CHAPTER - II
REVIEW OF RELATED LITERATURE

2.1   INTRODUCTION :

Review of related literature is one of the significant aspects of research. It enables the researcher to know the extent of work done in the concerned area. It also helps to explore the need of research in unknown and unexplored areas. It is necessary that the researcher is aware of the knowledge generated and the ongoing process of knowledge generation in an area of research for the better clarity of the problems in that area of research. The review of related literature can help a lot to the researcher in this aspect. It also helps to throw insight into the methodological aspects of research in a specific area and issues related to it. For any researcher, review of related literature forms the basis for the problem identification, helps to find ways and means of studying the problem, methods used in studying the problems, tools used to collect data and the ways of analyzing data to arrive at a solution. In a nut shell it helps the researcher to arrive at the proper perspective of the study. In the present study, the researcher has gone through the review of related literature in the area of study and presented it.

In this chapter the researcher has made an attempt to give a brief sketch of the researches carried out in the field of value education in India and abroad and teaching of Mathematics for Mathematics achievement. The studies have been taken from 1990 to 2014.

There were number of studies and investigations done on value education in different countries of the world and India. The studies in this chapter have been presented in different categories. This includes studies related to values and value education and studies related to teaching of Mathematics for Mathematics achievement.

2.2   STUDIES RELATED TO VALUES AND VALUE EDUCATION

In this section of review of related literature, the literature reviewed has been divided into two segments. The first segment includes studies conducted abroad and the second segment includes studies conducted in India.

2.2.1   *Studies Conducted Abroad*

Darmody (1991) examinyed the relationship between levels of Piagetian formal reasoning ability and values preferences derived from the Rokeach value survey. The subjects were 448 secondary school students. The results of the study revealed that subjects with high scores on formal reasoning ranked terminal values representing abstract notions with long-term implications higher than those focusing on immediate gratification. They also favored the instrumental values of self- reliance, competence, and independence. Low scorers on formal reasoning showed a preference for value groupings which were personal, hedonistic and involved immediate gratification and social approval.

Farmer et al. (1991) conducted a study on 'Achievement contexts: Effect on achievement values and casual attributions'**.** In this study they selected 1164 ninth grade and tenth grade students as subjects. The results showed that altruistic values were associated more with family and society than with the school success. Sports achievements were more related to social approval values than to mastery values or altruism values. School achievement, more than other contexts, were related to mastery values.

Segal (1993) conducted a study on cross cultural values and personality characteristics of social work students in the U.S. and India. The results showed that there were significant difference in values, attitudes and behaviors between Indian and U.S. graduate students. The personality characteristics of Indian graduate students and American undergraduate students were more similar than those of American undergraduates and graduates.

Nossenko and Frolova (1996) conducted a study on transformation in the system of values of the Ukraine students as the reflection of the socio- economic changes in the

country'. Social changes specific to the period of transition from the strictly organized social environment and planned economy to the market- oriented economy manifest themselves in some significant transformations in the system of young people's values and assumptions. On the basis of the longitudinal studies conducted in the period between 1993 and 1995, the following observations have been made. While the senior university students still seemed not to value too highly the active and gratifying life, an interesting job and full use of one's resources, the younger students demonstrated some signs of excitation of life forces. The deficit of achievement motivation is felt to be a specific feature of many young people. Students seemed to estimate quite highly more "abstract" values (cognition, self-perfection, freedom, creativity). Transition from the collectivist to the individualist code of values was observed. It was observed that socio-economic instability in the country made changes in the system of values of young people. Students equated individualistic value with independence.

Nicholas (1998) studied the value perceptions and normative rule compliance of Malaysian and American secondary school students with the objective to examine the norm conformity and value acceptance of American and Malaysian secondary students. The major findings of the study were: (i) Malaysian students had higher moral conformity and value acceptance than American students, (ii) for gender, significant differences were found in these scales measured collectively in Malaysia, (iii) no gender differences were found in the same for American Students, (iv) most of the students adverted to positive social norms, (v) unlike, Malaysian students, American students were not sure if teachers should teach values.

Skinner (1999) conducted a study entitled "Teaching through Traditions: Incorporating Languages and Culture into Curricula". This study discussed the challenges to the perpetuation of American and Indian Languages and their Cultures, as well as successful strategies and practices for developing culturally relevant curriculum. Seven values common to traditional native education were identified that could form the basis of a tribal code of education or curriculum and six recommendations were offered to move public schools towards equality and equity.

Seah and Bishop(2000) conducted a study entitled " Values in Mathematics Textbooks: A View through Two Australian Regions" This study outlined a preliminary investigation into the kinds of mathematical and mathematical educational values conveyed through lower secondary school Mathematics textbooks in Singapore and Victoria (in Australia) . The relationship between some of the commonly adopted value signals and the nature of Mathematics genre was explored. Differences in the way value were portrayed in the two culturally different religions were also discussed.

Joyce (2003) conducted a study on "Values expressed in Caldecott Medal Texts". (1938-2002). The main objective of this study was to examine the Caldecott Medal Textbooks to determine the values expressed in the texts. The content analysis of the books yielded findings of the total values expressed, the values expressed in each year, the values expressed in the text and illustrations and the values expressed as they related to gender, ethnic background, and the age of the characters. The major findings of the study included the following: (a) Total of 1,592 instrumental values were expressed by 331 characters in the text. Of the 331 characters, there were 235 humans and 96 non-humans. (b) Values were not equally distributed across the years, gender, age groups.

2.2.2   *Studies Conducted In India*

Bajpai (1990) did an experimental study of an educational intervention curriculum for value development and its facilitative effect upon the level of moral-judgment of children. The main objectives of this study were to develop an intervention programme to facilitate the development of moral judgment of children and to test its efficiency through an experimental study of two groups of children. The sample consisted of 80 children- 40 boys and 40 girls aged 7+ and 8+ enrolled in standard II in three schools in Lucknow and were assigned to two treatment groups i.e. experimental and control. Tools used were two sets of Piaget's stories highlighting particular aspects of moral judgment (pre and post- test), draw a man test by Pramila Pattak, SES scale by Kuppuswamy and school adjustment checklist by J. Pant. The results indicated that the intervention programme greatly enhanced children's ability

to judge and act as right and wrong and to understand the intention behind the act. Variables like, intelligence, academic achievement, school adjustment and family structure were found significantly related to the concept of moral judgment, whereas, no relation was found with SES, sex and birth order.

Nagar (1990) weighed the reinforcement concept of Skinner with its positive and negative aspects and Kohlberg's moral developmental stages. She concluded that the prevention of the undesirable and approach of positive guidance are the most effective ways for teaching values.

Das (1991) studied the methods adopted by selected secondary schools in India for development of moral and ethical values and measurement of the value judgment of students of class IX of these schools. He found that seven schools out of the group of schools selected and one out of the seven other schools were found to have a very high mean moral judgment score. The programmes and activities of these eight school aimed at moral judgment were as follows. (1) One period a week was provided in the school for moral education (b) brief talks on moral issues were given in the assembly, (c) yoga asana were taught to students (d) birthdays of religious and social leaders were observed by discussing their life & work (e) teachers observed and recorded the behaviour of the students and evaluated their personality in cumulative records.

Dubey (1991) did a critical study of the concept of value education in India at school level since 1947 to 1986. The study focused on the concept and implementation of value education in India at school level from 1947 to 1986 in order to ascertain the status of value education in Indian education, and highlight its educational implications. Opinions from 404 schools of all denominations selected randomly from Delhi were collected with the help of a questionnaire. Findings revealed that values like national integration, brotherhood, secularism, and punctuality have been highlighted. Songs and legends which highlight socially accepted values are missing from the curriculum. Value crisis is due to lack of ideal leadership. Neglect of affective domain in education, and corrupt practices in society.

Kalamani (1991) did his study on the problems of adolescents and their value system. An attempt was made to study the adolescents' problems in the personal, family, socio-emotional, and educational areas as well as their value system.

The sample consisted of 240 students from higher secondary schools in Anna District. The translated versions of Youth Problem Inventory (Sandhya Sharma) and New Test for Study of Value System (Gilant) were used. Mean, SD and 't' test was used to treat the data. Findings revealed that adolescent boys and girls had problems in personal, family, socio-emotional, and educational areas, Adolescent students in higher secondary schools were low in political and religious values, but high in social values.

Vaidya (1991) conducted a study in the context of life/human values in the physics textbook of standard 10th. It was a parallel group design where 38 students of class 10th were chosen as sample. The tools used included the physics textbook for standard 10th, dramatization of textual matters, questionnaires for teachers and student's experimentation and observations. The major findings were 1. It was found that after the experimentation the scores increased for all the moral values in the experimental group than control group.2. Science subjects too helped in the moral development of students. 3. Dramatization method of teaching was more effective in the development of values than the traditional method in teaching of physics.

Banuo (1992) attempted to find out the personal value pattern and self-concept of Nagaland college students and the relationship between the values. His objective was to find out if any difference exists in their values and self-concept among arts, science and commerce students and also between male and female students and tribal and non-tribal students. The findings revealed that (1) there were no significant differences in the mean value scores of arts, science and commerce college students in respect of social value, aesthetic value, economic value, knowledge value and hedonistic value and family prestige and health value scores. (2) The tribal and non-tribal students differed significantly in respect of their mean scores on religious value, social value, aesthetic and democratic value (3) Boys and girls differ significantly in respect of their mean scores on social value, aesthetic value, knowledge value, power value and

family prestige value. (4) There was a significant positive correlation between self-concept and social as well as democratic value and a negative relationship between self-concept and power as well as family prestige values; but there was no relationship between self-concept and each of the values-religious value, aesthetic value, economic value, knowledge value, hedonistic value and health value.

Dubey (1992) attempted to ascertain the status of value education in Indian education and highlight the educational implications of value education. His major findings revealed that values such as national integration, brotherhood, secularism, punctuality, have been emphasized. Folk songs and legends that highlight several socially accepted values were missing from the curriculum. The value crisis was due to lack of ideal leadership, neglect of affective domain in education and corrupt practices in the society.

Padmanaban (1992) did a study of values of high school pupils in relation to certain selected variables. The objective was to assess the value pattern of high school pupils and offer suggestions for the improvement of values in the schools in the light of these findings. Samples of 1,000 pupils studying in IX class in South Alcott district were selected. The student Value Inventory, Student's Occupational Preference Inventory and self-concept Inventory were used. Mean, SD, 't' test, chi-square and inter-correlation were used to treat the data. Results indicated that the highest score was obtained on social values and the lowest on political values. Boys and girls differed in respect to theoretical, economic, political, social, and aesthetic values. There was an association between the pupil's most preferred value, and their caste and religious, socio-economic status, and self-concept.

Usma (1992) in her study Effect of Parents and Teachers values on IXth standard students' creativity discusses effect of values on behavior. It concludes that the values, if perceptualised properly will enable the individual to maintain his values even under difficult personal social conditions

Arora (1993) studied the relationship between the nature of scientific knowledge and values among university teachers and students. The objectives of the study were: to

construct and standardize the tools on understanding of the nature of scientific knowledge and values; to study the understanding of the nature of scientific knowledge among university teachers and students; to study values among university teachers and students; and to study the relationship between the nature of scientific knowledge and values among university teachers and students. The descriptive survey method was used. The sample consisted of 142 university teachers and 461 university students of Varanasi city. Respondents were selected by using the random sampling technique. The tools developed by the researcher and used in this study were Value Reflecting Questionnaire (VRQ) and Scientific Thinking Style Questionnaire (STSQ). The conclusion that emerged from the study was that values do affect the understanding of the nature of scientific knowledge.

Dhand et.al. (1993) compared the effects of the implementation of the value discussion model in terms of value clarification and its dimensions on Canadian and Indian under-graduate students. The experimental group was treated through the Value Discussion Model and the other tow control groups followed their routine activities. The value clarification scale was used to collect the data. The data were analysed through ANOVA followed by the 't' test. The Value Discussion Model Group was found to be superior to the control groups.

Ushashree (1993) conducted an evaluation of value education provided in secondary schools of Tamil Nadu. Teachers were asked to indicate the extent to which the listed characteristics were found in the textbooks of the teachers' subject of specialization. From the weighted scores, it was found that in the books of VIII, IX, and X standards, the greatest attention was paid to examples given from life situations. Other characteristics that follow an order of descending weightage are : special mention is made regarding the qualities of discoverers, reformers, leaders etc., 'desirable values are emphasized wherever possible', ' a logical approach to problem solving is emphasized', 'questions given call for value judgment', and 'the good and glory of all religions are highlighted', 'exercises call for critical observation in various contexts are given less attention. The most prevalent character of this study was that ' a logical approach to problem solving is emphasized.

Sharma (1994) did a study on the effectiveness of value analysis model in developing value analysis competencies among B.Ed. trainees and school students. The study was conducted to see and compare the effectiveness of value analysis model (VAM) in developing value-analysis competencies (VAC) among B.Ed. trainees and school students when taught with or without the use of value-analysis model. An experimental design using pre-test and post-test with parallel groups has been used. The detailed description about various approaches strategies, and models of value-based education has been provided. The significance of value-based education and the role of teacher have been highlighted. The finding of the study indicated the effectiveness of VAM over conventional method of teaching in developing VAC among the members of the both treatment groups, over control group under observation. The major values taken up are co-operation, dedication to teaching profession, nationalism, perseverance, and scientific temper.

Diwakar (1995) did a study of effect of some intervening strategies on the development of contemporary values among teacher trainees. The study was conducted to find out the effect of different strategies on the development of values, mainly secularism, democracy, national integration, and non-violence among prospective teachers. A scale to measure value orientation was developed. A pre-test-post-test design was used. A sample of 300 teacher-trainees was taken up. The study revealed that the intervening strategies can promote the value of democracy and are useful in developing the value of national integration. It was also found that the value of democracy and national integration developed during experiment is retained over a longer period. It suggested that values like democracy, national integration, secularism, and non-violence and related to promotion of social cohesion and national unity and for ensuring a reasonable quality of life for all in the context of value crisis.

Kapoor (1995) did an experimental study on the value change in secondary school students. The main objective of the study was to determine whether value change could be brought about through an intervention programme on secondary school students. It also studied whether value change is stable over a period of time, and there exists any differential effects of sex on value change in the students. Using an

experimental intervention programme based on Rockeach's methods of the study, the investigator used the pre-post and delayed post method with control type of research design. The four target values considered in the study were self-respect, freedom, wisdom, and a sense of accomplishment. Students aged 14+ and 16+ from 9th and 10th grades in equal member of boys and girls from the schools of Lucknow city were taken as sample of the study. The result revealed that the modified Rokeach's value change instrument used in the experimental intervention programme was effective in bringing about desired value change among the students. The experimental subjects showed significant change in self-respect, wisdom, and a sense of accomplishment. The study also indicated that the value-change programme was more effective for girls as compared to that for boys. And there was significant change in favour of girls for the values, self-respect and a sense of accomplishment.

Agnes (1997) studied the personality characteristics of B.Ed. students in college of education in Tamil Nadu. The sample of 1050 B.Ed. students was randomly selected from the colleges of education in Tamil Nadu. The findings revealed that most of the B.Ed. students fall within the moderate level of the personality characteristics such as, achievement, deference, order, exhibition, autonomy, affiliation, interception, occurrence, dominance, abasement, nurturance, change, endurance, heterosexuality and aggression. Further, it was inferred that the personality characteristics have a partial impact on the personal values like, adaptability, cooperation and tolerance. Besides, the personality characteristics very much contribute towards development of values in the students.

Joshi (1998) did the study `Development of democratic values through value analysis technique in civics at secondary stage' with the objectives to study the effectiveness of value-analysis technique in terms of developing democratic values among students through teaching of civics, and trends in development of democratic values on different scores of different groups. The researcher used 21 null hypotheses, keeping in view the objectives of the study. The study followed experimental approach and time series design for the development of democratic values. The value analysis

technique was found to be effective in terms of developing democratic value among students, through teaching of civics.

Mehta (2003) carried out a study of value elements in English Textbooks at Upper Primary School level of Gujarati medium schools. The major objectives of this study were : (1) To identify the language content amenable to value orientation in the textbooks under study.(2) To analyse the likely positive and the negative impacts of the reflected values in the textbooks under study.(3) To study the opinions of teachers and students who have been using the textbooks under study. The major findings of the study were: (a) The language structure and language of daily use have been more emphasized in the textbooks of std V and VI rather than value elements.(b) Value based lessons on fairy tales, fables, parables, lessons regarding legendary personality etc., are found to be missing in the text books of English at upper primary school level.

Biswal and Srivastava (2005) conducted one study entitled 'Designing and implementing co-curricular activities to inculcate social values among B.Ed. students'. The objectives of the study were to design , develop, implement, and to study the effectiveness of the developed co-curricular activities in terms of value conceptual knowledge, value perception and value practice of certain values like tolerance, cooperation, equality, friendship, fellow-feeling . and to study the reaction of B.Ed. students towards the developed co-curricular activities..Tools used for the present study were value questionnaire, information schedule, value perception scale and reaction scale.

Findings of the study stated that: 1. The CCA programme was found to be effective in terms of students *conceptual knowledge* in all the taken social values for the present study and as a whole, as the adjusted mean conceptual knowledge value scores of the experimental group in these values were found significantly greater than those of control group. 2. The CCA programme was found to be effective in terms of student's *value perception* in all the taken social values. 3.The CCA programme was found to be effective in terms of students reaction towards the major components of CCA like,

morning assembly, purely value related activities, special CCA activities, celebration of different days, activities related to community and other aspects of CCA

Thakkar (2005) undertook a case study on the ' Study of the values incorporated in the English textbook and reflections of teachers and students of std. XI'.

Objectives of the study were: (1) to identify and to list out the corresponding values reflected through the textbook content under study. (2) to study the reflections of the English teachers regarding the same values. The tools adopted were (a) content analysis information sheets, (b) opinionative and (c) interview schedule. The major findings of the study revealed that: 1) Among the 8 values, personal value is the highest occurring value; while environmental value was the least. 2) The teachers considered the textbook very important in incorporating values by saying that textbook is having value education in its root.

Vijayan (2005) in a research study entitles as 'A critical study of the effectiveness of social science curriculum to develop the values of secondary school pupils' observed that the content of the secondary school social science is a rich repertoire of values. He identified 62 values among the total of 83 mentioned by NCERT. His major findings were (i) only 69% of teachers could identify various values hidden in the curriculum. (ii) 76% of teachers had valued definition ability. (iii) 84 % of teachers identified aesthetic values. (iv) majority of teachers (85%) used only low level of teaching activities regarding development of values in students.

Gardia (2007) did a study of some determiners of democratic values among higher secondary students. His objectives were (1) To explore the status of Democratic values among higher secondary students. (2) To find out the relationship of Democratic values with following personal and environmental variables :Family environment and School Environment, Occupational Aspiration, Emotional Adjustment and Socio Economic Status. (3) To study if the above mentioned variables are determiners of the democratic values.

Major findings of the study revealed that 1) Higher secondary students were good in the value of Co- operation, whereas they are poor in the value of liberty. They are in moderate status with respect to the value of Equality, Dignity of Individual, Justice and Tolerance. 2) Cohesive Family environment has been found to have positive and significant co- relation with the values of liberty.

Narad (2007) did a study of personal values of Senior Secondary Students in Relation to School Environment and Home Environment. Major Findings of the study were 1) The senior secondary school students of the three cultural regions of Punjab, that is , Daoba, Majha and Malwa did not differ significantly with respect to Religious, Social, Hedonistic and Power Values, but they differed significantly with respect to Democratic, Aesthetic, Economic, Family Prestige and Health Values.2) The students belonging to Doaba region were found to have higher knowledge of Health values as compared to the students of Majha and Malwa regions. Also, the students belonging to Doaba region had higher aesthetic and Economic Values as compared to the students of Doaba and Malwa regions. Also the students of Majha region were found to have higher Health value as compared to the students of Malwa region.The students of Malwa region had higher democratic value than the students of Doaba region. Also the students of Malwa region had higher Aesthetic and Economic values as compared to the students of Majha region.3) The senior secondary school students studying in Government and Private schools of Doaba region did not differ significantly with respect to Religious, Social, Democratic, Aesthetic, Knowledge, Power and Family.

Malti (2007) did a comparative study of Values, Intelligence and Academic Achievement of Students of UP, CBSE, and ICSE Board students. The study has compatibly employed descriptive survey research. Random cum cluster sampling technique has been suitably used to draw a sample of 450 students of different schools from three Educational Boards of Varanasi City, namely UP Board, CBSE & ICSE Board. 75 males and 75 females have been drawn Board wise. Tools used were Personal Value Questionnaire (PVQ) of Sherry & Verma, General Mental Ability Test of M.C .Joshi and, Achievement Test of Life Science constructed and standardized by the investigator has been utilized for the study. Mean, Standard Deviation, and t-

values have been computed for data analysis. In this study the investigator has focused on values, General Mental Ability (GMA) and Achievement of 12th standard students of the selected schools of CBSE, ICSE and UP. The major findings of the study revealed that, all ten values considered, namely, social, family , prestige, democratic , economic, hedonistic, aesthetic, religious, knowledge, power and health, differences have been observed in the status of students board-wise, and gender wise. The students of the three Boards have been reported to almost of the same level of GMA. The students of ICSE Board & CBSE have been found to achieve greater on the test of Life Sciences as compared to that of UP Board.

Rekha (2007) did a study on 'Development of a training module for teachers to transact biology curriculum for developing a certain moral values in secondary school pupils', her findings were special lessons prepared using Juris prudential Inquiry Model (JIM) were capable of developing certain moral values. The important suggestions made by her were (i) Teachers should take responsibility to promote value education (ii) They should find out values inherent in their subjects. (iii) Teachers should find the time and periods to transact values. (iv)Teachers should ready to receive training in value education.

Sahani (2007) in a study titled Value Orientation to Higher Education: integrating values in commerce education illustrates techniques of value education in higher education on the basis of the author's experiences in integration of value in teaching of regular curricula. He described the following techniques for values integration. A concept elaboration analogy, anecdotes, history, situation analysis, case study, modeling, problem solving, role play, reading, opinion poll, testimony.

Anilkumar(2014) This study is an attempt to find out the effectiveness of value integrated education on value based student behaviour and on value attainment of students at upper primary level using a pre-test post-test Quasi experimental design. The study revealed that value integrated education is effective for modification of value based behaviour and value attainment of the Upper primary school students. In the case of the context of behaviour such as school, family and other social context

Value integrated education is effective and in the case of five core human values viz. truth, righteous conduct, peace, love and non-violence it is found that value integrated education is effective for the attainment of values. The main and interaction effect of the levels of intelligence and socio economic status is not significantly effect on value based behaviour. In the case of the main effect of the levels of intelligence and socio economic status the effect on value attainment is significant but in the case of interaction effect, it is not significant.

2.3 STUDIES RELATED TO IMPACT OF TEACHING METHODOLOGY ON MATHEMATICS ACHIEVEMENT

Gangopadhyay (1991) attempted to investigate the relative effectiveness of teacher's classroom teaching techniques in relation to student's achievement in Mathematics. The sample of 100 students of class IX divided in to four groups. The 15 teaching units were planned in lessons of four types. The tools used were test of intelligence, pre- test and post-test for achievement. The major findings were : Technique T2(lecturing and explanation) showed more effectiveness than T1(lecturing). Technique T3(lecturing and explanation with questioning answering) showed more effectiveness than T2 (lecturing and explanation) and T1 (lecturing) at the post- test level. Technique T4 (lecturing and explanation with question- answering by using feedback sequence) showed more effectiveness than T3, T2 and T1 at the post test level.

Singh (1992) compared the results of compute assisted instruction (CAI) with conventional method of instruction in teaching Mathematics for certain selected units of the mathematical curriculum. The study was conducted in four higher secondary schools having facilities of three to five BBC micro -computers. The students belonged to different socio-economic groups. Three units of the Mathematics syllabus for class IX namely, simultaneous equations in algebra, statistical data and their graphical representation in statistics and triangles and their congruence in geometry were chosen for the study. The tools used in the study included rating scale by the researcher, Genus Intelligence Test the Attitude scale towards Mathematics and

educational software. The statistical techniques used included mean, and 't'test for data analysis. The major findings were : The group taught through CAT in all the schools showed a substantial progress. The CAI method of teaching Mathematics had proved to be more effective. Both boys and girls gained from the computed treatment. A significant favourable change in the attitude of the pupils of the experimental groups over the control groups was observed.

Deshmukh (1997) conducted an experiment in the use of educational technology for teaching mathematical concepts. This experiment was designed to develop alternative strategies and support activities as well as instructional materials to facilitate learning of the unit- 'Vulgar Fraction for Class V students. The researcher concluded that the learner learned what the teacher did.

Clark & Bland (2004) conducted the effect of teaching Mathematics Strategies and Keeping Mathematics Journals to reduce Mathematics Anxiety. This mixed method study examined how different strategies of learning Mathematics and keeping a Mathematics journal in a remedial. The findings led to the following recommendation: (1) To break the cycle of Mathematics anxiety, elementary school teacher who are the mathematically anxious should take measures to lessen their own anxiety. (2) Educators should teach several strategies for learning Mathematics. (3) Additional studies of journaling in Mathematics to alleviate Mathematics anxiety should be conducted: (4) Educators should solicit a Mathematical autobiography from students.

Patel (2007) developed a programme for enhancing achievement of the students of class X in Mathematics. It was a single group pre- test post- test design. Multi -stage cluster sampling was used and the size of the sample was seventy students. The programme for locating the weakness related to the pre requisite for teaching each unit and remediating it prior to teaching was developed and implemented. It was found using 't'test that the programme was effective and students were able to score high in the achievement test.

Kumar(2008) investigates on the formation of concepts in Mathematics among the pupil of standard VI, VII, VIII and its relating to correlated -approach in teaching

learning process. The sample consisted of 948 students from the three randomly selected schools in greater Mumbai affiliated to the Maharashtra state Board of secondary & higher secondary education, Pune. The design of the study was Experimental Post- test only control group design. The tools used were Achievement Tests & data was analysed using Mean, SD, T-test. It was found that the students who were taught using correlated-approach were highly benefited. Knowledge when perceived as a whole, enables the pupils to link the previous knowledge with the present knowledge & form a better configuration of knowledge.

Griffin (2008) use of co-operative learning and computer assisted instruction to investigate Mathematics achievement scores, students' attitude towards co-operative learning and confidence in subject matter. This study investigated Mathematics achievement scores between students working in co-operative learning groups using computer assisted instruction and student working alone using CAI in a post - secondary developmental Mathematics class. 51 students enrolled in a basic Mathematics course participated in the study. Two class were assigned to work alone using CAI and two class were assigned to work in cooperative pairs using CAI. This study was a pre-post- test design and was administered to all participants to determine their Mathematics achievement scores. A survey using a 5 point linker scale further examined if using co –operative learning and CAI would change students 'attitude towards their confidence in the subject matter, their attitude towards working in co-operative learning groups. It concluded that this approach was able to enhance the subject matter and also their attitude towards the co-operative learning groups.

Wharton (2010) did a study on "Improving Mathematics teaching and learning in an Adult Basic Education program using co-generative dialogues." This study explores the use of co-generative dialogue (cogen) in an Adult Basic Education (ABE) program located in New York City, and the ways in which students and teachers collaborated to cogenerate resources that afforded a positive and equitable learning environment built on solidarity and new perspectives on teaching and learning of Mathematics. Cogen was introduced to understand how certain structural characteristics within the classroom environment enable or constrain students' agency and understandings of

Mathematics. The research presented in this study focused on improving the teaching and learning of Mathematics in a General Education Development (GED) Mathematics class from the perspectives of the students--the immediate stakeholders. Findings from this research depicted that Cogen created learning environments that fit the needs of adult learners in which they were afforded the opportunity to co/plan, critique and implement curriculum and instructional practice that value how they learn Mathematics as adult learners. Thus, students engaged in the process of evaluating, analyzing and interpreting their mathematical knowledge in the form of sharing, co-teaching, and helping each other understand ideas regarding problem solving in a collaborative setting. This research has salient implications for the teaching and learning of Mathematics in urban ABE programs, the use of computer-assisted instructed programs and provides insight on how collaborative approaches among math teachers and their students improve and enhance Mathematics teaching and learning.

Marquand(2013) did a study on "A value-added study of a federal grant program in Mathematics for military dependent students" The purpose of this study was to provide additional, value-added information, to the findings of the district's annual assessment report of a three-year federally funded grant designed to close the Mathematics achievement gap for military dependent students performing below grade level at a California middle school. This study focused on the value-added support program titled, Students Achieving through Technology (SATT-21) a three year, 1.4 million dollar federally funded grant designated to CUSD in order to address the achievement gap of military dependent students performing below grade level in Mathematics. After a careful analysis of the district's annual assessment report, in combination with the responses from the participant's experiences in the program, findings revealed three major focus areas associated with the grant: (1) communication, (2) curriculum, and (3) professional development. Numerous themes emerged within each of the focus areas which supported suggestions and recommendations for the SATT-21 program. The results of this study provide value-added information for the district and stakeholders investing resources into school

support programs designed to increase student achievement, particularly for military dependent students performing below grade level in Mathematics.

2.4   SUMMARY OF THE REVIEW

There were several studies conducted in both India and abroad which were reviewed for this present study by the researcher. Most of the study were reviewed by keeping in mind the various aspects like values, value theory, value concept in students, values in textbooks, student teachers & teachers, value education, development of value education through various approaches. A few studies on the impact of teaching methodology for Mathematics achievement were also reviewed.

The researcher came across a few studies which were on theories of values. The studies of Darmody (1991) and Nagar(1990) focused on examining the relationship between the Piagetian formal reasoning values preferences derived from the Rokeah value survey, and to weigh the reinforcement concept of Skinner with its positive and negative aspects and Kohlberg's moral developmental stages. Their findings concluded that the prevention of the undesirable and approach of positive guidance were the most effective ways for teaching values. Students with Higher formal reasoning ranked terminal values representing abstract notions with long-term implications higher than those focusing on immediate gratification. Students also favored the instrumental values of self- reliance, competence, and independence.

With respect to values and value education the studies of Dubey (1991), Farmer et.al (1991) Dubey (1992), were related to; concept of value education in India at school level from 1947 to 1986, status of value education in Indian education and highlight the educational implications of value education, varieties of learning around the complex process of value education and evaluation on value education in secondary schools and effect on achievement values and casual attributions. The tools used for data collection included questionnaire, value test, educational aspiration scale and Adjustment Inventory of school students,. The major findings revealed that value crisis was due to lack of ideal leadership, neglect of affective domain in education and

corrupt practices in society. Altruistic values were associated more with family and society than with the school success.

There were few studies related to textbooks. Ushashree (1993), Seah and Bishop (2000), Joyce (2003), Mehta (2003), Thakkar (2005) and Vijayan (2005) conducted studies related to values in Mathematics textbook, values expressed in Caldecott Medal texts, value elements in English textbooks, effectiveness of science curriculum to develop the values of secondary school pupils and to indicate the extent to which listed characteristics of value education were found in textbooks of teachers' subject of specialization.   The findings revealed that they were able to identify values in their respective studies. They also considered textbook was very important in incorporating values.

There were several studies related to values in students at different levels. The studies conducted by Kalamani (1991), Padmanaban (1992), Gardia (2007), Malti (2007) and Narad (2007), focused on students at the school level their objectives included : (a) the problems of adolescents and their value system,(b) values of high school pupils in relation to certain selected variables, (c)comparative study of three social values : secularism, democracy and nationalism,(d) inter-relational study between fundamental and social values of pupils of different educational grades and socio-economic status,(e) determiners of democratic values in higher secondary students, comparing values, intelligence and academic achievement of students of UP,CBSE and ICSE board students, and (f) personal values of senior secondary students. Segal (1993) and Nicholas (1998) aimed to study the cross cultural values and personality characteristics of social work students at graduate level in the U.S and India and also the value perceptions and normative rule compliance of Malaysian and American secondary school students. The tools used during the studies were value test, inventory for good citizenship, student value inventory, students' occupation preference inventory and self-concept inventory. The major findings of these studies are as follows : (i) Adolescent students in higher secondary schools were low in political and religious values, but high in social values. (ii)Values like Secularism and nationalism are completely developed at Class XI level and democracy value in XII, high school

students are good in co-operation, poor in liberty and moderate in values like equality, dignity of individual, justice and tolerance. (iii) Boys and girls could have difference in theoretical, political, economic, social and aesthetic values (iv) students possessed a good social values than political values.

There were studies conducted on college students, student - teachers, teachers on their values or value patterns by Banuo (1992) , Arora (1993), Diwakar (1995) and Agnes(1997). The objectives were to find out personal value patterns and self-concepts of college students, it was also to study the nature of scientific knowledge and values in student teachers, effectiveness of intervening strategies on the development of contemporary values among teacher trainees and to study the personality characteristics of B.ed. students. The tools used in some of these studies were Value Reflecting Questionnaire (VRQ), Scientific Thinking Style Questionnaire (STSQ), and scale for measuring value orientations. These studies concluded that values could affect the understanding of scientific knowledge and gender base value differences were observed in terms of social, aesthetic, knowledge value, power and family prestige value in college students. The values like democracy and national integration if developed could be retained over a longer period. The personality characteristics could have a partial impact on personal values like adaptability, co-operation and tolerance.

There were many studies conducted on value development in students using various models, methods, techniques and approaches. Few of the studies reviewed were also conducted at higher education level. The studies of Bajpai (1990), Vaidya (1991), Dhand et al.(1993), Sharma(1994), Joshi (1998), Kapoor (1995), Biswal and Srivastava (2005), Rekha (2007) Sahani (2007)and Anilkumar(2014) dealt with value discussion model, value analysis model , Juris prudential inquiry model(JIM),Rockeah's method , dramatization method, integrated approach and also designing co- curricular activities for value inculcation. The various tools like sets of Piaget's stories highlighting particular aspects of moral judgment, draw a man test, SES scale , school adjustment checklist by J.Pant, Value clarification scale(VCS), value questionnaire, value perception scale, information schedule and reaction scale.

Their studies revealed a significance in development of values in terms of value based behavior, value conceptions, value perceptions, attitudes and attributes in the students at different level using various subjects like civics,commerce,physics, English, Malayalam, biology and extracurricular activities.

There were few studies reviewed on Mathematics teaching with various methods used for enhancement of achievement in Mathematics. Gangopadhyay (1991), Singh (1992), Deshmukh (1997), Clark & Bland (2004) ,Patel (2007) ,Wharton (2010) and Marquand(2013) focused on teaching techniques, development of different programmers like locating weakness and providing remediation, and Students Achieving Through Technology (SATT-21) for enhancing achievement of the students in Mathematics. The studies focused on use of educational technology, computer aided instructions, using co-generative dialogues (cogen) and an approach for correlated approach for improving the achievement and attitude towards Mathematics. Their findings revealed that these approaches were helpful in improving the achievements of Mathematics.

2.5   IMPLICATIONS FOR THE PRESENT STUDY

The studies reviewed were mainly of two types. The nature of the studies included survey and experimental types of research. Both these types of studies had different objectives and focus. The survey type studies were conducted with a view to study the relationship between various values and different variables like, family background, sex, rural-urban background, caste, etc. of students at school and graduate level.

The experimental studies were conducted in order to study the effectiveness of different intervention strategies, as well as models on development and status of changing values among students. The researcher came across different studies related to textbooks of different subjects and curriculum. There were several studies which focused on various models, methods, approaches, designs, programmes on value development in students. The different tools used in the studies reviewed were questionnaires, value tests, reaction scales, inventories, perception scales, etc. Anilkumar (2014),studied the effectiveness of value integrated education on value

based student behaviour and on value attainment of students at upper primary level through the teaching of Malayalam. There were few studies which focused on CAI, technology enabled programme, and co- related approach with an aim to improve achievement in Mathematics. The literature reviewed did not include any study related to integrated approach in teaching of Mathematics for inculcation of values in students at secondary level. Hence the researcher conducted a study on teaching Mathematics through the integrated approach for value inculcation at secondary level.