CHAPTER V
SUMMARY, CONCLUSIONS, EDUCATIONAL IMPLICATIONS AND
SUGGESTIONS FOR FURTHER RESEARCHERS

This chapter presents a summary, conclusions and recommendations on a study that set out to understand the relationship between motivational beliefs, learning strategies and academic achievement in Mathematics of college students. It also aimed at analyzing and comparing differences on motivational beliefs with achievement in Mathematics and learning strategies with achievement in Mathematics by taking components across gender and streams.

5.1 SUMMARY

Many psychologists and thinkers believe that motivation and learning strategies plays an important role in learning. If that is the case, in institutes of education especially in colleges and universities where learners are expected to be self-directed in their learning, motivation and learning strategies becomes an essential element. Therefore, this study can help students to regulate their learning behavior and to take responsibility for their own learning. Also they have to make decisions in such a way which will help them to accomplish their learning tasks. So the level of motivation and learning strategies may play an important role in the way they attend to these learning tasks. This study is also important for educators, teachers and learners of different streams.

Metacognitive abilities in mathematics mainly can be used for focusing on outcomes rather than technique, making learning experiential, giving students control over their own learning, motivating for studies etc. Metacognition, or the monitoring of one's mental activities, is essential to employing the appropriate information and strategies during problem solving. It involves student’s awareness and self regulation and thinking of their cognitive processes (Campione, Brown & Connell, 1989). The control of metacognition involves a variety of decisions and strategies, including identifiable behaviors as predicting, planning, revising, selecting, checking, guessing, & classifying (Artzt A. et. al, 1992) etc.

Newman et al (1995) pointed out that for learning mathematic to be meaningful (authentic) it must be individually constructed. Learning takes place as student process, interpret and negotiate the meaning of new information. Mathematical skills are heavily
influence by the prior knowledge, values, expectations, reward and sanctions that shape the learning environment in mathematics.

Pask (1976) found that students conceptual understanding, found them using different learning strategies in seeking understanding. They have distinct preferences in the styles of learning they adopted. Some students adopt a holist style in which right from the start they tried to see the task in the widest possible perspective establishing an overview which went well beyond the task itself. Their learning process involved the use illustration, examples, analogies, and anecdotes in rooted personal experience and beliefs. Other students preferred a serial list style in which they began with a narrow focus, concentrated on details and logical connection in a cautious manner and looked at broader context only towards the end of the topic.

Learners at all levels use strategies such as reading text repeatedly, copying notes, consulting peer, and asking instructors for clarification to actively process information and thereby influencing their mastery of material (Pintrich et al., 1993). In fact, motivated strategies for learning are an important aspect of student academic performance in the classroom, especially for the college and university students.

Motivation is one of the most important components of learning in any educational environment Maehr (1984). The field of motivation is so broad and rich that in just 60 years that have been major upheavals in the field, metaphors replaced, important new Areas uncovered and essential new concepts introduced. Motivational Beliefs are cognitive meditational variables that are constructed by the child through his/her success/failure expectation, are influenced by the adults who interact with him/her, influence subsequent effects in similar act (Skinner & Belmont, 1993).

Mathew (1991) argues that students have more positive attitudes towards school and colleges to achieve more knowledge and skills when taught, counseled or advised through their natural or primary style rather than a style that is secondary or underdeveloped, particularly when adjusting to a novel and new situation that creates such as beginning situation in higher education. Generally cognitive styles are more related to theoretical or academic research, while learning styles are more related to practical application.

Reader (1980) considered that the students will develop a way or style of learning and refine that style in response to three groups of factors. Unconsciousness personal
interventions by the individual, consciousness interventions by the learners themselves and interventions by some other external agents lead to learning. Learning strategies are important in today’s world or lifelong learning environment. Today’s society is facing up technological revolution where technology and information constantly changing.

Berger et al. (2011) Considerable evidence indicates that student motivation and use of learning strategies are related. There is insufficient understanding, however, about their reciprocal effects whether motivation affects strategy use, the converse, or whether the effects are bidirectional and which components of motivation and strategies are involved. A two wave longitudinal design was used to examine this issue among 9th grade students (N = 306) enrolled in high school mathematics classes during an academic term. A cross-lagged structural model found that students' self-efficacy in mathematics and value predicted their reported use of learning strategies. There was no evidence, however, that learning strategy use predicted motivation and, thus, support for unidirectional effect of motivation during that time interval. Implications for models of self-regulated learning and instruction are discussed.

In this rapidly changing world, the challenge of teaching is to help students develop skills which will not become obsolete. Learning strategies are essential for the twenty-first century. They will enable students to successfully cope with new situations. Teachers and school library media specialists capitalize on their talents as well as access a wealth of resources that will create a metacognitive environment which fosters the development of good thinkers who are successful problem-solvers and lifelong learners. However, knowledge of cognitive and metacognitive and resource management strategy is not enough to promote students achievement at college and university level.

In this study we adopt the view that motivational beliefs and learning strategies should be studied as parts of an integrated whole, as neither component is alone sufficient to successfully interpret learning outcomes in students Achievement in Mathematics. Some studies by taking the above parameters are laid down in secondary students but no such studies are taken on college students in India, particularly in Punjab. The present investigation aims at exploring how motivational beliefs and learning strategies of college students are related to the achievement in mathematics. The study further aimed to find out gender difference and stream difference in motivational beliefs components and learning
strategies components and also, find correlation of achievement of mathematics with these components.

5.2 OBJECTIVES OF THE STUDY
The study is aimed to achieve the following objectives:

- To develop and standardized tool for Achievement in Mathematics.
- To study achievement in mathematics among the college students of Punjab in relation to stream and gender.
- To study motivational beliefs among the college students of Punjab in relation to stream and gender.
- To study learning strategies among the college students of Punjab in relation to stream and gender.
- To study relationship of achievement in mathematics with motivational beliefs namely Goal orientation, Task value, Control beliefs, Self efficacy and Test Anxiety across the different streams namely art, commerce and science.
- To study relationship of achievement in mathematics with learning strategies namely Rehearsal, Elaboration, Organization, Critical Thinking, Self regulation, Study Habit, Effort Regulation, Peer Learning, Help Seeking among the college students of Punjab.
- To identify significant predictor of achievement in mathematics.

5.3 HYPOTHESES

- There will be no significant gender difference of achievement in mathematics among the college students of Punjab pursuing the studies in different streams namely art, commerce and science.
- There will be a significant stream difference of achievement in mathematics among the college students of Punjab pursuing the studies in different streams namely art, commerce and science.
- There will be no significant gender difference in motivational beliefs namely Goal orientation, Task value, Control beliefs, Self efficacy and Test Anxiety among the college students of Punjab.
There will be a significant stream difference in motivational beliefs namely Goal orientation, Task value, Control beliefs, Self efficacy and Test Anxiety among the college students of Punjab.

There will be no significant gender difference in learning strategies namely Rehearsal, Elaboration, Organization, Critical Thinking, Self regulation , Study Habit, Effort Regulation, Peer Learning, Help Seeking among the college students of Punjab.

There will be a significant stream difference in learning strategies namely Rehearsal, Elaboration, Organization, Critical Thinking, Self regulation , Study Habit, Effort Regulation, Peer Learning, Help Seeking among the college students of Punjab.

There will be significant relationship of achievement in mathematics with motivational beliefs namely Goal orientation, Task value, Control beliefs, Self efficacy and Test Anxiety.

There will be significant relationship of learning strategies namely Rehearsal, Elaboration, Organization, Critical Thinking, Self regulation , Study Habit, Effort Regulation, Peer Learning, Help Seeking with achievement in mathematics.

There will be significant predictor of achievement in mathematics namely motivational beliefs and learning strategies.

5.4 DELIMITATION OF THE STUDY

The centre of the proposed study is to explore the study of motivational beliefs and learning strategies in relation to achievement in mathematics among college students of Punjab.

The universe of the study will be delimited to students of degree colleges of Punjab.

5.5 THE PROBLEM

Visualizing the importance of achievement in mathematics of the college students and realizing the need to study achievement in mathematics of the college students of Punjab in relation to motivational beliefs and learning strategies the following problem was selected for the investigation.

The statement of the problem in hand is:-
“MOTIVATIONAL BELIEFS AND LEARNING STRATEGIES AS CORELATES OF ACHIEVEMENT IN MATHEMATICS AMONG COLLEGE STUDENTS OF PUNJAB.”

5.6 OPERATIONAL DEFINITION OF THE VARIABLES

Motivational Beliefs

Motivational beliefs refer to those factors which increase and decrease the vigor of an individual’s activity. Thus it determines the level of degree of its activity. In educational field motivation is called effort. Motivational beliefs connote motivational constructs in terms of value component (intrinsic motivation, extrinsic motivation, task value) expectancy components (control of learning belief and self efficacy for learning) and affective components (test anxiety).

Intrinsic Goal Orientation

This refers to an engagement in an activity for its own sake for the pleasure and satisfaction from the task.

Extrinsic Goal Orientation

This refers to external incentives such as money, grades or prizes for a person to perform a given task.

Task value

Task value refers to student interest in the task, which in turn foster a deep approach of leaning.

Control of Learning Beliefs

Control of learning Beliefs refers to student beliefs that their own efforts to learn will result in positive outcome.

Self Efficacy

Self efficacy refers to peoples beliefs in their capabilities to organize and execute courses of action to attain goals.

Test Anxiety

Test anxiety refers to measurement of how much one worries about tests and how much an often thought starts directing when an individual takes an examination.

Rehearsal

Rehearsal involves reciting or naming items from a list to be learned.
Elaboration

Elaboration helps students to store information into a long term memory by building internal connections between items to be learned.

Organization

Organization helps the learner to select appropriate information and also construct connections among the information to be learned.

Critical thinking

It is described as a student applying previous knowledge to new situations. Students ability to solve problems, make critical evaluation, and comparison or reach decision with respect to students of excellence.

Self Regulation

Self-regulation refers to the self-directed process through which learners transform their mental abilities into task related skills.

Study Habit

It involves the effective use of time to study, planning weeks or smooth ahead, effective use of the study time for the realistic setting of goals.

Effort Regulation

It is the ability to deal with failure and building resiliency of drawbacks when self regulated learners find inadequate learning strategies they regulate their learning activities.

Peer Learning

It refers as collaborating with one’s peers has been found to have positive effect on achievement.

Help Seeking

Help Seeking refers the aspect of the environment that students learn is to manage the support from other students or instructions.

Academic Achievement

Academic Achievement as the sum total of information gained after completing a course of instruction (partially or fully) in a particular grade that he has obtained on an achievement test.

5.7 METHODOLOGY

Descriptive method of research was used in the conduct of the present study.
5.7.1 SAMPLE

The universe of the study consisted of the students studying in B.A, B.Sc, B.Com (1st year respectively) in all the colleges of all the districts of Punjab.

A list of the districts of Punjab was obtained. From these groups, five districts: Ludhiana, Patiala, Jalandhar, Nawanshahr, Ropar were selected randomly. Further three colleges from each district were selected on random basis. As the focus of the study was on the college students studying in B.A., B.Sc, B.Com 1st year, and a representative sample of 1200 college students were taken from these 15 colleges selecting 200 students from each district. In this design 1200 students were taken by investigator in three different streams namely B.A, B.Sc, and B.Com from different colleges. Each 400 students with 200 boys and 200 girls were taken from different streams.

5.7.2 RESEARCH TOOLS

Following Tools were used for the collection of data:-

(1) Mathematics Achievement Test.
(2) Motivational Strategies for Learning Questionnaire (MSLQ) developed by Pintrich et al. (1991).

5.8 PROCEDURE

The purpose of the present study as mentioned earlier was to explore the influence of motivational belief, learning strategies on the academic achievement of mathematics of the college students in Punjab. The data collection was done by administering all the two tools to the college students by visiting the colleges personally by taking permission from the Principals of the colleges. In each college, students were selected randomly from the class. After establishing a rapport with the students all the instruments were administered to the students. The students were instructed properly to give responses. The scoring was done strictly according the directions and instructions given in the respective test manuals. The filled in questionnaires or answer sheet were collected from each respondents. The scoring was done strictly according the directions and instructions given in the respective test manuals. The class interval and distribution of 1200 college students was plotted and Q1 and Q3 were calculated to get low and high values of different variables such as achievement in mathematics, motivational beliefs, learning strategies.
5.9 ANALYSIS AND INTERPRETATION OF DATA

Keeping in view the objectives of the study, results were interpreted under the following sub headings.

- **Achievement in mathematics of College Students**

  The mean score of college students on achievement in mathematics was 55.5 with median and mode 55 and 54 respectively whereas range of the scores came out to be 54.00. The mean score of college male (BA) students in achievement in Mathematics is 43.6 with median and mode 43 and 45, female (BA) students in achievement in Mathematics is 44.9 with median and mode 45 and 45, Male (B.Sc.) College Students in achievement in Mathematics are 45.02 with median and mode 44 and 45, Female (B.Sc.) students in achievement in Mathematics is 45.2 with median and mode 44.5 and 43 and (B. Com.) male in achievement in Mathematics is 44.4 with median and mode 44 and 44 and the mean score of (B. Com.) female college students in achievement in Mathematics is 44.4 with median and mode 45 and 54 respectively. The mean score of B.A stream college students in achievement in Mathematics is 44.21 with median and mode 44 and 45, B.Sc. Stream college students in achievement in Mathematics is 45.07 with median and mode 44 and 43 and and B.Com. Stream college students in achievement in Mathematics are 44.4 with median and mode 44 and 44 respectively whereas range of the scores came out to be 48.00. That indicated that the scores were nearly in normal distribution.

- **Motivational Belief along with different components of College Students**

  The mean score of male and female college students in motivational belief intrinsic goal orientation (IGO) is 5.32, with median and mode 5.0 and 5.0 respectively. The mean score of B.A., B.Sc and B.Com College students is 5.19, 5.19 and 5.24 with median and mode 5.0 and 7.0,6,5 respectively shows the scores lie nearly in normal distribution whereas range of the scores came out to be 6.0.

  The mean score of male and female college students in motivational belief Extrinsic goal orientation (EGO) is 5.14 with median and mode 5.0 and 6.0 The mean score of B. A., B.Sc. and B.Com college students is 4.70, 5.26 and 5.40 with median and mode 5.0, 5, 5.5 and 5.0,6,5 respectively showing that the scores lie nearly in normal distribution whereas range of the scores came out to be 6.0.
The mean score of male and female college students in motivational belief Control of Learning beliefs (CLB) is 5.10 with median and mode 5.0 and 5.0 respectively. The mean score of B.A, B.Sc. and B.Com college is 4.71, 5.18 and 5.21 with median and mode 5.0 and 4.0 respectively showing that the scores lie nearly in normal distribution whereas range of the scores came out to be 6.0.

The mean score of male and female college students in motivational belief Task Value (TV) is 4.80 with median and mode 5.0 and 5.0 respectively. The mean score of B.A., B.Sc. and B.Com college students in motivational belief Task Value (TV) is 4.42, 5.15 and 5.11 with median and mode 4.5, 5.0 and 5.0 respectively showing that the scores lie nearly in normal distribution whereas range of the scores came out to be 6.0.

The mean score of male and female college students in motivational belief Self-efficacy for learning and performance (SE) is 5.16 with median and mode 5.0 and 5.0 respectively showing that the scores lie nearly in normal distribution whereas range of the scores came out to be 6.0. The mean score of B.A, B.Sc and B.Com college students is 5.11, 5.08 and 5.27 with median and mode 5.0 and 6.0 respectively showing that the scores lie nearly in normal distribution whereas range of the scores came out to be 6.0.

The mean score of male and female college students in motivational belief Test Anxiety (TA) is 3.22 with median and mode 5.0 and 3.0 respectively showing that the scores lie nearly in normal distribution whereas range of the scores came out to be 6.0. The mean score of B.A, B.Sc and B.Com is 2.99, 3.32 and 3.44 with median and mode 3.0 and 3.0 respectively showing that the scores lie nearly in normal distribution whereas range of the scores came out to be 6.0.

- **Learning Strategies along with different components of College students**

The mean score of male and female college students in learning strategies (REH) is 5.17, 5.07 with median (Md) and mode (Mo) 5.0 and 5.0 respectively it shows the scores lie nearly in normal distribution whereas range of the scores came out to be 6.0. The mean score of B.A, B.Com and B.Sc. are 4.96, 5.23 and 5.05 with median and mode 5.0 and 5.0 respectively it shows the scores lie nearly in normal distribution whereas range of the scores came out to be 6.0.

The mean score of male and female college students in learning strategies (ELA) is 5.08 and 5.07 with median and mode 5.0 and 5.0 respectively showing that the scores lie
nearly in normal distribution whereas range of the scores came out to be 6.0. The mean score of B.A, B.Sc. and B.Com are 5.14, 5.07 and 5.43 with median and mode 5.0 and 5.0 respectively it shows the scores lie nearly in normal distribution whereas range of the scores came out to be 6.0.

The mean score of male and female college students in learning strategies (ORG) is 5.09 and 5.10 with median and mode 5.0 and 5.0 respectively showing that the scores lie nearly in normal distribution whereas range of the scores came out to be 6.0. The mean score of B.A, B.Sc. and B.Com are 4.93, 5.06 and 4.93 with median and mode 5.0 and 5.0 respectively it shows the scores lie nearly in normal distribution whereas range of the scores came out to be 6.0.

The mean score of male and female college students in learning strategies (CRI THI) is 5.08 and 5.10 with median and mode 5.0 and 5.0 respectively showing that the scores lie nearly in normal distribution whereas range of the scores came out to be 6.0. The mean score of B.A, B.Sc. and B.Com are 5.02, 4.99 and 5.33 with median and mode 5.0 and 5.0 respectively it shows the scores lie nearly in normal distribution whereas range of the scores came out to be 6.0.

The mean score of male and female college students in learning strategies Self-regulation is 5.25 and 5.08 with median and mode 5.0 and 5.0 respectively showing that the scores lie nearly in normal distribution whereas range of the scores came out to be 6.0. The mean score of B.A, B.Sc. and B.Com are 5.00, 5.20 and 5.16 with median and mode 5.0 and 5.0 respectively it shows the scores lie nearly in normal distribution whereas range of the scores came out to be 6.0.

The mean score of male and female college students in learning strategies study habit is 5.17 and 5.24 with median and mode 5.0 and 5.0 respectively showing that the scores lie nearly in normal distribution whereas range of the scores came out to be 6.0. The mean score of B.A, B.Sc and B.Com are 5.00, 5.19 and 5.22 with median and mode 5.0 and 5.0 respectively it shows the scores lie nearly in normal distribution whereas range of the scores came out to be 6.0.

The mean score of male and female college students in learning strategies Effort Regulation is 5.18 and 5.13 with median and mode 5.0 and 5.0 respectively showing that the scores lie nearly in normal distribution whereas range of the scores came out to be 6.0. The
mean score of B.A, B.Sc. and B.Com are 5.16, 5.10 and 5.27 with median and mode 5.0 and 5.0 respectively it shows the scores lie nearly in normal distribution whereas range of the scores came out to be 6.0.

The mean score of male and female college students in learning strategies Peer Learning is 5.13 and 5.08 with median and mode 5.0 and 5.0 respectively showing that the scores lie nearly in normal distribution whereas range of the scores came out to be 6.0. The mean score of B.A, B.Sc. and B.Com are 5.04, 5.07 and 5.35 with median and mode 5.0 and 5.0 respectively it shows the scores lie nearly in normal distribution whereas range of the scores came out to be 6.0.

The mean score of male and female college students in learning strategies Help Seeking is 5.18 and 5.04 with median and mode 5.0 and 5.0 respectively showing that the scores lie nearly in normal distribution whereas range of the scores came out to be 6.0. The mean score of B.A, B.Sc. and B.Com are 5.00, 5.16 and 5.00 with median and mode 5.0 and 5.0 respectively it shows the scores lie nearly in normal distribution whereas range of the scores came out to be 6.0.

- **Relationship of Achievement in Mathematic with Motivational Beliefs**

  The correlation value between Intrinsic Goal Orientation, Extrinsic Goal Orientation, Task Value, Control of Learning Belief, Self efficacy, Test Anxiety and Achievement in Mathematics is (r = 0.635, 0.579, 0.536, 0.641, 0.555, 0.555) respectively that is significant at the level 0.01. The result indicates that motivational belief is significantly and positively related with Achievement in Mathematics of college students.

- **Relationship of Achievement in Mathematic with Learning Strategies**

  The value of correlation between Rehearsal, Elaboration, Organization, Critical Thinking, Self Regulation, Study Habit, Effort Regulation, Peer Learning, Help Seeking and Achievement in Mathematics is (r = 0.534, 0.608, 0.574, 0.593, 0.555, 0.591, 0.554, 0.551 and 0.526) that is significant at the level 0.01 as shown in Table. The result indicates that Test Anxiety is significantly and positively related with Achievement in Mathematics of college students.
TESTING OF HYPOTHESES

Taking into count the outcomes after processing the data pertaining to different variables belonging to the study as reported in preceding section, the hypotheses were tested and the interpretations are mentioned here under.

Hypotheses -I

The results of the study indicated no significant difference in achievement of mathematics of male and female students. So the hypothesis “There is no significant gender difference of achievement in mathematics among the college students of Punjab pursuing the studies in different streams namely art, commerce and science” stands accepted.

Hypotheses-II

As the results of the study indicated that the no significant stream difference among college students of Punjab pursuing the studies in different streams namely art, commerce and science. Hence the hypothesis “There is a significant stream difference of achievement in mathematics among the college students of Punjab pursuing the studies in different streams namely art, commerce and science” is rejected.

Hypotheses-III

The hypothesis “There is no significant gender difference in motivational belief namely Goal orientation, Task value, Control beliefs, Self efficacy and test anxiety among the college students of Punjab.” is accepted on the basis of outcomes of the study. The results of the study indicated that there prevails significant difference in motivational beliefs (IGO) of college students of Punjab.

Hypotheses-IV

The findings of the study indicated that no significant stream difference in motivational belief namely Goal orientation, Task value, Control beliefs, Self efficacy and test anxiety among college students of Punjab. So, the hypothesis stating “there is significant stream difference in motivational belief namely Goal orientation, Task value, Control beliefs, Self efficacy and test anxiety among college students of Punjab.” is rejected.

Hypotheses-V

As the results of the study revealed that there is no significant gender difference in learning strategies. So the hypothesis “There is no significant gender difference in learning strategies namely rehearsal, organization, critical thinking, Self regulation, Study habit,
Effort regulation, Peer learning, Help Seeking among the college students of Punjab” is accepted. The study also reveals that there is significant gender difference in leaning strategy namely elaboration among the college students of Punjab.

Hypotheses-VI

The results of the study indicated there is no significant stream difference in learning strategies namely rehearsal, elaboration, organization, critical thinking, Self regulation, Study habit, Effort regulation, Peer learning, Help Seeking among the college students of Punjab. So the hypothesis “There is no significant stream difference in learning strategies namely rehearsal, elaboration, organization, critical thinking, Self regulation, Study habit, Effort regulation, Peer learning, Help Seeking among the college students of Punjab” is rejected.

Hypotheses-VII

The hypothesis “there is significant relationship of achievement in mathematics with motivational belief namely Goal orientation, Task value, Control beliefs, Self efficacy and test anxiety was retained, as the results of the study revealed significant and positive relationship among all the variables. The results showed that achievement in mathematics was significantly and positively related with Goal orientation, Task value, Control beliefs, Self efficacy and test anxiety. The findings also revealed significant and positive interrelationship among Goal orientation, Task value, Control beliefs, Self efficacy and test anxiety.

Hypotheses-VIII

The results of the study indicated there is significant relationship of achievement in mathematics with learning strategies. So the hypothesis “There is significant relationship of achievement in mathematics with learning strategies namely rehearsal, elaboration, organization, critical thinking, Self regulation, Study habit, Effort regulation, Peer learning, Help Seeking among the college students of Punjab” is accepted.

Hypotheses-IX

The study reveals that there is significant relationship of achievement in mathematics with motivational belief namely Goal orientation, Task value, Control beliefs, Self efficacy and test anxiety and with learning strategies namely rehearsal, elaboration, organization, critical thinking, Self regulation, Study habit, Effort regulation, Peer learning, Help Seeking. The study indicates that motivational belief and learning strategies both are significant
predicator of achievement in mathematics. So the hypothesis “There is significant predicator of achievement in mathematics namely motivational belief and learning strategies” is accepted.

5.10 DISCUSSION

The results of the present study revealed that there is no significant difference in achievement of mathematics of the male and female students. This difference in academic achievement might be due to some personality traits. In earlier studies conducted by Fennema (1974), Aggarwal (1983), Artzt & Armour (1992), Muller (1998), Joshi (2000) the female students were generally considered to have submissiveness, stable and controlled emotions, superior study habits and high verbal ability. Whereas the boys were taken as more outgoing, have more distractions and are emotionally less matured. Perhaps these differences in personality traits induced by our culture, parenting style and way of bringing up the girls in Indian society that leads the girls to concentrate more on studies and success. But the studies conducted by Slavin (2006), Naderi et al. (2008), Singh & Parveen (2010), Thomas et al. (2010), Zirima & Nyanga (2012) indicates that the concept of discrimination is acceptable till primary and secondary education but for undergraduate and graduate students due to awareness of career opportunities there is no gender difference in academic achievement among Boys and Girls.

The result of present study goes in line with the findings of Lent & Hackett (1987), Tuckman & Abry (1998), Zarch and Kadivar (2006), Seo (2009) suggesting that there is no significant stream difference of achievement in mathematics among students. Three streams namely arts, commerce and science was taken for comparative study among college students. The questioner of Achievement in Mathematics Tool and Motivational Strategies for learning Questionnaire was given to students. The results indicate no stream difference among the college students. Similar studies was performed on MSQL and MAI Tools by Kesici (2009), Hoffman & Schraw (2009), which shows when students studies in beginner classes there exists stream difference but when the students starts college studies there exists no stream difference. The admission criteria in various streams in college classes now days are based on the entrance test; they can get the admission in any stream based on the high or low academic achievement.
High school students found that boys and girls did not differ either in their capability to solve mathematics word problems or in the strength of their self-efficacy beliefs. Moreover, boys and girls displayed similar overconfidence when they start applying motivational beliefs, Pajares and Kranzler (1995). The findings are in line with the results that there is no significant gender difference in motivational belief among college students Chemers, Hu & Garcia (2001), Kesici (2009), Kim, C et al. (2010). These findings are generally congruent with the motivational theories and support the position that students of various streams should be encouraged to adopt task goals and actively involve themselves in math class activities, which in turn increases the skill level of students.

It is important to help students develop a positive self-image of their academic capabilities by assigning appropriate task where they can experience success and so experience less anxiety. This could be achieved by encouraging the students at every step of the way by helping them view themselves as successful individuals. As the results of Chaturvedi (2009) Saransi & Ravi (2010), Asthana (2011) indicate that Girls are better than Boys in some of the Motivational Beliefs Strategies such as Intrinsic Goal Orientation and Control of learning Beliefs. The results are in order with studies conducted by Ryan & Deci, 2000; Yukselturk & Bulut’s, 2007; Diseth, Age, 2011; Nishitani et al., 2011) and (Pintrich, 2003; Kesici, Sahin & Erdogan Ahmet, 2009) respectively. The findings can be due to acceptance of challenges, curiosity and hard working by Girls compared to Boys. It is seen from the different studies that there have been large increases in the percentages of young women graduating from universities in Punjab and nearby states.

Most of the research findings from western countries are obviously different from the ones from the East like Bruni et al. (2006), Dee (2006). Children in western countries have unfavorable early exposure to unacceptable social practices compared to their counterparts in the Eastern countries. The early exposure affects their level of maturity as well their studies. In western countries, adolescence stage is shorter; during this period student join societal roles early than it is in eastern societies Thomas et al. (2010), Zirima & Nyanga (2012). Children in eastern countries have a longer period during their adolescence and at this time they tend to take responsibility seriously as they become innovative in resolving of social problems. This is particularly observed in the girl students who perceive the usefulness of mathematic for better future and career prospects.
In our findings, boys and girls had similar motivational beliefs, these important similarities in boys and girls may also be caused by numerous aspects of formal schooling that are generally common across Indian societies and appear to exclude overt gender typing. For example, boys and girls appear to receive similar messages about what it takes to do well at school and these communicated contingencies are similar across the contexts under study by Kim, C et al. (2010), Lynch, Douglas J (2010). Moreover, many aspects of individualized school-related experiences of children (e.g., feedback regarding effort and luck) are also similar and not pervaded by gender stereotyping. It is also clear from a wide range of motivational research that motivational levels and styles are dependent on time and place Good & Brophy (1994), Cavas (2011). The presence or absence of gender differences in motivation, and the direction of any such differences, are likely to be dependent on myriad of local and broad cultural circumstances. Rather than looking to determine in a definitive manner the nature of motivational difference as a function of gender, the role of research ought to be the mapping of variation between gender groups.

5.11 CONCLUSIONS

Based on the findings of the study the following conclusions can be drawn

1. The achievement in mathematics of college students is appreciably good mean score being 44.5 on a scale of 28-70.

2. The Motivational Belief namely intrinsic goal orientation, extrinsic goal orientation, task value, control of learning belief, self efficacy, test anxiety of college students in relation to gender is also good mean score being 5.21, 5.13, 4.84, 4.98, 5.13 and 3.22 on a scale of 1-5.8.

3. The Learning Strategies namely Rehearsal, Elaboration, Organization, Critical thinking, Self Regulation, Study Habit, Effort Regulation, Peer Learning, Help Seeking of college students in relation to gender is also upright mean score being 5.17, 5.08, 5.09, 5.08, 5.12, 5.17, 5.18, 5.13 and 5.18 on a scale of 1-5.8.

4. The results shows there is no significant gender difference of achievement in mathematics among the college students of Punjab pursuing the studies in different streams namely art, commerce and science.
5. The findings from gender difference on motivational beliefs such as, extrinsic goal orientation, task value, self efficacy, test anxiety components showed that there is no significant difference between boys and girls students.

6. The motivational beliefs components intrinsic goal orientation shows significant difference between boys and girls students. It shows intrinsic motivation is positively related to a number of desired cognitive and motivational outcomes such as students’ academic performance. This study therefore concluded that goal orientation had an immense influence on academic achievement of the students.

7. The motivational beliefs components control of learning beliefs shows significant difference between boys and girls students. It shows the Efforts put by students, involvement of teachers and good strategies improves the achievement. This study therefore concluded that control of learning beliefs had a great impact on academic achievement of the students.

8. It is concluded that Test anxiety among the college students is less compared to other motivational beliefs parameters. This suggests that students who had high test anxiety, were less confident, less motivated to learn and less likely to meta-cognitive strategies.

9. The results show Motivational Belief component Intrinsic Goal Orientation has major impact on BA Stream students and Extrinsic Goal Orientation plays an important role in deciding the academic achievement level of B.Sc and BCom college students respectively.

10. There is significant positive relation of motivational beliefs with achievement in Mathematics. Directing students’ attention to the strategy aspects of a learning task can have a positive effect on students’ self-efficacy and their motivation. Strategy instruction is an instructional format designed to teach procedures for thinking about math processes. When introducing a new task, teachers explain the strategies required for the task and state that they are learnable and can be used to advance mathematical achievement.

11. The findings from gender difference on Learning Strategies Rehearsal, Organization, Critical thinking, Self Regulation, Study Habit, Effort Regulation, Peer Learning,
Help Seeking of college students components showed that there is no significant difference between boys and girls students.

12. The Learning Strategies component Elaboration shows significant difference between boys and girls students. This study therefore concluded that Elaboration had a vast control on academic achievement of the students.

13. Learning strategy components Effort Regulation & Help Seeking and Study Effort & Elaboration respectively are the major factors by which Male and Female college students differ from each other.

14. The results shows Learning strategy components Effort Regulation & Elaboration has major impact on BA Stream students, Elaboration & Peer Learning plays important role in deciding the academic achievement level of B.Com college students and for B.Sc stream Self Regulation and Study Habit are the major factors.

15. There is significant positive relation of learning strategies with achievement in Mathematics. Students should be encouraged to compare their progress to their personal standards, not to the performance of others. In the light of this, instruction should be as individualized as possible, and teachers should be given individualized feedback on a regular basis, informing students of their performances. This individualized approach should take into account gender, ethnic, and age differences, together with tutor instructional methods.

16. There is significant positive relation of motivational beliefs with learning strategies. Students whose metacognitive skills are well developed are better problem solvers, decision makers and critical thinkers, are more able and more motivated to learn, and are more likely to be able to regulate their emotions (even in difficult situations), handle complexity, and cope with conflict.

5.12 EDUCATIONAL IMPLICATIONS

- The bulk of the evidence in the past 50 years suggests that the gender gap in mathematics does not exist before children enter school, but is large and significant in the middle school years and beyond

- The patterns on math tests are especially striking when one considers that females either systematically outperform males or have made enormous gains on many
educational dimensions. The high school dropout rate is 28% for females compared to 35% for males

- It is important to facilitate strategy use. Teacher might consider modeling specific strategies or ways of thinking for learning mathematics in class, in addition to encouraging students to share their strategies for learning the course content.

- Teachers should teach a way that builds confidence as well as competence among the students. This requires, in part, a teacher that is knowledgeable and enthusiastic about the subject, and has appropriate pedagogical knowledge. It should be noted that the ability to create a classroom environment conducive to fostering of self efficacy and cognitive development depends very much on the self-efficacy of the teacher. So teacher should use many cognitive and metacognitive learning strategies in the classroom so their teaching becomes enjoyable and knowledgeable for the students.

- For teachers and school psychologists, these results suggest that academic achievement, study skills, and engagement can be increased by tapping into students’ interests. It can be done by building upon personal interest or creating situational interest. That is, allowing students to work on topics they find personally interesting may help them to engage in such ways that they use better strategies for learning and ultimately achieve higher levels.

- One way to increase on personal interest is to allow students to pick topics for class projects or reports. Admittedly, it is difficult to design classroom activities that capitalize on the personal interest of all students in the classroom.

- Group learning is needed for some low achievers students. These students feel more comfortable speaking in small groups. In groups, students may obtain emotional support and academic assistance. More structured group activities reduce math anxiety, students with high math anxiety do not trust themselves to obtain math answers, often prefer not to work alone and they do not necessarily like discovery learning. So by using Peer learning strategies students feel more comfortable and increase their learning.

- Teachers should help students store information into long term memory by building internal connection between items to be learned, then help them to achieve their goals.
• Allow students as much control over the anxiety as it has been found to be negatively related to expectancies as well as academic performance. Students should be encouraged to use strategies to increase their own educational outcomes.

• Besides learning strategies, learners should be able to manage and regulate their time and study environments. Time management involves scheduling, planning and managing one's study time. So the learners should use the time in effective manner and achieve their goals.

• Dialogue with peers can help the learner clarify course material and complete the course assignments easily, so peer learning strategies help the learners in every subject.

• Students can access their Metacognition level through questionnaires, surveys, journals, or any other method deemed useful. Teachers must be aware about the student in terms of self-efficacy. They must also remain alert and up to date in using techniques for importing self efficacy of their students.

5.13 SUGGESTION FOR FURTHER RESEARCH

A meaningful research always provides cause and pays the way for the further investigation. Also every investigator after accomplishing his or her task may feel inspired to do more researches through his or her own efforts. The researcher may feel greatly motivated, for showing the new areas of the research to the future researchers.

Based on this research the following suggestions are made for the further work.

• The present study was confined only to Punjab state, so it cannot claim to have comprehensiveness. Conclusions may not be universally valid. It is therefore suggested that study may be conducted on other states also to establish the results fairly.

• The study was conducted only on first year college students. It may be conducted on consecutive years on students with different streams, students of technical institutions and university students may be taken.

• In the present study the sample taken was rather small. The study may be carried out with a large sample to make broader generalizations.
• More psychological correlates could be included in the study as the present study is confined to few variables such as motivational beliefs, achievement in mathematics and learning strategies.

• Perceptions of students and opinions of parents should be included by using interview, case studies, workshops and seminars method.

• Students who are not metacognitively adept will have great difficulty being successful with mathematics. These students need to be explicitly taught how to be metacognitive learners. Teachers who model this process, who teach students problem solving strategies, who reinforce students' use of these strategies, and who teach students to organize themselves so they can access strategies, will help students who have metacognitive deficits become metacognitive learners.

• There should be change in the curriculum; students should be exposed to a number of important math’s concepts in the first year. The next year, students return to those math’s concepts, expanding on the foundation established the year before. This cycle continues with each successive year until the math solving anxiety is overcome.

• If the student is lagging behind in studies, the specific components of Motivational Beliefs and Learning Strategies should be considered and proper correction should be planned to remove the discrepancy.