Chapter 2

Review of Related Literature

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2.01 INTRODUCTION

For any worthwhile study in the field of educational research, one of the pre requisites is to make a survey of the studies undertaken earlier relating to the topic, now under study. Availability of adequate information enables the investigator to know precisely the types of researches that have already been done by others relating to the topic.

The up-to-date information facilities the researcher in incorporating the findings and to build upon them or to view - the problem with new orientation so that much light can be thrown and better result achieved. The analysis of earlier researches enables the investigator to plan up the investigation by adopting appropriate tools.

The importance of reviewing the studies made was given by Best (1986). He said, “Practically all human knowledge can be found in books and libraries. Unlike other animals that must start a new with each generation, human beings build upon the accumulated and recoded knowledge of the past. Their constant adding to the vast store of knowledge makes possible progress in all areas of human behaviour”.

Hence the review of the studies made earlier enables one to understand what have already been done in one’s field of research.
Many changes have taken place from nursery in Teacher Education. Universalisation of elementary education and eradication of adult literacy have been the two of the most important and basic goals of educational development. National Policy of Education (NPE) on further expansion and to support the implementation, a third tier system was developed with DIETs at District level the functioning of DIETs and its influence on teacher training was to be studied under the related literature.

The researcher, after going through Educational Surveys, journals, abstracts of thesis and books, collected information relevant to the area of research.

The studies are classified as follows:

1. Attitude Towards Mathematics Education,
2. Attitude Towards Teaching Profession,
3. Mathematics Achievement,
4. Mathematics Attitude and Achievement, and
5. Attitude Towards Teaching Profession and Achievement.

2.02 ATTITUDE TOWARDS MATHEMATICS EDUCATION

a) Studies done in Foreign

The content and operation of an experimental Mathematics course designed primarily to modify and shape attitudes towards Mathematics is described. The resulting attitude changes are discussed (Manfred et al., 1972).
On a Likert scale, 269 prospective elementary school teachers instructed in a seminar workshop approach showed a greater improvement in attitude towards Mathematics than students in a lecture setting. On the Dutton attitude scale, there were no differences between instructional techniques nor between pre- and posttest means (Barry 1981).

Attitudes towards Mathematics of college students in Mathematics, psychology, and other fields were measured (Yi-Guang, 1982). Items describing Mathematics as a good mental exercise and valuable mental training were selected by more than 55 percent of the students sampled. Overall similarity in attitudes among the three samples was high. Mathematics was highly valued.

Malaysians have more favorable Mathematics attitudes than Indonesians; urban students, more favorable attitudes than rural students. Males have more positive Mathematics attitudes; females have more positive school attitudes (Frank. 1983).

Saburoh et al. (1984) investigated whether attitudes toward school Mathematics on mathematical achievement differed between low and high intelligence eighth-grade students in three Japanese schools (N=808). Results indicate that the attitude of low intelligence students is more important and it affects more in magnitude than that of high intelligence students.

Charles (1989) compared the performance in college algebra for four testing strategy classes: a homework class; a quiz class; a test class; and
the control class. Adjusted mean scores in performance and adjusted final attitude were not different among the four strategy groups. The test class had a higher attrition rate than the homework class.

Oakley (1992) described a summer Mathematics inservice workshop for 39 elementary teachers from rural, small schools throughout New Mexico. Focused on minority participation, hands-on activities, and improvement of attitude towards the teaching of Mathematics. Posttests revealed improvement in knowledge of manipulative use, confidence in use of manipulatives, and Mathematics anxiety.

Differences in attitude toward Mathematics of German students (n=748) aged 14-19 were examined by Gabriele (1993) to verify previously reported differences. Results indicated continuing gender differences in interest in Mathematics, perceived importance of Mathematics achievement, and Mathematics career choice; changed views on gender roles.

The meta-analysis integrated 143 primary studies on the relationship of attitude toward self and social factors with achievement in Mathematics. Attitude was decomposed into self-concept about Mathematics, perception of family support, and perception of Mathematics as a male domain. Major findings included: (a) self-concept, family support, and Mathematics as a male domain were all related to achievement; (b) the three relationships did not show significant gender differences; (c) the three relationships consistently decreased from the junior high grades to the senior high
grades; (d) the relationship between self-concept and achievement varied as a function of ethnicity, whereas the relationship between family support and achievement was consistent across ethnic background; (e) the three relationships all varied across sample selection; (f) the relationship between self-concept and achievement varied with sample size, whereas the relationships of family support and Mathematics as a male domain with achievement were sample-size invariant; (g) the relationship between self-concept and achievement increased over time, whereas the relationships of family support and Mathematics as a male domain with achievement remained almost unchanged over time; and (h) there were no statistically significant interaction effects among gender, grade, and ethnicity for any of the three relationships. Xin Ma, Nand Kishor (1997).

Stephen et al (1998) discussed part of study stimulated by the continuing debate over differences between boys and girls in their attitudes towards Mathematics and their participation and performance in this subject at school. Concludes that there were clear differences between boys and girls on the Mathematics as a Male Domain scale with girls being less stereotyped in their perceptions than boys.

George et al (1998) reported the results of a study aimed at changing prospective teachers' attitudes toward Mathematics using a Mathematics preparatory program designed and implemented over three years and employing questionnaires and interviews. Results showed significant
improvement of attitudes, particularly toward the satisfaction from and the usefulness of Mathematics.

Markku (2002) suggested a new framework for analyzing attitude and changes in attitude. This study identified four different evaluative processes as aspects of attitude: (1) emotions aroused in the situation; (2) emotions associated with the stimuli; (3) expected consequences; and (4) relating the situation to personal values. Illustrates the usefulness of this analytical framework using an exemplary case study.

Xiaoxia (2002) focused on gender differences in growth in Mathematics achievement in relation to various social-psychological factors such as attitude towards Mathematics, self-esteem, parents' academic encouragement, Mathematics teachers' expectations, and peer influence. Results indicate that gender differences in growth in Mathematics varied by the student's initial status in Mathematics.

This study is a report of the development of a new instrument to measure students' attitudes toward Mathematics, and to determine the underlying dimensions of the instrument by examining the responses of 545 students. The data represent all grade levels and subjects of the secondary Mathematics curriculum. The reliability coefficient alpha was .97. A maximum likelihood factor analysis with a varimax rotation yielded four factors: self-confidence; value of Mathematics; enjoyment of Mathematics; and motivation. Psychometric properties were sound and the instrument, Attitudes toward Mathematics Inventory (ATMI), can be recommended for
use in the investigation of students' attitudes toward Mathematics. (Tapia, 2004).

The purpose of this study was to investigate the attitudes of secondary school students toward Mathematics study, to compare the attitudes of students in the USA with eight other countries, and to compare differences in attitudes by gender for students in the USA. The study also analyzed the relationships between these attitudes and other Mathematics learning factors and reported their impact on Mathematics achievement (Kathryn et al., 2004).

Amorim (2004) performed action research with the aims of improving primary school student teachers (STs)' understanding of, and attitudes to, Mathematics. The teaching strategies used to help STs' improve their understanding and attitudes were similar to the ones suggested for their future use in teaching children. The data indicated that most STs improved their understanding. Some also said that they had improved their liking for the subject and their remarks clearly demonstrated a connection between the affective and cognitive domains. Yet others said that their attitudes towards Mathematics had not changed much. The two main aims of this action research remain incompatible in the perception of some of these STs.

A multiple regression analysis of the relationship between prospective teachers' scientific understanding and Gender, Education Level (High School, College), Courses in Science (Biology, Chemistry, Physics, Earth
Science, Astronomy, and Agriculture), Attitude Towards Science, and Attitude Towards Mathematics is reported. Undergraduate elementary science students (N = 176) in an urban doctoral-level university in the United States participated in this study. The results of this study showed Gender, completion of courses in High School Chemistry and Physics, College Chemistry and Physics, and Attitudes Toward Mathematics and Science significantly correlated with scientific understanding. Based on a regression model, Gender, and College Chemistry and Physics experiences added significant predictive accuracy to scientific understanding among prospective elementary teachers compared to the other variables (David et al., 2005).

In this study the aim was to determine the variation of students’ attitude levels through Mathematics by performing an education in which Realistic Mathematics Education was used. In the inclusion of this aim, a Likert type attitude scale containing 26 items was prepared. The scale’s validity and reliability were made and for this aim the scale was applied to 167 students as a plot group before it was applied to the real student group. The scale’s Cronbach Alpha reliability coefficient was determined as 94. According to the result, this scale is reliable. The scale has taken from 13 positive and 13 negative attitude items. In the study, pre-attitude, post-attitude control groups’ design was applied. The experiment and control groups were determined by impartial appointment. The pattern has been taken from 73 students. Using Realistic Mathematics Education for
experiment group and traditional method for control group made the education. At the beginning of the education and at the end of the education pre-attitude scale and post-attitude scale was applied to both of the groups. The obtained data was analyzed by SPSS packet program. The analyze result shows that the education made by using Realistic Mathematics Education makes positive variations in students' attitude levels through Mathematics (Devrim et al., 2006).

Konstantinos et al. (2007) attempted to answer are related to the attitudes of student teachers of the Department of Early Childhood Education at the University of Patras (Greece) towards Mathematics, as well as their views on the instruction of Mathematics in Early Childhood Education. The research sample included 52 students in the fourth semester of studies, who were invited to answer a questionnaire with respect to Mathematics and its instruction. The findings reveal the negative attitude our research subjects adopt towards Mathematics. Their epistemological views on Mathematics and its instruction do not constitute a single and solid conceptual system. These findings underline the need to improve the mathematical education offered to student teachers of Early Childhood Education.

Orhun (2007) conducted a study aimed to investigate whether there is a relationship between gender and learning style, mathematical achievement and attitude towards Mathematics. The subjects of this study were 5th-semester students (42 females, 31 males) from the Mathematics
Department at Anadolu University. The results of this study suggest that there were differences among learning modes preferred by female and male students, their mathematical achievements, and their attitudes towards Mathematics. Mathematics achievement and attitude towards Mathematics were not, themselves, dependent on gender. It was also noticed that while female students most preferred the Convergent learning style, male students most preferred the Assimilator learning style. No students were observed to prefer the Accommodator learning style in both groups.

Preservice elementary teachers have been shown to generally possess poor mathematical knowledge (e.g. Goulding, Rowland, & Barber, 2002) and also strong negative attitudes toward Mathematics (e.g. MacNab & Payne, 2004). Recently, national organizations have proposed interventions to address these issues (Conference Board of the Mathematical Sciences, 2001). This paper analyzes the impact of a content course intervention. When compared to a control group, the experimental group had a significantly more positive attitude toward Mathematics. When previous achievement was partially controlled for, the experimental group scored significantly higher than the control group on a measure of content knowledge (Michael, 2007).

This study sought to determine the effect of simulation-games environment on students’ achievement in attitudes to Mathematics in secondary school. Data was collected from a sample of 147 students in
senior secondary school in Osun-State, Nigeria. t-test and analysis of variance was used to analyze the data collected for the study. The finding reveals that students' poor academic achievement in Mathematics is partly due to the method of teaching used. Also, the findings revealed that, the use of simulation-games environment led to improve achievement and positive attitude towards Mathematics. The study conclude that teachers' use of stimulating teaching methods would go a long way in sustaining and motivating students interest in learning Mathematics (Akinsola et al., 2007).

The purpose of this study was to examine the effects of webquest-based applications on the pre-service elementary school teachers' motivation in Mathematics. There were a total of 202 pre-service elementary school teachers, 125 in a treatment group and 77 in a control group. The researcher used a Likert-type questionnaire consisting of 34 negative and positive statements. This questionnaire was designed to evaluate a situational measure of the pre-service teachers' motivation. This questionnaire was used as pre- and post-tests in the study that took place in two semesters. It was administered to the participants by the researcher before and after the instruction during a single class period. The paired-samples t-test, the independent-samples t-test and analysis of covariance with [alpha] = 0.05 were used to analyse the quantitative data. The study showed that there was a statistically significant difference found in participants' motivation between treatment and control groups favouring the treatment group. In other words, the participants who designed the
webquest-based applications indicated positive attitudes towards Mathematics course than the others who did the regular course work (Erdogan, 2008).

In this study the results of a comparative longitudinal study investigating changes in girls’ and boys’ attitudes towards Mathematics, and self-confidence in Mathematics are presented. A 5 point Likert scale, AMMEC, was used to measure attitudes towards Mathematics (AM), computer-based Mathematics (AMC), and self-confidence in Mathematics (CM). A total of 430 students using technology for Mathematics and 109 students not using it were monitored for 3 years. At the beginning of the study, the participants were ages about 13 years. The statistical analyses of the data showed few gender differences in the way student’s attitudes and self-confidence changes over the 3 years. Significant gender differences favouring boys were found in attitudes towards Mathematics in grades 8 and 9 for the group using technology. For the group using technology, significantly more boys than girls got high scores in attitudes towards computer-based Mathematics in grade 7. Significantly, more girls using technology then girls not using it got high scores in grade 8. The use of technology did not have a positive impact on students’ self-confidence. Regardless of whether they used computers or not, from grades 7 to 9, there was a decrease in the self-confidence in Mathematics of both boys and girls. To enrich these results and detect possible gender differences in the way attitudes were constructed, 12 girls and 13 boys were interviewed
at the end of the study. The analysis of the arguments they presented to explain and justify their attitudes towards Mathematics, computer-based Mathematics, and their self-confidence in working in Mathematics provided evidence of important gender differences in the ways in which boys and girls construct their attitude, indicating how their constructions reflect the gender stereotypes within Mexican society (Ursini et al., 2008).

This study examined the effect of behavioral objective-based (BOBIS) and study question based (SQBIS) instructional strategies on students’ attitude towards Senior Secondary Mathematics. The three hypotheses for the study were tested at 0.05 level of significance... The research adopted a pre-test, post-test, control group quasi experimental design. There were three treatment groups which are - two experimental groups (behavioral objective-based (group 1, N=117) and study question-based (group II, N=95) instructional strategies) and a control group (group III, N=100). A total of 312 students were involved in the study. The classrooms were randomly selected in each school and all the students in the selected classroom constitute the sample (intact class). Students’ Attitude Questionnaire (SAQ) has a reliability coefficient of $r = 0.81$. Findings revealed a significant effect of treatments (BOBIS & SQBIS) on students’ attitude towards Mathematics. The result was ($F (2,311) = 72.95$, $P < 0.05$). There was a significant difference in attitude between behavioural objective based instructional strategy group and the control group with the BOBIS group having far better attitude to Mathematics than the control group.
Similarly, significant difference was found between the attitude of SQBIS group and the control group but no significant difference in attitude was found between BOBIS group and SQBIS group. Behavioral objective-based and Study-question-based groups were found to have similar attitude towards. In other words, there was significant differences between the attitudes of subjects exposed to behavioural objectives and control group and between those exposed to study question and the control group and no significant difference in attitude between the behavioural objective and study question groups. Both experimental groups (BOBIS and SQBIS) proved to be superior to the control group. Based on the findings, behavioral objective-based and study question-based instructional strategies were found to be viable instructional strategies that could promote positive attitude towards Mathematics. The implication of the result is that teachers’ method of instruction in classroom is important in changing students’ attitude and habits towards Mathematics (Akinsola et al. 2008).

This study investigated the effects of self and cooperative-instructional strategies on senior secondary school students' attitude towards Mathematics. The moderating effects of locus of control and gender were also investigated. The study adopted pre-test and post-test, control group quasi-experimental design using a 3 x 2 x 2 factorial matrix with two experimental groups and one control group. Three hundred and fifty SSS II students from six purposively selected secondary schools in Ijebu-North Local Government Area of Ogun State were the subjects. Three
instruments were developed, validated and used for data collection. Analysis of Covariance (ANCOVA) and Scheffe "post hoc" analysis were the statistics used for data analysis. Findings showed that the treatments had significant main effect on students' attitude towards Mathematics. The participants exposed to self-instructional strategy had the highest post-test mean attitude score. The study found no significant main effects of locus of control and gender on the participants' attitude towards Mathematics. It was concluded that Mathematics teachers should be trained to use self and cooperative learning packages in the classroom, since the strategies are more effective in improving students' attitude towards Mathematics than the conventional method (Ifamuyiwa et al., 2008).

This study was designed to compare the effects of Team Assisted Individualization (TAI) and Student Teams-Achievement Divisions (STAD) on fourth grade students' academic achievement in and attitudes towards Mathematics. Seven classes of a school were randomly selected for this experimental study. Two of these were given instruction through TAI; two through STAD, and the remaining three were treated as a control group. For the purpose of the data analysis regarding academic achievement, the 3X1 covariance analysis was used to compare the groups. As a result of this comparison, both the TAI and STAD methods were found to have positive effects (d = 1.003 for TAI and d = 0.40 for STAD) on students' academic achievement in Mathematics. The pairwise comparisons showed that the TAI method had a more significant effect than the STAD method.
The scores for the attitude towards Mathematics were analyzed by using non-parametric statistics. As a result of this analysis, no significant difference was observed regarding students' attitudes towards Mathematics (Kamuran et al., 2008).

This study aimed to compare Mathematics learning achievement entitled Parabola, attitude towards Mathematics, and analytical thinking abilities of Mathayomsuksa 3 (grade 9) students between organization of activities using the Geometer's Sketchpad Program as media and organization of activities using conventional method. They were assigned into an experimental group of 38 students who learned using organization of learning activities by the use of the Geometer's Sketchpad Program, and a control group of 39 students who learned using the conventional organization of learning activities. The research instruments used in the study included 12 lesson plans for organization of activities using the Geometer's Sketchpad Program and 12 lesson plans for conventional organization of activities., a 30-item of multiple-choice Mathematics achievement test, a 30-item analytical thinking ability test, and a 30-item scale on attitude towards Mathematics. Mean, standard deviation, Pearson correlation ($r_{xy}$), t-test (independent samples), and Hotelling's $T^2$ were employed for testing hypotheses. The findings revealed that students who learned using organization of activities by the use of the Geometer's Sketchpad Program as media had higher attitude towards Mathematics learning than those organization of activities using
conventional method at the .05 level of statistical significance. In addition, students who learned using organization of activities by the use of the Geometer’s Sketchpad Program as media had higher Mathematics achievement entitled, Parabola and more analytical thinking abilities than those who learned using the organization of activities using conventional method at the .05 level of significance (Renuwat et al., 2009).

The aim of this study was to investigate the complex relationship between students’ Mathematics confidence, confidence with technology, attitude to learning Mathematics with technology, affective engagement and behavioural engagement, achievement, gender and year level. The participants were secondary students from state co-educational schools in Metropolitan Athens, Greece. Gender differences as well as differences between year levels and the resulting clusters of students were investigated by using a MANOVA. It was found that boys expressed more positive views towards Mathematics and more positive views towards the use of technology in Mathematics, compared to girls. It was also found that high achievement in Mathematics was associated with high levels of Mathematics confidence, strongly positive levels of affective engagement and behavioural engagement, high confidence in using technology and a strongly positive attitude to learning Mathematics with technology. Low levels of Mathematics achievement was associated with low levels of Mathematics confidence, strongly negative levels of affective engagement and behavioural engagement, low confidence in using technology, and a
negative attitude to learning Mathematics with technology (Anastasios et al., 2009).

Dolores et al (2009) examined changes, if any, in three cohorts of general education teacher candidates’ (n = 13, n = 8, n = 5) attitudes toward teaching Mathematics to students with disabilities after participating in focused instructional experiences which provided both information and vicarious positive teaching activities in special education. Data collected included pretest and posttest scores for each of the three cohorts and journal entries. Little or no change in attitude towards students with disabilities and Mathematics, and efficacy to teach students with disabilities was observed for the year one and year two cohorts. In the third year the modules were combined with a structured field experience. The data collected from the third year cohort suggested a positive trend in attitude as measured by the survey data and field experience journal data. Future study with larger samples is needed.

2.03 ATTITUDE TOWARDS TEACHING PROFESSION

a) Studies done in Foreign

Elloasson et al. (1940) while summarizing their research concluded that interest in teaching and attitude towards teaching were significant factors associated with teaching success.

Fuller (1946) found no significant relationship between attitude scores and self-ratings and supervisor’s rating of student teaching.
Celes Brembeck’s (1962) book on Discovery of Teaching is built upon living experience of teaching and learning. He quotes Suranna Wesley “In order to form the minds of children first thing to be done is to conquer their will”.

Bordin et al. (1963) found the vocationally mature individuals are not only mature in occupational attitudes and orientations, but also in other personality characteristics. Thus vocational maturity seems to be reflections of general personality development.

A follow-up study of recent Graduates of the college of Education, University of Missouri - Columbia was done by Hopkin Nark. (1970). A part of an analysis and evaluation of the teacher training programme in the college of Education, University of Missouri - Columbia, a questionnaire survey was conducted (i) to ascertain if in the opinion of recent graduated their pre-service programme gave them an adequate preparation for teaching. (ii) To assess trainees towards teaching profession. A 100 item questionnaire was constructed. Subjects (279) were selected by random sample from a list 169 College of Education graduates. Findings based on 96 percent return of questionnaires, indicate that most of the recent graduates are relatively well satisfied with teaching as a profession.

Anderson et al. (1972) examined the concurrent validity of observed behaviour as a predictor of teacher philosophy, teacher professional attitude and teacher ability to forecast first grade reading achievement.
Opinionnaire measuring teacher morale or attitude towards the teaching professional were used.


Yee Albert (1973) considered the schools role in establishing a social attitude in the teaching profession and the development of the attitudes of students and teacher.

Rosenshine (1973) tried to relate teacher classroom behaviour as measures by Flander’s system to pupil attitude (measured as adjusted and unjust post list scores on Michigan students questionnaire) and found that indirect teacher behaviour was positively, frequently and significantly related to students attitude towards - rather perception of teacher’s activityness, fairness of rewards of punishments, teacher’s competence and interest in school work.

George et al. (1978) found that there is no significant difference between the B.Ed., trainees before and after the micro teaching exposure in their attitude.

Kushwaka (1979) studied the attitude and perceptions of secondary teachers. The sample consisted of 600 trained graduate / post graduate teachers. Role perception inventory was used to collect data. Findings revealed that there was no relationship between teaching experience motivator role.
Attitudes towards the profession were determined among different aged teachers and students enrolled in teacher education programme by Lipka et al. (1981). No age difference in attitude among the teacher samples were found but inter-group differences in attitudes were found between students and teachers.

Chirore (1986) studied Form IV pupil’s perception of and attitude towards the Teaching Professional in Zimbabwe. A survey of 577 secondary students was conducted to determine pupil’s attitude towards teaching profession. Teaching in general and secondary teaching in particular, was more attractive to females to students from rural schools and pupils whose parents had low academic qualifications.

Notar et al. (1987) made a comparative analysis of Teacher Education in the people’s Republic of China and the United stated 1985-86. This comparison covered the national policies, attitude towards teaching profession and teacher education reform. This study has suggested that U.S. educators should be more interested in what other countries are doing in the teacher education field.

Okpala et al. (1988) analyzed the classroom interaction pattern of physics teacher trainees in a Nigerian college of education. It was found that there is a significant relationship between classroom interaction patterns and attitudes towards the teaching profession.

Studies by Wandi (1988), Ryans (1960), Koul (1973), Quraishi (1975) and Mann (1978) indicated that successful teaching was significantly
related to favorable attitude toward children and the teaching profession. They found that there was an insignificant change towards favorableness suggesting that the training programme was inadequate and had to revamp.

A Development of the Primary Teacher Questionnaire (1992) “A Teacher Beliefs Scale Based on the NAEYC Guidelines for Appropriate Practice in the Primary Grades”. This report describes the development of the Primary Teacher Questionnaire (PTQ); the teacher believes scale based on the position statement on development appropriate to the practice in the primary grades published by the National Association for the Education of young Children (NAEC). The development of the PTQ was conducted in three phases, item development, initial testing and scale refinement, and field testing, in the field test, a 42 - item version of the PTQ was administered to 144 elementary and early childhood pre-service and in-service teachers. This version of the PTQ consisted of two sub-scales that related to developmentally based and traditionally based practices. Results of the testing indicated that the two PTQ sub-scales highly differentiated respondents on the basis of their background in early childhood education, and were internally consistent. Factor analysis of the 42 items identified 2 factors. It is concluded that the PTQ is a useful instrument for examining teacher beliefs about appropriate practice in primary school settings.

Roy (1992) analyzed the teaching behaviour pattern of experienced science teachers.
A case study by Cantor et al. (1997) explored the socialization of four beginning teachers as they engaged in the pre-induction and induction years of professional training. The analysis provided information about what contributes to the development of beginning teachers as they participate in school communities engaged in inquiry and as they grapple with issues of social injustice. The four case students were examined in terms of social justice education, attitude towards the teaching profession, why the participants wanted to become teachers, their development as social justice educators, support, collaborative School - University activities and inquiry as a means for school reform and teacher education constructivist pedagogy and collaboration.

Blackadar et al. (1998) conducted a study to determine if there was a significant difference among disciplinary procedures used among urban and suburban teachers. Thirty-eight elementary school teachers of grads K-5 were the sample. The suburban teachers indicated more positive attitude towards teaching as a profession.

Lynn et al. (2002) presented a career cycle for teachers, including variables of enthusiasm, interactive teaching skills and attitude towards the teacher profession. This study discussed the models in eight stages pre-service induction, competency building, enthusiasm and growth career frustration, career stability, career wind down and career exit.

This research (Agius et al., 2003) was based upon the teachers’ attitudes towards the progressive teaching strategies and the affects that
these strategies had upon children. In this research, investigators focused mainly on the observations and questionnaires completed in Church, State and Independent schools. Investigators discovered that the need for change was necessary in their schools. These results were also associated with the National Minimum Curriculum principles that the teachers should implement in their classrooms. This study pointed out that teachers could benefit from both approaches to create a successful learning environment.

The Purpose of this study was to ascertain the beliefs of Mathematics teacher trainees about their chosen profession before they began their service. Specific topics included instructional approaches, the role of the teacher, interaction among students, and interaction between teacher and students during class. Data were collected by use of an open-ended questionnaire administered to 46 pre-service Mathematics teachers. Most of the participants in the study held non-traditional beliefs about Mathematics teaching. This finding has several implications for teacher education (Boz., 2008).

This study set out to investigate the attitude of senior secondary school students towards the teaching profession. This was with a view to ascertain the extent to which variables like gender, location and school type may influence students' attitude towards teaching as a profession. A fifteen (15) item questionnaire was designed to elicit responses from individual students with a view of determining students' attitude towards teaching profession. A representative sample size of 250 respondents was chosen.
from ten (10) schools randomly selected from public and private schools within the rural and urban areas of the Federal Capital Territory (FCT) Abuja, Nigeria. Findings confirmed that senior secondary school students in the Federal Capital Territory exhibited general positive attitude towards teaching as a profession without prejudice to gender, school type and location. It is recommended that government and other employers of labour should create the enabling environment to motivate students to choose and pursue career in teaching. It is also emphasized that teachers and educators in general should continue to conduct themselves in manner that would endear the noble profession to the hearts of the upcoming generation (Oluwatimilehin, 2009).

b) Studies done In India

Vashishta (1973) found that the teacher programme generates a favorable attitude towards teaching more so in women and science students.

Ahluwalia (1974) found that the nature of the training programmes provided by different institutions either increase or decrease the student teacher favorableness towards teaching.

Sukhwal (1977) found that trained teachers had more positive attitude than untrained ones.

Mishra (1978) developed a scale to measure attitude and indicated a relationship of attitudes with some Socio-Economic Factors.


Kakkar (1984) studied the attitude of teacher trainees and their parents towards teaching. The result suggested that.

1. Parents are relatively similar to students in their attitude towards teaching.
2. A fair positive relationship exists to students in their attitude towards teaching.
3. Trainees tend to identify themselves with the attitude of the parent of the same sex.

The study confirms that parents do have a role in helping to form the professional attitude in their children who became teachers.

The study on the correlates of teacher performance in a stimulated teaching setting by the NCERT (1986) showed that student teachers of high teaching attitude can give better performance through stimulated teaching.

Seshamma et al. (1986) undertook research on Attitudes of Pre School Teachers towards pre-school education programme. The major objectives were to determine the difference in the attitudes of pre-school
teachers towards play in three different set ups, namely, anganwadi, laboratory schools, and their nursery schools, and to find out if there were and different in facilities a valuable for play. The study revealed that a majority of the teachers in all set ups considered, play as very essential. Amongst anganwadi workers ninety seven percent accepted play as essential, eighty percent had positive attitudes towards water play, sand play organized play etc., and ninety three percent of anganwadi had play activities.

Singh. (1987) studied the relationship between teacher effectiveness and the various variables including attitude towards teaching profession and found that attitude towards teaching appeared to be correlated with teacher effectiveness.

Singh et al. (1988) studied the impact of teaching practice on student teacher’s attitude.

More (1988) examined the relationship between teaching effectiveness, teaching aptitude and personality traits.

Singh in 1988, used Flanders Interaction Analysis Category System for observing teacher’s class room behaviour and attempted to predict if from attitudes, measured by the Minnesota Teacher Attitude Inventory. This study revealed that there was a significant relationship between attitude towards teaching in both male and female groups. Lecturing, criticizing, justifying authority direct influence and restrictiveness are negatively correlated with attitude towards teaching.
Devi (1988) found that the teacher education programme non-contributory to the teaching attitude of student-teachers but did account for influencing their aesthetic values positive as also social and health adjustment.

The National Centre for Education statistics (NCES) sponsored the 1988-89 Teacher Follow up Survey (TFS) conducted (1992) by the U.S. Bureau of the census, to update data on teacher career patterns and plans. One of the main purposes of TFS was to obtain data on attitude towards teaching profession.

Attitudes towards teaching in relation to variables of personality, intelligence, adjustment, creativity and values were studied by Kala (1989).

Singh (1990) studied teacher effectiveness as related to their attitude towards teaching profession. This study found that rural and urban teachers do not differ significantly on their attitude score towards teaching profession. Rural teachers attitude towards teaching was significantly related to teachers effectiveness but this was not so in the case of urban teachers.

Reddy et al. (1990) tried to determine the degree of relationship between a teachers age, sex, training and years of teaching experience and attitude towards teaching and found out no differences among teachers in their attitude towards the teaching profession because of the factors considered.
Sundaresan (1991) studied the extent to which B.Ed., students were favorably disposed towards teaching and found 95.04% of B.Ed., and students had a favorable towards teaching. Negative correlation was found between the student teacher’s attitude towards the teaching and their interest in it.

Sinha (1991) studied about the impact of elementary teacher education programmes on attitudinal change of elementary teacher trainees of Orissa, followed the design of presage studies.

Reddy (1991) studied on the teaching aptitude and, attitude towards teaching with right to sex, age, faculty and category of teachers.

Study on relationship between self concept and attitude towards teaching was done by Ganapathy (1992).

A study about the factor content of Minnesota Teacher Aptitude Inventory applied to teachers in India was carried out Bhushan (1992).

Babi (1992) found that less experience, favourable attitudes towards teaching and efficiency of teaching corresponded with higher job satisfaction.

Misra (1992) on the basis of his study concluded that in-service training had a positive impact on teachers’ behaviour and pupils’ active participation in the class.
Das (1992) found the impact of curriculum of the one year. JBT programme on developing a proper attitude towards teaching rather favourable for both the rural and, urban teaches.

Yadav (1992) studied the impact of teacher training on self-concept, social maturity and attitude towards teaching.

Su. Justine (1993) presented a profile of teacher education students, focusing on students, demographic characteristics, their reasons for entering teaching, their attitude toward teaching as a profession.

2.04 ACHIEVEMENT IN MATHEMATICS EDUCATION

a) Studies done in Foreign

Gadgil (1979) studied the causes of failures at Secondary School Certification (SSC) examination and found that school factors like inadequate courage of the syllabus, inadequate attention to difficult topics and lack of motivation has been responsible for failures.

Kalra (1979) found that the mathematically fitted were quite high on creativity. Tuli (1979) found aptitude for Mathematics and achievement in Mathematics were significantly and positively related to mathematical creativity.

Gakhar (1981) identified variables of educational environment as responsible for acquisition of mathematical concepts. SES, intelligence, teachers' qualification, class size, encouragement to teachers by head, use
of audio-visual aids, and feedback are some other variables were significantly related to the acquisition of mathematical concepts.

Manika (1983) found language mastery was an important factor in the acquisition of concepts in Mathematics.

Bailker’s (1983) study revealed that a self-instructional remedial microteaching course improved the instructional competence of the teacher in respect of some selected skills, the course had a lasting effect. Pratap (1982) said that Micro Teaching was more effective in the development of skills in comparison with the traditional method.

Briefly summarized are results from a report on Mathematics assessments in 32 states. The general trend in Mathematics achievement is upward, since the mid-1970's in some states and the early 1980's in others. Patterns are noted for addition, subtraction, multiplication, and division with whole numbers; fractions; decimals; numeration; geometry; and problem solving. Major implications are noted, particularly the point that students are scoring relatively well on items dealing with computation with whole numbers, but scores on concepts and problem solving are not as high. Topics on which scores were below the 50 percent level are listed, with some comments on the five topics which occasioned the greatest difficulty (Suydam, Marilyn, N. 1984).

Mondkar (1984) revealed that the ability to learn the number system is chiefly composed of factors, general intelligence, number factor and perceptual factor.
Kaur (1985) is her studies analysed abstract concepts in Mathematics and isolated the figural angular factor and numerical facility factor as the dominant factors in case of high school students.

Guilford’s structure of intellect was analysed and their hearing on Mathematics achievement was studied by Dubey (1987). This study found numerical reasoning; numerical facility and visualization of numerical patterns are the common factors of numerical aptitude tests.

**b) Studies done in India**

Sharma (1901) said the P.L.I. was more effective than conventional teaching not only in relation to achievement but also in relation to retention. P.L. also found favourable with flexibilities while rigids benefited more by conventional teaching.

Iyyer (1977) in his studies revealed that some personality variables like self reliance, sense of personal freedom, feeling of belongingness, nervous, symptoms, social skits, general and test anxiety, parental education and, their profession were the factors for under achievement in Mathematics.

Nalinidevi (1976) studied the development of number concept and found that discrimination, serration and numeration among children appeared in that order.
Defective textbooks, of limited knowledge blind use of rules, insufficient drill works, and absence of mathematical approach were some of the causes for the low achievement in schools (Sharma, 1978).

Katiyar’s (1979) study revealed that sex has no influence on the achievement in Mathematics. Numerical reasoning and numerical ability occupied a prominent place among the five cognitive functions studies in relation to Mathematics achievement. Affective variables were seen to possess the ability to disorientate between the extreme achievement pairs as against more approximate pairs - was the outcome of studies carried out by Soman (1977) and Singh (1986).

Somasundaram (1980) studied the personality variables in relation to over and under achievement. All personality variables except the reuse of personal works, sense of personal freedom and community relations disorientated behaved over achievers and non-over achievers.

Nilimakumari (1984) studied the conservation of number and substance in relation to intelligence and SES, revealing positive relationships. Reasoning power, space insulizations, attitude towards Mathematics were found significantly related to Mathematics achievement.

Patel (1984) in his study revealed that achievement motivation was found to have no relation on achievement.

Tiwari (1986) analysed 19 Tests of Reasoning Ability and 6 Tests of Set concept. The study revealed two dominant factors, namely cognition of semantic implication and convergent production in the case of the
reasoning ability test and in the case of set concept test the dominant factors identified were: concepts of sets and concept of functions. Factor Analysis of 19 Reasoning Ability Tests and composites set concept Achievement Tests revealed a significant loading on deductive reasoning.

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Achievement in Mathematics has been studied in relation to a number of variables, both cognitive and affective studies in the past have confirmed that intelligence and socio-economic background are major contributors of achievement in Mathematics (Singh, 1986; Gakhar, 1981; Rajput, 1984; Nibrinidevi 1976).

The remedial instructional micro teaching was effective in improving the skills of probing questioning and demonstrations of both more and less experienced primary school teaching was the result of the study of Singh (1987).

Raj B (1988) concluded that learning through programmed text (input) had no conclusive effect on the rate of learning and achievement but it did reduce individual differences in retention.
Dwelling in the field of micro-teaching, Sultana (1988) established the superiority of micro-teaching in bringing about changes in behaviour of student - teachers of science between the first and the fifth teaching sessions.

Desai S.S (1992) found that supervisory - feed-back was more effective than the audio-feed back in facilitating student teacher’s acquisition of teaching competence as well as individual skill competence.

2.05 ATTITUDE TOWARDS MATHEMATICS EDUCATION AND ACHIEVEMENT IN MATHEMATICS EDUCATION

a) Studies done in Foreign

Concern regarding the prevalence in primary school teachers of poor attitudes towards and low achievement in Mathematics has received some empirical support. But the common assumptions (1) that attitudes towards, and achievement in, Mathematics are substantially related, and (2) that teachers' attitudes and achievement in Mathematics affect pupils' attitudes and achievement, await empirical verification. Findings support the contention that attitude to Mathematics is not unidimensional (Hilary et al., 1978).

Ketkar (1982) developed unit tests in Mathematics and found that urban boys and girls scored better than rural counterparts. Though attitude towards Mathematics seems to be positively related to achievement, no efforts has been made to investigate how that attitude is formed.
Kim (1988) investigated was the effect of programming-augmented Mathematics classes on the math achievement, problem solving abilities, and attitudes of students with different cognitive styles. This study reported BASIC programming groups demonstrated higher Mathematics achievement than the LOGO group, and field independent students performed better and had more positive attitudes towards Mathematics.

Programme for International Student Assessment (PISA, 2003) for student achievement in Mathematics found that, among the 41 participating countries, students in only two - Hong-China and Finland - performed better than Canadian students in math. Students in seven other countries performed as well as Canadian students, while students in the remaining countries performed less well. In fact, students in three provinces - Alberta, Quebec and British Columbia - ranked among the best in the world. Drawing on analysis of the PISA 2003 results, this study looks at two sets of factors that affect student achievement in Mathematics. The first consists of the role played by student attitudes to, and perceptions of, Mathematics. The second consists of the relationship between parental education and occupation and students’ math performance. (Education Matters, 2004).

The overall purpose of this study is to disclose plausible prerequisites for students' success in Mathematics. The assumption is that a number of interactional conditions are important for students' achievement in Mathematics. Certainly, there are individual differences with respect to intellectual qualifications. However, this study concentrates on contextual
aspects in the sense of educational preconditions and family background. A basic assumption is that such aspects may be related to the students' attitudes to the school subject "Mathematics" which in turn may influence their performance (grades). In order to verify or falsify these hypotheses, information about students' attitudes towards Mathematics, their perception of classroom settings, their parental support as well as their actual achievements was collected. Using data from a national survey including 120 different comprehensive schools, information from 6758 students (school year nine, age about 16) was analyzed. The results show that one and the same classroom setting or educational strategy may have a different impact on dissimilar students. To some students, high demands, distinct objectives and invitations to participation can result in positive attitudes to Mathematics. However, the same conditions can end up in a negative attitude among students. The reason for this outcome is discussed with reference to students' home situation. Appended are: (1) Items related to different factors of attitude to maths as a school; (2) Items related to different factors of the learning environment at school; and (3) Items related to different factors of the learning environment at home (Alajaaski, 2006).

A sample of 26 at-risk fourth graders was randomly divided into experimental and control groups. The experimental group was taught geometry concepts using drama, while the control group received more traditional instruction. Fifty minute lessons per day were given for one week. Then, a multiple choice test to assess academic achievement was
administered along with a Likert survey to assess interest and attitude towards math. A significant difference was found between the academic achievement of experimental and control groups. No difference was found in the interest and attitude toward math between experimental and control groups. Finally, no significant relationship was found between academic achievement and interest and attitude towards math. These results imply that drama can be an effective teaching tool but may be more beneficial over a longer time to students whose learning style best appeals to such instruction (Patrick, 2006).

Allan et al. (2006) reported on a study focused upon 83 pre-service primary teachers in their first Mathematics pedagogy subject at the University of Western Sydney. They completed three surveys: an achievement test of the Mathematics they would be expected to teach; a survey of their beliefs about Mathematics, Mathematics teaching and Mathematics learning; and a survey of their attitudes towards Mathematics. The experiences and beliefs of pre-service teachers influence the formation of attitudes and these, in turn, influence their classroom practices and beliefs. These beliefs, attitudes and practices may sometimes be at variance with the main direction of their tertiary teaching methods courses. Thus, it is crucial in assisting pre-service teachers to understand their own beliefs, attitudes and practices, and that these are made explicit and examined. This paper reports the data from the achievement test, belief survey and the attitude survey, and investigates the relationships between
these data. The results from this study show some connections, although relatively weak, among the three constructs and lead us to speculate on possible reasons for these.

Mo’ale et al. (2007) examined the self-efficacy and liking of subjects of New Zealand students and analyses the relationship of those attitudes towards academic performance in Mathematics, writing, and reading by self-reported ethnicity. Data were obtained from the forming samples from the Assessment Tools for Teaching and Learning project in New Zealand. Of special interest are the relationships between attitude and performance for Pasifika and Tongan students in New Zealand. Tongan and Pasifika students had positive attitudes, but their mean scores were not significantly different to other ethnic groups except in writing for Tongan students. Tongan and Pasifika students did have lower academic performance than majority and Asian immigrant students in all three subjects. The correlation between liking and self-efficacy was fundamentally zero for Tongan and Pasifika students, while it was weakly positive for majority and Asian immigrant students. Together these results question the power of self-efficacy and liking attitudes to predict academic performance for immigrant students from agrarian or traditional societies. Further, the data suggest that "school effects" are most likely explanations for this relationship, rather than lack of attachment, opposition, or deficiency theories.
b) Studies done in India

Attempting to study the causes of under-achievement, Panchalingappa (1995), has found poor attitude towards Mathematics is a cause for attitude towards Mathematics is a cause for underachievement.

Srinivasan (1999) in his study has found that, the attitude of students towards study of Mathematics had the highest correlation with Mathematics achievement.

2.06 ATTITUDE TOWARDS TEACHING PROFESSION AND ACHIEVEMENT in MATHEMATICS EDUCATION

a) Studies done in Foreign

Rostkat et al. (1945) agreed that attitude of teachers towards teaching was significantly correlated with teaching success as judged by pupil growth.

Pawel (1966) reported that there was positive relationship between teacher praise and encouragement and pupil attitudes and achievement.

Bordic et. al (1969) showed that there is low but significant positive correlation between attitude towards schools and class achievement.

Grewal (1976) studied relationship between intellectual and personality factors and teacher effectiveness. He found out that main predictors of teacher effectiveness were home, health, social, emotional and total adjustments, dominance, submission and verbal and non-verbal intelligence. The four criterion measures of teacher’s effectiveness (attitude, interests, pupil’s ratings of teachers and colleagues ratings of...
teachers) were not orthogonal to each other and the observed R was very high. The predictors significantly correlated with criterion measures of teacher’s effectiveness.

Gosh (1982) tried to assess the relationship between student teacher’s attitude and performance in theory and practice of teaching and found that they correlated negatively.

Kaur A (1988) found that inservice education and training of teachers had significantly contributed to the development of professional competency in Punjabi and the process and structure variables had a positive bearing on the product variables. Inservice education was useful in improving the skills of teachers and had a positive effect on their attitude of teaching.

A positive correlation between attitude towards teaching and teaching efficiency was found by Basin (1988) Shah (1991) examined the predictive values of the determinants of teaching efficiency.

Development of the Primary Teacher Questionnaire (1993) describes the development of the Primary Teacher Questionnaire (PTQ), a self-report beliefs scale. The three phases described are item development, initial testing and scale refinement, and field testing. Data analysis indicated that the PTQ provides a feasible way of assessing teacher’s beliefs appropriate primary level instruction.

Opinions of teacher trainees attending secondary school education programs about teaching profession knowledge courses were investigated
to determine whether or not their opinion differs according to their gender, type of teaching program, satisfaction in teaching program, general academic achievement grade averages and willingness on being teacher. The research was carried out with 242 teacher trainees attending Science and Mathematics for Secondary Education Graduate Program- Non Thesis at Graduate School of Sciences, Social for Secondary Education Graduate Program-Non Thesis at graduate School of Social Sciences and English Certification Program in Dumlupinar University, Kutahya, in the 2006. Data which were collected through the Opinion Scale about Teaching Profession Knowledge Courses revealed that teacher trainee’ opinions about teaching profession knowledge courses were positive and were significantly associated with type of teaching program, their satisfaction in teaching program and their willingness on being teacher. However, there were no significant relationships between the teacher trainees’ opinions about teaching profession knowledge courses and the other variables examined (Karaca, 2008).

b) Studies done in India

Samantory (1971) found that there exists some degree of positive relationship between teachers attitude towards teaching and teaching efficiency.

Singh (1974) found that there was a significant relationship between attitude towards teaching and teacher effectiveness.
Malhotra (1974) and Gupta (1977) found that success in teaching was significantly related to professional attitude.

Vyas (1982) examined that relationship of certain predictors including attitude towards teaching with teaching success criteria like supervision ratings, total practical assessment, etc. Attitude towards teaching and academic achievement showed significant relationship with the criterion variables but not self-perception.

Mahesh et al. (1983) studied the effect of practice on teaching efficiency and teaching attitude of B.Ed. students. They found that practice teaching of B.Ed. Course brought about positive and statistically significant changes in attitude and teacher effectiveness.

Mahesh et al. (1983) studied the effectiveness of practice in teaching programme on teaching efficiency and teacher attitude of arts and science groups and of experienced and non-experienced B.Ed. trainees. The study showed that the practice in teaching programme of the B.Ed. level was influential in bringing about certain positive and statistically significant changes in attitude and teacher effectiveness with regard to classroom teaching among the teacher trainees. Arts and science group student teachers were teaching in a positive and significant way. With regard to teaching efficiency, student teachers with or without teaching experience were equally and positively affected by teaching practice programme. However, there was no positive change in the attitude of experienced student teachers, meaning thereby that they were not ready to change.
Verma (1985) investigated into the impact of training values, attitudes, personal problems and adjustment of teachers. The sample consisted of 546 randomly selected student teachers of the B.Ed., Course of session 1966-67 in the 8 teachers colleges, affiliated to the university of Rajasthan. The objectives of the study were.

i. To investigate into the values, attitudes personal problems and completion of their training programme.

ii. To make a comparative study if these personality characteristics to find out how far the training programme bring about change therein.

Srivatsava (1989) in her evaluation of the impact of training found that it did improved teaching efficiency which in turn, influenced the attitude and aptitude of student teachers.

Anandhi (1994) found that there is significant relationship between intelligence, teaching competency, self-concept, attitude towards teaching and achievement motivation of men and women. Woman B.Ed., student teachers were better than male B.Ed., student teachers in intelligence, attitude towards teaching, achievement motivation and teaching competency. Male student teachers were found to better self-concept than female student teachers. So has also found that there was no significant difference in the mean anxiety scores of men and women student teachers.

Venugopal (1995) studied the influence of attitude towards pupils and expectation from individual pupil on their achievement.
2.07 ATTITUDE TOWARDS TEACHING PROFESSION AND ACHIEVEMENT IN MATHEMATICS EDUCATION

a) Studies done in Foreign

David et al (1976) examined changes occurring in the attitudes of student teachers in a college of education towards Mathematics and the teaching of Mathematics. Rating scales were constructed to measure these attitudes by sex and age. Findings show that attitudes of students training for elementary teaching are more significantly affected than those of students training for secondary education.

Hamide (2004) provided the preliminary results of a study documenting changes on pre-service teachers' attitude and perception of Mathematics after the implementation of an Integrated, Collaborative, Field-Based Approach to Teaching and Learning Mathematics. All the blocks (consisted of Mathematics content, Mathematics methodology and pedagogy courses) taken by pre-service teachers in spring 2002 at a four-year southwest university participated in the study. The findings reported here are from one of the blocks where the integrated approach was fully implemented. The preliminary results indicate that students had noticeable positive changes on their attitude towards and perception of Mathematics. Many of them became more optimistic about their ability to do Mathematics. Educators of prospective teachers can consider approaches similar to the one reported here in order to address low motivation and negative.
2.08 CONCLUSION

In this chapter the investigator presented the reviews of related literature of the studies carried out in foreign countries as well as in India. The methodology adopted for the study is presented in the ensuing chapter.