951) defines thinking as a mental activity in its cognitive aspects or mental activity with regard to psychological objects. Valentine (1965) states that in strict psychological discussion it is well to keep the thinking for an activity which consists essentially of a connected flow of ideas which are directed towards some end or purpose. Garrett (1968) considers thinking as a behavior which is often implicit and hidden and in which symbol (images, ideas, concepts) are ordinarily employed.

Thinking is considered as a skill because skill is an ability to perform effectively in certain circumstances. Thinking can be improved by practice and direct attention. The ability to generate thoughts and to link them together in a coherent way obviously involves in thinking skill. Thinking is an operating skill with which intelligence acts upon experience. Knowledge or information is the basic material handled during thinking. In school subjects, information is more important than thinking. At one extreme, thinking is impossible without some information on the subject. At the other extreme perfect information would make thinking unnecessary. Thinking is only a tool for assimilating information, classifying it and putting it into its proper place. Thinking is not a substitute for information and that information is no substitute for thinking. There is a need for both. Unless we have complete information we need thinking in order to make the best use of the information we have. Whenever
computers and information technology give us more and more information we also need thinking in order to avoid being overwhelmed and confused by all the information. In short, for stimulating creativity, new designs and alternatives, we need thinking. Thinking skills, once mastered, can be used both individually and in a group, dispensing with brainstorming. Teaching higher order thinking provides students with relevant life skills and offers them an added benefit of helping them improve their content knowledge, lower order thinking, and self-esteem (DeVries & Kohlberg, 1987; McDavitt, 1993; Son & VanSickle, 1993). So it becomes imperative to pay more attention to ‘thinking’ in education also. Without creativity, independent thinking and judging personalities the upward development of society is as unthinkable as the development of the individual personality without the nourishing soil of the community. Yet there are a lot of misconceptions about thinking in the society.

1.1.1 Misconceptions about Thinking

- Many people even perceive thinking as nothing but a matter of cleverness and ability to solve difficult problems.
- Intelligence and thinking ability are the same. The more IQ one has the better thinking ability he has. On the contrary, those who have lower IQ have only low thinking abilities.
- Less educated or uneducated can never become good thinkers.
- Cognitive abilities like thinking are inherent and there is very little we can do to develop these.
- To develop people’s thinking it is necessary to give them tasks which are too difficult for them to do.
- Thinking is boring because it is too difficult.
- Most of the people believe that present education system develops and enhances thinking and so the more educated a person is, the better thinker he is. Certainly this is not true. Actually, education on the contrary suppresses free thinking. Experiments show that most of the children rank as highly creative before entering school. Because our educational system places a higher value on left brain skills such as mathematics, logic and language than it does on drawing or using our imagination, only ten percent of these children rank highly creative by age 7. By the time of adulthood, high
creativity remains in only 2 percent of the population. Creative thinking has almost no place in current education. Moreover, education even destroys creative thinking abilities by it’s over emphasis on logical thinking and critical thinking which are relatively lower types of human thinking.

To remove these misconceptions awareness about thinking needs to be generated. There is a need to teach children to become effective thinkers which is increasingly being recognized as an immediate goal of education. If students are to function successfully in a highly technical society, then they must be equipped with lifelong learning and thinking skills, necessary to acquire and process information in ever changing world (Robinson, 1987). If intelligence is the potential, then thinking is the ability to use this potential, this belief is very firmly established today. Just as the skill of the driver determines how a car is used, thinking determines how intelligence is used. The rapid advancement of science and technology in the 21st century, characterized as the age of knowledge, has led to several multidimensional changes in areas like social, economical and educational areas. For students to be able to cope with these changes and the increasing responsibilities they need to have higher order thinking skills. In recent years social demands for higher order thinking has generated a strong interest among educators in the teaching of thinking skills.

1.1.2 Thinking Skills

Thinking skills are valued in all fields. These have been defined and classified in many ways. The most important classification of core thinking skills includes following components:

**Focusing Skills** – Focusing skills include attending to selected pieces of information and ignoring others.

- Defining problems: clarifying needs, discrepancies or puzzling situations.
- Setting goals: establishing direction and purpose.

**Information Gathering Skills** – These skills require bringing to consciousness the relative data needed for cognitive processing.

- Observing: obtaining information through one or more senses.
- Formulating questions: seeing new information through inquiry.

**Remembering Skills** – Remembering skills deal with storing and retrieving information.
- Encoding: storing information in long-term memory.
- Recalling: retrieving information from long-term memory.

**Organizing Skills** – Organizing skills are required in arranging information so it can be used more effectively.

- Comparing: noting similarities and differences between or among the entities.
- Classifying: grouping and labeling entities on the basis of their attributes.
- Ordering: sequencing entities according to a given criterion.
- Representing: Changing the form, but not the substance of information.

**Analyzing Skills** – These skills are essential for clarifying existing information by examining their parts and relationships.

- Identifying attributes and components: determining characteristics or the parts of something.
- Identifying relationships and patterns: recognizing the way elements are related.
- Identifying main ideas: identifying the central elements; for example the hierarchy of the key ideas in a message or line of reasoning.
- Identifying errors: recognizing logical fallacies and other mistakes and correcting them where possible.

**Generating Skills** – These skills are concerned with producing new information, meaning or ideas.

- Inferring: going beyond available information to identify what may reasonably be true.
- Predicting: anticipating next events or the outcome of a situation.
- Elaborating: explaining by adding details, examples or other relevant information.

**Integrating Skills** – Integrating skills are used while connecting and combining information.

- Summarizing: combining information efficiently into a cohesive statement.
- Restructuring: changing existing knowledge structures to incorporate new information.

**Evaluating Skills** – These skills are related to assessing the relevance, rationality and quality of ideas.

- Establishing criteria: setting standards for making judgment
• Verifying: confirming the accuracy of claims.

The various thinking skills and its components are also highlighted through the following diagram:

**FIGURE 1.1**

Diagrammatic Representation of Thinking Skills

Thinking skills that promote effective solutions to problems are critical thinking, deductive thinking, divergent thinking, inductive thinking, lateral thinking, metacognitive skills, visual thinking and vertical thinking. Higher order thinking includes critical, logical, reflective, metacognitive and creative thinking. These skills are activated when students of any age encounter unfamiliar problems, uncertainties, questions or dilemmas. Successful applications of these skills result in higher order thinking skills like explanations, decisions, performances, and products that are valid within the context of available knowledge and experience and promote continued growth in higher order thinking as well as other intellectual skills.

Further the most basic premise in the current thinking skill movement is the notion that students CAN learn to think better if schools concentrate on teaching them HOW
to do so (Presseisen, 1986). To develop thinking skills among students, there is a dire need to understand different types of thinking.

1.1.3 Types of Thinking

**Perceptual or Concrete Thinking**: It is simplest form of thinking. It is carried out on the perception of actual or concrete objects and events.

**Abstract Thinking**: It is abstract thinking where one makes use of concepts, generalized ideas and language. It is superior to perceptual thinking.

**Critical Thinking**: It is the process of evaluating statements, events, arguments and experiences. It is the judging of statements based on accepted criteria.

**Convergent Thinking**: This type of thinking is cognitive processing of information around a common point, an attempt to bring thoughts from different directions into a union or common conclusion.

**Reflective Thinking**: This is higher form of thinking. There is an insightful approach to thinking rather than trial and error. It takes all the relevant facts arranged in a logical order to arrive at a solution.

**Non-Directed or Associative Thinking**: It is daydreaming, fantasy, delusions, free flowing uncontrolled activities

**Inductive Thinking**: This is the process of reasoning from parts to the whole, from examples to generalizations.

**Deductive Thinking**: This type of reasoning moves from the whole to its parts, from generalizations to underlying concepts to examples.

**Vertical thinking** – Vertical thinking refers to solving a problem by analysis. It focuses on the known and correct method to address a particular problem. It involves the solving of problem using conventional logical processes.

The all above mentioned thinking skills are reactive. But there is need of other types of thinking i.e. ‘proactive’. This requires “operacy” or the ‘skill of doing’ and it requires thinking that is constructive, creative and generative. Some of them like creative thinking, lateral thinking and parallel thinking are explained in detail in following paragraphs.

**Divergent Thinking**: In Guilford (1956) ‘structure of intellect’ divergent thinking processes are those which stem from the assumption that there may be several new ways to solve a problem. It involves a broad scanning process, enabling a person to evolve as many solutions as possible. So it is used when one is confronted with a
problem, which has many possible solutions. This type of thinking is, therefore essential for the development of creativity, creative expression and inventions.

**Creative thinking:** Creative thinking is concerned with the thinking that helps an individual to create, discover or produce a new idea or object including the re-arrangement or reshaping of what is already known. De Haan and Havighurst (1961) stated that creativity is the quality which leads to the production of something new, may be new to society or merely new for the individual who created it. Creativity is the ability to generate novel and useful ideas and solutions to everyday problems and challenges. It involves the transaction of one’s unique gifts, talents and vision into an external reality that is new and useful. Creativity (C) is multidimensional. It is an ability to synthesize the given information in various novel and non-conventional ways. It is a function of knowledge (K), Imagination (I), Evaluation (E) and Conceptual Structure (CS)

Mathematically \[ C = K \times I \times E \times CS \]

The definition of creativity depends upon the ways of defining it. Creativity has been viewed by Guilford (1956) as divergent thinking in his famous structure (S.I) of model. According to him, creativity is, by no means, a unitary trait but is rather a collection of complex component abilities and other traits. Divergent production abilities plus the redefinition abilities of convergent production category and sensitivity to problems which falls into evaluation category constitute Creativity. Torrance (1966) Conceived Creativity as “ a process of being sensitive to problem, deficiencies, gaps in knowledge, missing elements, disharmonies and so on, identifying the difficulty, searching for solution making guesses, or formulating hypotheses about the deficiencies, testing and retesting these hypotheses and possibly modifying them, and finally communicating the results.” According to Passi (1972) creativity is a multi- dimensional attribute differentially distributed among people and includes chiefly the associated factors of seeing problem, fluency, flexibility, originality, acquisitiveness and persistency. Alvino (1990) looks at creativity as “ A novel way of seeing or doing things that is characterized by four components- fluency (generating many ideas), flexibility (shifting perspectives easily), originality (conceiving of something new) and elaboration (building of other ideas). Edward de Bono (1992) has brought in three diverse concepts into his definition of creativity. At the simplest level, he says, creativity means “bringing into being something that was not there before.” The second aspect his definition raises is that “The new thing must
have, “value” and to these, he adds a third element namely that it must include the concepts of “unexpectedness and change.” The creativity, involved in generating idea, is a thinking skill that can be taught through the methods of lateral thinking.

**Lateral thinking** - De Bono (1967) invented the term ‘lateral thinking’. According to the Oxfords English Dictionary, Lateral thinking is “… a way of thinking which seeks the solution to intractable problems through unorthodox methods, or elements which would normally be ignored by logical thinking”. Lateral thinking is specifically concerned with the generation of new perceptions and new ideas. In general it includes thinking outside the box. The purpose of lateral thinking is to overcome the limitations by providing a means to restructure the line of thought, escaping from click patterns and putting information together in new ways to give new ideas. Lateral Thinking suggests that the student or problem solver should explore different ways of examining a challenging task, instead of accepting what appears to be the solution with seemingly the most potential and going forward. Here thinking is a combination of perception and logic. Lateral thinking is essential in perceptual thinking. It aims at freeing the mind from the imprisonment caused by already established thinking patterns and generating innovative ideas. Lateral thinking is more concerned with the movement value of statement and ideas. Human brain, which is the center of thinking process, has two parts, namely right hemisphere and left hemisphere. Left hemisphere is concerned with vertical thinking which comprises analytical and verbal thinking process. In vertical thinking, the traditional, logical thought that looks at a reasonable view of a problem or situation and works generally in a path of least resistance. On the other hand, right hemisphere is concerned with lateral thinking consisting of intuitive and visual thinking processes.

As a matter of fact, a thinker will not be able to perceive new ideas if he simply sticks onto conventional lines of thought. “You cannot dig a hole in a different place by digging the same hole deeper.” (de Bono, 1967).

“Lateral thinking is for escaping from established ideas and perceptions in order to find new ones.” (de Bono, 1967). It is based on ‘self-organizing’ information system. “A self-organization information system allows incoming information to organize itself into pattern. These patterns are not symmetric. There is need of a means for cutting across patterns. Lateral thinking provides that means.” Thus lateral thinking is based on information behavior in self-organizing system. The specific meaning of ‘lateral thinking’ covers the use of specific techniques which are used to help us
generate new ideas and new perceptions. This is directly concerned with creative thinking. The general meaning of ‘lateral thinking’ covers thinking that sets out to explore and to develop new perceptions instead of just working harder with the existing perceptions. In this way, lateral thinking is closely connected with perceptual thinking. Thus Lateral thinking is a set of attitudes, idioms and techniques including movement and provocation for cutting across patterns in a self-organising asymmetric patterning system.

**Parallel Thinking**– De Bono originated parallel thinking which is an alternate to argument, where each thinker puts forward his or her thoughts in parallel with the thoughts of others – not attacking the thought of others. Parallel thinking means at each moment everyone is looking in the same direction. Thus parallel thinking is a notion of co-operative team thinking rather adversarial thinking and a focus on exploration and design rather than analysis. The essence of parallel thinking is that individuals of a group think in the same direction at all points in the given time. Although the direction may be changed but each thinker thinks in the same direction. It allows the brain to maximize its sensitivity in different directions at different times. Parallel Thinking provides a method of thought processing that is practical, constructive, and invites participants to give their full attention to one point of view at a time. It can be taught, modeled, and learned. Additionally, de Bono (2008) believes that parallel thinking complements and supports the theory of Emotional Intelligence (Goleman, 2006) in which managing and understanding emotions effectively and using them in thinking and reasoning correlate with life outcomes.

Wikipedia defines Parallel thinking as a thinking process where focus is split in specific directions. Another definition provides that “In general Parallel thinking is a process, focusing ever more on explorations – looking for ‘what can be’ rather than for ‘what is’. There is co-operative and co-ordinate thinking. It improves decision making productivity, greater degrees of participation and higher quality dialogue and decisions. It reduces conflicts and can be used at all levels. Thus parallel thinking guides thought processes in one direction at a time so one can effectively analyze issues, generate new ideas and enhance quality thinking.

1.1.4. **Parallel Thinking v/s Lateral Thinking v/s Creative Thinking**

There are significant differences as well as overlaps between parallel thinking, lateral thinking and creative thinking, it is difficult to determine which of these thinking
skills are more important. So one would expect, a combination of the above thinking skills may come in handy for a particular situation.

Parallel thinking is a process that segments individual or group thinking that leads to significant increase in the efficiency and effectiveness of the thinking process. On the other hand lateral thinking is a set of tools and structured techniques in order to develop truly innovative ideas and solutions while creative thinking is based on the premise that the best way to get a good idea is to get lots of ideas. Parallel thinking is cooperative, lateral thinking is generative and creative thinking is creative in nature. In Parallel thinking each thinker puts forward his or her thoughts in parallel with the thoughts of others, not attacking the thought of others. While in lateral thinking one can make directly deliberate jumps from one direction to another approaching different principles and ideas. On the other hand creativity is the ability to take existing objects and combine them in different ways for new purposes.

Parallel thinking is almost the exact opposite of adversarial thinking where each party deliberately takes an opposite view. Here at each moment each person is looking in parallel from the same point of view with emphasis on designing a way forward. All the ideas including contradictions are laid out in parallel, a solution is constructed for the problem at hand. Whereas, lateral thinking works outside the yes-no system. It leads one to think across different domains, helping one to examine problem from many different perspectives and ultimately a preferred solution can be implemented after critical evaluation. But creative thinking emphasizes possible ways of solving a problem, not the implementation of a particular solution. In creative thinking everyone uses information in setting up new ideas. But in lateral thinking, we tend to explore all the different ways of looking at something.

In general, parallel thinking is a further development of the lateral thinking process as parallel thinking is more regulated form of thinking than lateral thinking. The essence of parallel thinking is that at any moment everyone is looking in the same direction—but the direction can be changed. While lateral thinking includes such powerful techniques of thinking out of the box which enable individuals, teams and entire organizations to significantly improve their ability to develop creative thinking. There is an overlap with creativity, since both (lateral thinking and creative thinking) are concerned with producing something new, but lateral thinking is a more precise definition of the process of changing perceptions, changing the way we look at things.
Therefore, it is clear that in parallel thinking process, lateral and creative thinking skills are also involved.
Thus we have to focus on development of these thinking skills. Fortunately, research has shown that it is possible for students to acquire thinking skills in the classroom through various methods, techniques, activities, problem-solving exercises and so on.

1.2.0 Teaching for Thinking

“Thinking is not intelligence or information or being right but an operating skill that can improve” (de Bono 1994).

Gough (1991) says that thinking skills are perhaps most important in today’s information age, and are viewed as crucial for educated persons to cope with a rapidly changing world. If thinking is viewed as a separate competence, then one must presume that thinking can be taught. The weight of evidence suggests that some deliberate instruction or training can help people become better creative thinkers and creative problem solvers. As Ristow (1988) asserted that direct teaching of thinking skills can produce better and more creative thinkers. Further a large number of researchers (like Barba and Merchant 1990, Bass and Parkins 1984, Robinson 1987, Freseman 1990, Kagan 1988) have emphasized that instructions on thinking skills enhance academic achievement. Not only this, the benefits of developing thinking ability are manifold. By developing one’s thinking skills one can make achievements; can become successful; can shine in social life; can attain emotional, social and economic maturity and so on. Also it is possible to transform one’s aggressive tendencies, bad temper and other negative tendencies into creative and constructive approaches.

Methods that are commonly used for teaching how to think are Philosophy for children (Lipman et al, 1980), Instrument Enrichment ( Fewerstein, 1980), CoRT thinking lessons (de Bono, 1986), Six Thinking Hats (de Bono, 1986), Somerest thinking skills ( Blagg et al, 1988) and Nisbel et al (1990) lists over 30 such programs. Since the 1980’s thinking skills appear in school in some countries like UK and Netherlands. It could be said that thinking methods are intervention that make a child a more effective thinker at a particular part of time. The “random word” technique works very well with children of all ages. They enjoy findings new ideas using random words. “PMI” (Plus points, Minus points, Interesting points), “OPV” (Other People’s Views), “Truth, Logic and Critical thinking” and “Hypothesis, Speculation and Provocation” are other important methods quite easy to teach to children.
Edward de Bono has developed a program for teaching a very broad concept of thinking of the whole mind. De Bono uses the concept of the mind as a pattern making and pattern using system described in “The Mechanism of Mind”. He claims that there are three possible states of thinking: natural thinking, subjective thinking and directed thinking.

In natural thinking, the mind flows from idea to idea. The end result is haphazardly traveled that can move a considerable distance from the topic being discussed. In subjective thinking, the central subject matter is kept firmly in mind so that rather than a free drift from idea to idea, the tendency is to move from an idea back to the central subject. Although this type of thinking is not as remote as natural thinking, the exploration of the idea is still haphazard and may be limited if there is an emotion content. Directed thinking, is what the CoRT is all about. The central subject matter is supported by a series of techniques having specific tools in which one has to direct his thinking. With directed thinking there is less drift, thinking is more purposeful and the whole idea can be explored. Thus there are various methods/ techniques to develop different types of thinking skills. Some of them which are recommended by de Bono (1992) to develop parallel thinking, lateral thinking as well as creative thinking are presented through Table 1.1.
### Table 1.1.
Different Methods/ Techniques for the Development of Different types of Thinking

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All the above mentioned techniques in Table 1.1 are concerned with improving parallel, lateral and creative thinking. The present study revolves around one of these strategies which develop parallel, lateral and creative thinking simultaneously. This is Six Thinking Hats strategy.

#### 1.3.0 Six Thinking Hats Strategy
Six Thinking Hats is a strategy devised by Edward de Bono which requires students and teachers to extend their ways of thinking about the topic by wearing a range of different thinking Hats. It is simple, effective parallel thinking process that helps people to be more focused and mindfully involved. In this strategy each and every member can learn how to separate thinking into six valuable functions and roles. Each thinking role is identified with a color symbolic “Thinking Hat”. By mentally wearing
and switching “Hats”, one can easily focus or redirect thoughts, the conversation or the meetings. The six thinking hats is a strategy for doing one sort of thinking at a time. There are six colored hats and each color represent a type of thinking. These hats are directions to think rather than labels for thinking. It separates ego from performance (de Bono, 1985). The Six Hats system encourages performance rather than ego. It allows one to unbundle thinking. Thus, it encourages parallel thinking and full spectrum thinking as well.

According to de Bono it improves lateral thinking also. As Lateral Thinking is “a way of solving problems by unconventional or apparently illogical means rather than using a traditionally logical approach”. It is a separation of the thinking into divergent and convergent thinking. In Six Thinking Hats strategy the thinking is separated into six areas represented by six different colors: white, red, yellow, black, green, and blue. The white hat is to only look at facts, information and data. The red hat is to give emotional response to a subject. The yellow hat is to view a subject from a logical positive side. The black hat is to view a situation or idea from a logical negative side. The green hat is to generate alternatives or innovative ideas. The blue hat is kind of a facilitator viewpoint. It is to think about thinking.

The six thinking hats strategy is actually based on the theme of Parallel thinking, however it has the same rationale as the separation of the thinking in the lateral thinking. Therefore it is a good illustration of how separation of divergent thinking and convergent thinking is at the essence of Lateral thinking. Also the close association between parallel and lateral thinking makes it useful in improvement of both the thinking skills.

Besides this, six thinking hats strategy systematically provides an opportunity for creativity in an environment that is free of the criticism and confrontation. It generates creative ideas in a novel way. As already mentioned, each hat focuses on certain aspect of thinking in this strategy. In order to solve a problem in the first stage, it is necessary to generate novel ideas and insights through the use of each hat separately and at later stage, pool all the hats together in a synergistic way to solve the problem creatively.

Thus this strategy is a framework for thinking and can incorporate parallel thinking, lateral thinking as well as creative thinking. Valuable judgmental thinking has its place in this system but it is not allowed to dominate as in normal thinking. There are six metaphorical hats and the thinker can put them on or take them off. The hats must
never be used to categorize individuals. When done in group, everybody wear the same hat at the same time. According to de Bono(1985) the descriptions about hats are:

**White Hat:-**

The white hat is neutral and symbolizes ‘information’. The white (absence of colour) indicates neutrality. Think of white paper. When it is in use, everyone focuses directly and exclusively on information. This covers facts, figures, information needs and gaps. Imagine a computer that gives the facts and figures for which it is asked. The computer is neutral and objective. It does not offer interpretations or opinions. When wearing the white thinking hat, the thinker should imitate the computer. Thus the white hat lays out the means for obtaining the needed information about the topic/subject-matter. It includes following types of questions:

What information do we have?
What information do we need to get?
What information is missing?
How are we going to get the information we need?

**Red Hat:-**

The red hat is for intuition, feelings, hunches and emotions. Think of fire and warmth. The red hat legitimises emotions and feelings as an important part of thinking. The red hat makes feelings visible so that they can become part of the thinking and also part of the value system that chooses the route on the map. The red hat provides a convenient method for a thinker to switch in and out of the ‘feeling’ mode in a way that is not possible without such a device. The red hat allows the thinker to put forward his feelings and intuitions without any need to justify them. The red hat covers two broad types of feeling. Firstly, there are the ordinary emotions such as fear
and dislike to the more subtle ones such as suspicion. Secondly, there are the complex judgements that go into such types of ‘feeling’ as hunch, intuition, sense, taste, aesthetic feeling and other not visibly-justified types of feeling. It includes following types of questions:

What do I feel about this matter right now?
My intuition is as follows……………
I have this feeling……………
I am very angry about this……………
There are many doubts………

**Black Hat:**

The black hat is for thinking that is cautious, careful and critical. Think of black and a judge’s robes. It belongs to judgment. The black hat is used to point out why a suggestion does not fit the facts, the available experience, the system in use, or the policy that is being followed. The black hat must always be logical. It is an objective attempt to put the negative elements onto the map. Black hat thinking is specifically concerned with negative assessment. It has mainly following questions:

Does this fit the facts?
Will it work?
Is it safe?
Can it be done?
What can go wrong?

**Yellow Hat**

Yellow Hat is the logical positive, why something will work and why it will offer benefits. The yellow colour symbolises sunshine, brightness and optimism. It can be
used in looking forward to the positive results of some proposed action, values and benefits. Thus it develops ‘value sensitivity’ which is required for constructive thinking. Yellow hat thinking is concerned with positive assessment just as black hat thinking is concerned with negative assessment. It is concerned with operacy and with ‘making things happen’. This hat thinking can be speculative and opportunity seeking. It also permits visions and dreams. It has mainly following questions:
Why it can be done?
What are the benefits?
Why it is a good thing to do?
What are the values here?

**Green Hat:**

Green Hat is the hat of creativity, alternatives and energy. The green colour symbolises fertility, growth and the value of seeds. Under this hat everyone looks for fresh ideas, modifications of an idea and possibilities. The search for alternatives is a fundamental aspect of green hat thinking. There is a need to go beyond the known and the obvious and the satisfactory. Here, the thinker uses creative pause also to move forward from an idea in order to reach a new idea. Provocation is an important part of green hat thinking. A provocation is used to take us out of our usual patterns of thinking. Thus green hat is important for lateral thinking also. It includes following types of questions:
What is interesting?
What can be alternative changes?
What can we do here?
Are there some different ideas?
**Blue Hat**

Blue Hat is the overviewing or process control hat. This hat organizes the thinking. Think of the blue sky above. The blue hat is concerned with Meta cognition. It decides on the focus, puts together outcomes, solutions, designs, next steps, etc. Blue hat thinking is also responsible for summaries, overviews and conclusions. It includes following types of questions:
- What are we thinking about?
- What do we want to achieve?
- What is the outcome here?
- Can we suggest a solution?
- What is the next step?

Thus, this strategy is to do only one kind of thinking at a time. The rationale behind the separation is first of all to maximize the sensitivity of the thinking about a particular area or field. The point is that a continuous thinking about a specific area is actually a stimulus for the thinking of the area itself. In other words, if a person gets only positive input about a subject then the mechanism of the mind will make the thinking directed in that area of thinking. It generates a spiral effect, where the sole thinking about an area makes it easier to think about that area, with a continuous upward effect. Positive input affects the thinking to think in positive ways, while negative input does it to think negative and creative input does it to think creative.

Six Thinking Hats is a tactic for incorporating various ways of thinking into the learning process. In simple terms this is a tool in which thinking skills are developed in an educational environment. Six Thinking Hats are also represented through Figure 1.2.
1.3.1. Role of Six Thinking Hats Strategy in Education

We have moved from the Information Age to the Concept Age. There is simply too much information out there, far too much for our children to be mere regurgitators of facts. Schools cannot hope to give even a fraction of the knowledge to a child that he will come across in his lifetime. Educational institutions must give their students the tools to cope with what life will throw at them, and in particular the ability to deal with new concepts and situations. Seitsinger, mentioned “Abstract national curriculum standards call for meaningful teaching and learning that are developmentally appropriate and that help students reach proficiency not only in basic skills but also in high order thinking skills and real world applications of skills.” Since 1999, thinking skills have been included in the National Curriculum in some western countries alongside ‘key skills’ such as those to do with communication and
information and communications technology (ICT). Although Indian education System has started recognizing urgent need to bring changes education and thinking as a hot topic is making place in curriculum yet no such provision for the same is suggested even in National Curriculum Framework in India. Therefore a dire need is being felt to use various thinking methods and techniques of developing thinking in education. Six Thinking Hats is just one such tool, that can be used to teach various types of thinking. The hats represent here different perspectives of thinking. Thinking Hats help learner’s analyze a topic, problem, or situation from different view-points. It also helps the learners to think about a topic in a systematic, objective and creative way. The first main purpose of this method is to simplify thinking by allowing a thinker to deal with one type of thinking at a time and the second main purpose is to allow a switch in thinking. Through Six Thinking Hats there is to request certain types of thinking. This method has many benefits to students as well as teachers.

**Benefits to Students**-

- The colors and hats provide a visual image that is easy to learn, remember and use.
- Students become independent thinkers.
- Thinking is visible, focused, in depth, and at higher levels of critical and creative thinking.
- The strategy can be used on a simple, concrete, abstract and sophisticated level.
- Listening, speaking, reading and writing improve with a strategy for focus.
- Interdisciplinary connections integrate the curriculum.
- Problem solving, decision making, leadership and independence are developed.
- Students led discussions and projects are focused and in depth.
- Students ask quality questions.
- Develop confidence among students.
- Self-evaluation in systematic manner.
- Listen more intently to the views of others to gain a deeper understanding of issues.
- Cooperative groups and teamwork are effective and organized.
Benefits for the Teachers-

- Teachers organize their ideas using different perspectives.
- Teachers can become effective facilitator.
- Conduct a richer, more balanced exploration of any subject.
- Objectively guide group discussions.
- Evaluate alternatives constructively.
- Improve research and writing skills.
- Think thoughtfully before speaking.
- Present ideas with more confidence.
- Solve problems.
- Grading is objective.

Benefits for the Educational Leaders -

Educational leaders find the Six Hats strategy valuable in two ways:

1. A meeting facilitation tool and
2. A teacher observation strategy.

As a meeting facilitation tool, the mental wearing and switching hats the whole teams can separate thinking into six modes for analyzing matters objectively and comprehensively. When teams separate emotion from fact, the benefits from the possible problems, the critical from creative thinking, the results include shorter meetings, thorough assessment of alternatives before making decisions, better communication and easier problem resolution. Hidden agendas are uncovered, and objectives are achieved without fragmented thinking and argument. All sides of an issue are addressed. The team works together to think clearly, objectively, systematically and creatively!

As a teacher observation strategy, educational leaders can see the questions and student responses and able to assess the depth and diversity of them. As the instructional process is observed, an administrator is able to effectively analyze the thinking into the six categories. Conferences between the teacher and observer are clear, objective, and systematic with the focus on developing in depth, critical and creative thinking. The administrator shows which thinking processes the teacher used
during the lesson and offers constructive suggestions and a plan for increasing use of those not in the lesson.

Thus, Six Thinking Hats is a tool which has multi-dimensional values in educational field. Its simplicity allows it to be applied in many scenarios. The methods are widely used at Prudential Insurance (the largest insurance group in the world). This is also in use at Honeywell, Motorola, Eli Lilly, Cargill, Fidelity Investments, National Semiconductor, and in many other companies. Healthcare groups, religious organization, financial institution, chemical and pharmaceutical companies, manufacturers and utilities are just a few of the industries using Six Thinking Hats. At present this is the part of curriculum in some western countries like Venezuela. But now is a time to use this method in Indian classrooms also. The present study is an effort in the same direction.

1.4.0 RATIONALE OF THE STUDY
The rapid advancement of science and technology in the 21st century, characterised as the age of knowledge, in addition to changes in the structure of societies. For today’s children nothing is more important than learning to think- learning to come up with innovative solutions to the unexpected situations that will continually arise in their lives. Unfortunately, most schools are out-of-step with today’s need: they were not designed to help students develop as creative thinkers. So, it is necessary to break existing thinking patterns in order to change perspective and create new, original ideas. To be a successful creative thinker, it is crucial to have the attitude to see the world in the different way from various perspectives, facing the world and its problems in an exciting and flexible way. Consequently, it becomes the duty of educators to realize the importance of teaching higher order thinking skills to students. Many such training programs that teach thinking skills are available. One such method that shifts our thinking from ‘reactive’ to ‘proactive’ and ‘constructive’ to ‘generative’ is Six Thinking Hats method, devised by de Bono. This strategy provides the framework from parallel thinking and the avoidance of time wasting argument. While at the same time incorporating reference to the renowned ‘Lateral Thinking’ processes and with the potentially to be substantially enhanced by the use of the thinking tools. Moreover the formality and “game” aspect of the strategy are its greatest virtues. Children use to take interest in this and they are fully involved. This
is a simple, effective parallel thinking process that helps people be more productive, focused and mindfully involved. This method is widely used in business sector but some countries have initiated the application of six thinking hats method in the field of education also. India should also make some efforts in this direction. There is dire need to use such an effective tool as teaching strategy for Indian school children suited to age, ability, culture, ideologies and background so as to be helpful in developing parallel and lateral thinking skills. The hunch has been put forward that Six Thinking Hats strategy can help improving all these thinking skills but it is less supported by empirical findings. It is in this context that present study has been planned and conducted to find out the effects of Six thinking hats strategy for developing of parallel thinking, lateral thinking and general creativity among high school students.

1.4.1 Statement of the problem:
On the basis of the above discussion and rationale given therein, the problem was framed as under:

“Effectiveness of Six Thinking Hats Strategy on the development of Parallel Thinking, Lateral Thinking and General Creativity in High School Students.”

1.4.2 Operational Definitions of the key terms
1. Six Thinking Hats strategy:
Six Thinking Hats strategy has six colored metaphoric hats and each color of the hat represents a different mode of thinking. This is a system of conscious thinking that focuses an individual’s thinking in a specific direction for a specific period of time. It is a simple, effective parallel thinking process that helps people to be more productive and mindfully involved. It requires students and teachers to extend their way of thinking about a topic by wearing a range of different thinking hats. The same definition of Six Thinking Hats strategy is adopted in the present study. The descriptions about six thinking hats are given in the following flow diagram:
2. Parallel Thinking:
Parallel Thinking means everyone is thinking in the same direction not attacking the thought of others. It allows the brain to maximize its sensitivity in different directions at different times. In parallel thinking, main focus is on exploration and design rather than analysis. The term parallel thinking has been defined in the same context in the present study.

3. Lateral Thinking
Lateral thinking is concerned with changing perceptions, concepts and ideas. It covers thinking that sets out to explore and to develop new perceptions instead of just working harder with the existing perceptions. It is specifically concerned with changing preconceived notions to bring out new ideas. The same definition has been used in the present study.

4. General Creativity:
General Creativity is concerned with the thinking that helps an individual to create, discover or produce a new idea or object including the re-arrangement or reshaping of
what is already known. De Haan and Havighurst (1961) stated that creativity is the
gility which leads to the production of something new, may be new to society or
merely new for the individual who created it.

5. High School Students:
High school students mean those students who are studying in IX class taken in the
present study.

1.4.3 Objectives of the Study:
1. To study the effect of Six Thinking Hats strategy on Parallel thinking of
   high school students.
2. To study the effect of Six Thinking Hats strategy on Lateral thinking of
   high school students.
3. To study the effect of Six Thinking Hats strategy on General Creativity of
   high school students.
4. To study the effect of Six Thinking Hats strategy on Argumentativeness
   of high school students.

1.4.4 Hypotheses of the Study:
In order to achieve the objectives of the study, null hypotheses were framed. The
reason being that it was the only testable form of hypotheses and there are not many
studies with the investigator to frame directional hypotheses. Following are the
hypotheses framed:

1. There is no significant effect of Six Thinking Hats strategy on Parallel
   thinking of high school students.
2. There is no significant effect of Six Thinking Hats strategy on Lateral
   Thinking of high school students.
3. There is no significant effect of Six Thinking Hats strategy on General
   Creativity of high school students.
4. There is no significant effect of Six Thinking Hats strategy on
   Argumentativeness of high school students.

1.4.5 Delimitations of the Study:
The study has its delimitations with respect to title, sample selected,
experimentation process and treatment applied. Apart from this, other delimitations of
the study were:
1. The study is limited to only one strategy of teaching i.e. Six Thinking Hats whereas there could be some other effective strategies also.

2. The sample was selected from a Government Senior Secondary School (Boys) located in an urban area.

3. The home environment of the students was not included in the study.

4. The other variables like watching television and extra study materials available through any other source that may have affected the thinking process have not been accounted for.

5. Various extraneous variables might have affected the results. The variables that the researcher could not think of, or the variables which were beyond the control of the researcher, have not been included in the study.

6. The study is also limited to teacher variable. Teachers of varying aptitude, with different culture, ideologies and background, teaching the students have not been taken care of. This variable has neither be controlled nor matched for different groups of students.