CHAPTER-7

FINDINGS, IMPLICATIONS AND SUGGESTIONS

This chapter is devoted to report the findings of the study based on the analyses of data. It is followed by the educational implications and a few suggestions for further study in this direction.

7.1.0 FINDINGS

The study was conducted with respect to the effectiveness of Six Thinking Hats strategy in developing parallel thinking, lateral thinking, general creativity and argumentativeness. The effectiveness of the strategy was studied by Pre-test Post-test design. The results are based on quantitative analysis. The findings related to the same have been presented in the following section: -

7.1.1 Effect of Six Thinking Hats strategy on Parallel thinking of High School Students:

1. Students of experimental group achieved much higher mean scores than the student of control group. Thus Six Thinking Hats strategy affected improvement in parallel thinking of high school students.

2. Intelligence also affected improvement in parallel thinking scores. High intelligent students achieved much higher scores than middle and low intelligent students.

3. The students achieved higher mean scores at post-test than at pre-test showing that the parallel thinking increased after the treatment i.e. post-test.

4. The students belonging to experimental group achieved the highest mean scores on the post-test after the experiment. It indicated that the Six Thinking Hats strategy is helpful in developing parallel thinking of the high school students.

5. The high intelligent students of experimental group achieved the higher mean scores on the post-test than their counterparts in control group on parallel thinking test scores. So the Six Thinking Hats strategy was better than Conventional method in developing parallel thinking of high school students.
7.1.2 Effect of Six thinking Hats strategy on Lateral thinking of High School Students:

1. The students of experimental group achieved much higher mean scores than the students of control group. So, Six Thinking Hats strategy was most helpful in enhancing the lateral thinking of the high school students.

2. The students of high intelligent groups achieved slightly higher mean scores at lateral thinking test than their counter parts with medium or low intelligent students. It shows that the intelligence affected the results on lateral thinking test significantly.

3. The students achieved higher mean scores at post-test showing that the lateral thinking ability increased after the treatment i.e. post-test.

4. There was a significant difference among students of different levels of intelligence when they were pre-tested and post-tested indicating that the Six Thinking Hats strategy was more effective in improving lateral thinking scores of the high intelligent students in comparison to middle or low intelligent students.

5. The experimental group achieved the higher mean score on the post-test than their counterparts in control group on lateral thinking indicating that the Six Thinking Hats strategy was helpful in developing lateral thinking of high school students.

7.1.3 Effect of Six thinking Hats strategy on General Creativity of High School Students:

1. The students of experimental group achieved much higher mean scores than the students of control group and the creative ability was much higher in experimental group. So the Six Thinking Hats strategy was very much effective in development of general creativity of high school students.

2. Intelligence was also found to affect the result on general creativity test. The high intelligent students achieved slightly higher mean scores at general creativity test than their counter parts with medium or low intelligent students.

3. The students achieved higher mean scores at post-test than at pre-test showing that the creative thinking ability increased after the treatment i.e. post-test.
4. The significant differences existed among students of experimental and control groups when they were pre-tested and post-tested. The experimental group achieved the higher mean score on the post-test than the control group on general creativity test. So it was clear that the Six Thinking Hats strategy was helpful in enhancing creative ability of high school students.

5. There was a significant difference among students of different levels of intelligence when they were pre-tested and post-tested indicating that Six Thinking Hats strategy was more effective in improving creative thinking ability of the high intelligent students in comparison to middle or low intelligent students.

7.1.4 Effect of Six thinking Hats strategy on Argumentativeness of High School Students:

1. The argumentation level was higher in experimental group. The students of experimental group achieved higher mean scores on argumentativeness test than the students of control group. So the Six Thinking Hats strategy was more effective in improving argumentation level of the high school students.

2. The students achieved higher mean scores for argumentativeness on post-test than pre-test i.e., after the experimentation So the Six Thinking Hats strategy was effective in developing argumentativeness.

3. The experimental group achieved higher mean score on the post-test than their counterparts in control group on argumentativeness. So it was clear that the Six Thinking Hats strategy was more helpful in stimulating argumentativeness of the students than the Conventional method.

7.2.0 IMPLICATIONS

The present study revealed that ‘ability to learn’ and ‘ability to think’ are two qualities which make the students effective thinkers. For these qualities, the students must have high order thinking skills i.e. problem recognition, analysis, finding new solutions, evaluation etc. Lifelong learning and thinking skills are necessary to be acquired by the students to function successfully in a highly technical society. The study carried the view that if the students are provided free environment in the classroom and are taught through six thinking hats strategy, they will come up with innovative,
alternative and effective ideas. Teaching of such strategies as revealed by the study becomes all the more important for high school students because the students of that particular age group need to learn thinking skills to help them further.

The study further focused that the teaching through six thinking hats strategy affects the thinking of high school students. Instruction through this promotes intellectual capacity and fosters parallel, lateral as well as creative thinking. Since it is very essential for educators to realize the importance of teaching thinking skills to students, the strategy like Six Thinking Hats is urgently required to bring reforms in traditional thinking style. The study also revealed that the teaching through Six Thinking Hats strategy was not only effective in developing parallel thinking; it also enhances lateral thinking, creative thinking and argumentation level of the students. The findings of the present study have implications for all those associated with education system in general and particularly to students, teachers, teacher educators, parents, curriculum planners etc. Apart from education this strategy can be quite useful for other sectors too.

1) Students: - The study has its implications for the students in general in every aspect of life. The challenges of this new millennium can be met only by being a skillful thinker. Today, because of the information explosion a child is bombarded with a lot of information. To search for the relevant information out of this huge stock, in itself is a cumbersome task. The left over information gets accumulated as information garbage. The need of the hour is recycling this waste i.e. converting this information garbage into the wonderful new ideas and possibilities, which are definitely a must for equipping students to stay competitive in this rapidly changing and highly competitive world. This strategy can help students in developing various thinking styles that is essential for innovations, generating new ideas, coordinating and cooperative thinking and being open to new perspectives and new dimensions. It can open a new pandora’s box for the students. They can learn to use the discarded or even the absurd information in a productive and generative way. Such efficient thinker can achieve a lot in different fields of life.

The deliberate action of wearing the six hats creates useful contexts to be free to think in the mode of objective thinking under white hat, feelings and emotions
with red hat, critical thinking under black and yellow hat, creative and lateral thinking under green hat, organization of thinking with blue hat. Therefore, the strategy can prepare the students not only to success in exams but also in their future careers and real life situations. This strategy can also provide them very strong base for dealing with real life problems efficiently through multi-dimensional thinking. This strategy is of great help as seen in the study in the development of parallel thinking, lateral thinking, general creativity and argumentativeness among high school students. Since the idea is to use six different colored hats to denote different perspectives, a student is able to think in different directions dealing with one direction at a time. So the students give full attention to every perspective; be it positive, negative, creative, evaluative, factual or conceptual viewpoint. This is exactly what parallel thinking is. This can help students to put forth their views without opposing other person’s view. Therefore the students trained in this strategy were more accepting to other people’s views and regard the contrary ideas. They can learn to use these ideas in exploration of their thinking. Later on, it would be helpful to teach some “design thinking” directly in a practical way which focuses on ‘what can be’ rather than ‘what is’. This type of thinking helps the students to find new possibilities in every field of their life.

Sometimes the need arises to discard the prevalent or conventional line of thought and look in different directions simultaneously to get a solution to any problem. Here lateral thinking comes into effect which is about changing concepts and perceptions. In six thinking hats strategy as each different hat has a different style of thinking, it becomes an important and powerful tool in the development of lateral thinking among students. It is used to look at decisions from a number of important perspectives. This strategy not only helps them in their class tests and various competitive exams but also prepares them to take good decision in life by judging all perspectives. General Creativity can also be developed by this strategy as the students generate new and alternative ideas by using green hat thinking. The teaching of creative and constructive thinking has become essential in education today. Individuals who have constructive thinking skills feel the need to improve themselves and revise what they have learned. Individuals who have not gained this skill remain rigid in relation to what was learned and are not generally
creative and constructive. Therefore there is a need to apply such type of teaching strategy that will teach creative and constructive thinking to students. The strategy in the present study fulfilled all these conditions.

Another very important aspect is that it can provide a congenial environment in classroom for such topics on which students are reluctant to open up, for example: AIDS, Drugs Abuse, Rape or Sex Education because it is an emotive issue-or because they are shy. Under the six thinking hats they can offer their thoughts without the fear of being shouted down by others. Through the use of this strategy students can improve their argumentation level which is helpful during communication. Students will be able to put forth their point of view more confidently as they are clear about the conceptual and factual information with respect to all perspectives of the topic. Education system also needs to consider that Six Thinking Hats strategy has a positive influence not only on the higher order thinking skills but also on great social and moral values like open mindedness, flexibility in outlook, positive attitude and cooperation. Therefore, there is a need for this strategy of parallel thinking from the earliest stage. This develops the skill of using their mind fully rather than just taking a position and defending it. So every effort must be made for encouraging students to learn and to use such strategies. Educational Institutions must make more and more use of this strategy to make the students to cope with present age.

2) **Parents:** The study has its implications for the parents also. Through this strategy they can develop these thinking skills in their children as well as in themselves. The exposure to such strategies can help in shape their own thinking and belief system. It is the responsibility of the mother and father to organize such an environment that can help in fostering higher thinking skills in their child. It can help in filling the generation gap which is becoming a considerable issue at present. Parents are the first person who can start the training of their children in such type of thinking skills at an early age. Therefore, their acceptance for the new thinking tools can significantly help the children who themselves are good thinkers. The fear to experiment something new and the rigidity in the belief system makes them conservative which at times becomes intolerable to their children. The Six Thinking Hats strategy is easy to learn and they can use it in deliberate manner by asking the questions related to different thinking hats to their
children at home in different situations. It can give them an opportunity to broaden their vision and accept even the rarest possibility. In this manner, they may feel more connected to their own children as they may be able to understand their perspective too.

After themselves being trained in such a strategy they can provide such a congenial environment to their child where the child can become habitual in bringing positive changes in his own behavior. The parents trained in this strategy may motivate to the discussions and free talk with their children instead of imposing their decisions on them. This strategy separates ego from performance so one can think objectively from different point of view focusing upon one at a time. Therefore, this will reduce their authoritarian nature and a better environment for the suitable development of their child will be created. Even simple issues like where to go for holiday or how much pocket money to be given can become a matter of producing innovative ideas and thinking parallelly and laterally.

3) **Teacher Educators:** - The study has its implications for teacher-educators. The teacher-educators will have to take up such methods of teaching that can help students to stimulate their thought processes. If the teacher-educators train the teachers in such alternative methods/ strategies of teaching, it will enable them to apply these methods during their class-room teaching for development of higher order thinking skills.

As the study reveals that the Six Thinking Hats strategy was highly effective in developing parallel, lateral and creative thinking of the students. This strategy individually as well as in group was found to be successful in developing these types of thinking. It was also found that focusing directly on ‘teach to think’ sharpens their perceptions and help to generates innovative ideas. The teacher-educators will have to take up such methods of teaching that can help the student-teachers to bring up their thought processes. They will have to develop self learning material as well as training material for pre-service teachers and in-service teachers. The training given by them in the strategies like Six Thinking Hats helps the student-teachers to make use of these strategies in the common classroom situations. So the strategy can also helps the teacher educators in
developing the competence in idea generation, exploration of the subject from multiple points of view and solving problems with six different thinking hats in themselves as well as among pre-service and in-service teachers. Therefore there is a dire need for the inclusion of direct teaching of thinking skills in the teacher-training courses.

4) **Student teachers/ Trainee teachers:** - The study has its implications for the training of teachers of new generation. The strategy can provide a very strong base for bringing a change in thinking of our future teachers and helpful in educational reforms. It can train the future teachers with some idea generating tools. The student-teachers after achieving the mastery over it can use the strategy in their class. They can practice individually or in groups to be able to effectively use of it to generate alternative and innovative ideas in an effective manner.

Student-teachers can learn to engage their students in one sort of thinking at one time which is essential for parallel thinking. They will be able to know the way to assign their students simple exercises including various aspects in an interesting manner under six thinking hats. Because in this strategy, hats are based on the principle of parallel thinking; instead of trying to do everything at once, the thinking is broken down into six segments, and everyone thinks in the same direction (by wearing the same colour hat) at the same time. De Bono along with some other educationist have regarded that the society kills the one third creativity of a child whereas the school kills the other two third. But if students are timely exposed to such thinking styles, this greatest gift of God to the child in form of these types of thinking can not only be protected but also stimulated in a big way. Thus this type of teaching strategy must be included in teacher training programs also.

5) **In- Service Teachers:**- The study has its implications for in-service teachers. A teacher works within the vast framework of the school education system with its goals, curriculum, materials, methods and expectations from the teacher. In learning centred education the students participate actively in the learning process by exchanging ideas with others, writing, discussing, making connections with the past, putting knowledge they have acquired into practice in daily life, solving problems, and thinking on their own. For a teacher to be able to develop a learning
centred class, they need to think in a creative way themselves and use this skill to create various stimuli and opportunities that will stimulate the students to think. Students learn a lot from their teachers who themselves are effective thinkers. It is therefore very imperative and important that the in-service teachers must be trained by this strategy. This strategy provides desired teaching inputs to the teachers so that they may develop such thinking skills that can match to the thinking of future generations.

Teacher is the only person who can help students in providing a congenial environment for developing thinking. The parallel thinking is the most desired type of thinking in present era which is based on cooperative and coordinated thinking. It can solve not only the national problem but also the future problems of the society in an effective and quicker manner. It removes ego from performance and focuses on ‘what can be’ rather than ‘what is’. Through the proper use of six thinking hats strategy a teacher can improve this type of thinking in their students as well as in him.

Further, after the training of strategy, it will be successfully used by the teachers in their classroom situation and ultimately can provide their students a learning environment to look at important decision from a number of different perspectives under six thinking hats. They can help them to arrange and rearrange their thinking manners in different situations to solve the problem, generate fresh ideas and better decisions. The teachers trained by this strategy will become thus more welcoming to the numerous questions and queries in the minds of students all the time. Instead of rote memory, emphasis should be laid on independent thinking. For this teachers can provoke the students by asking evocative questions to think in specific direction under various thinking hats and encourage the students for discussion. It helps the students to make better and innovative solutions by forcing them to move outside their habitual way of thinking and encourages for lateral thinking.

So, their perspective will definitely change their perception towards the methods of teaching. They will become more democratic in the class-room. After learning such strategies, they will be full of ideas. This strategy requires from teachers as well as students to extend their way of thinking about a topic by wearing different thinking hats. Therefore they will learn to improvise instead of cribbing about lack
of facilities. They will learn to use even anything and everything to illustrate the content instead of complaining about unavailability of interesting teaching aids and resources.

Further, maintaining the discipline without using corporal punishments is a big challenge for the new generation teachers. After exposure with the strategy, the teachers will be able to convert even the most provoking situations into some fruitful and productive situations. Conflicts and aggression will be suitably modified into discussions and cooperation by switching the thinking mode. Inclusion of new teaching methodologies like Six Thinking Hats and active participation can keep them well motivated and will help in creating the interest in learning. Ultimately it makes not only the students but even the teachers internally disciplined.

6) Curriculum Planners and Administrators: The findings of the present research once more asserted the need of thinking skills among high school students. The biggest challenge today is to develop educational programs and to use such teaching methods that assume that all individuals can become complete thinkers. There is an urgent need to develop such educational programs which not only transform the teaching of ordinary school subjects in a way to focus on thinking but also strengthen the skill of thinking in students. This strategy can efficiently strengthen the present curriculum without turning the present curriculum upside down. So this strategy can be integrated in the curriculum also. Some special time can be set in time table for such exercises, activities and games based on the six thinking hats strategy that may invoke the interest of the students in such thinking tools and ultimately make the students well trained in such strategies.

The study focuses on the ideas based on broad and different prospective in a logical manner. This strategy provides a useful and simple structure to incorporate feelings, intuitions and creative processes along with the more traditionally valued objective and critical thinking modes under six metaphoric colored hats. So the study and the strategy have its implications for the management people also to generate new ideas with better results. Even the bureaucrats and officials should get training in such strategies so that they can change their outlook towards the problems and may become capable of finding novel ideas to solve these problems.
by thinking in an efficient way. The present study has its implications even for a common man who can learn the strategy to bring change in their attitude as well as to solve their day to day problems.

The results of the study and implications delineated in the preceding paragraphs show that these thinking skills are of utmost importance in today’s human life. If we want our country to make progress at every front by reaching new milestones, conscious efforts need to be made to develop parallel and lateral thinking. The teacher-educators, teachers, students, parents and country-men in general need to adapt to such new strategies and skills.

7.3.0 SUGGESTIONS

The present study has been directed towards studying the effectiveness of Six Thinking Strategy on development of parallel thinking, lateral thinking and general creativity in high school students. It has its own limitations and delimitations. Therefore, it is desired that similar studies may be conducted after overcoming the limitations. Further, the experimental studies, like this, need to be repeated and done in a different cultural setting so as to test the reliability and validity of the findings. However, a few suggestions for further research:-

1. A similar study for effectiveness of the Six Thinking Hats strategy can be conducted for the students of senior secondary and higher education system.
2. A similar study for effectiveness of the Six Thinking Hats strategy can be conducted on management students, teachers and professionals.
3. A comparative study for effectiveness of the Six Thinking Hats strategy can be conducted for students from government and private schools.
4. A comparative study for effectiveness of the Six Thinking Hats strategy can be conducted for male and female students.
5. A similar experimental study may also be undertaken to explore the attitude of the students and teachers towards the Six Thinking Hats strategy.
6. Similar studies may be undertaken for students belonging to different socio-economic status.
7. Researchers may take up studies with a view to comparing other instructional method with Six thinking hats strategy. Micro level studies may help teachers to find a method of teaching that can develop parallel, lateral and creative thinking.
8. Studies at micro level going for content analysis of the worksheets, students responses and analogical etc. needs to be conducted so as to find out those convenient situations where parallel, creative and lateral thinking at its maximum.

9. Researches may be conducted component wise, area wise of parallel thinking and lateral thinking.

The investigator concluded the study with the hope that the findings would help in improving parallel thinking, lateral thinking, general creativity and argumentativeness of high school students to a great extent. It is also hoped that the studies suggested elsewhere would be carried out by others.