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CHAPTER-II

REVIEW OF RELATED LITERATURE

2.1 INTRODUCTION

By the present study it is aimed at examining the "Effect of Metacognition and Motivation Intervention strategies on developing the Competency in teaching Science among the DIET trainees." To get theoretical understanding of the variables in the present study, the investigator made an attempt to review almost all the available studies in this area up to the year 2005. Scientific investigation starts with a review of related literature. The ‘Review of related Literature’ is the significant part of the research study.

It helps the investigator to acquire information about what has been done in a field of study and to gather up to date information about the area from which he intends to take up a problem for his research. A familiarity with the available literature and studies in the area of research is also required by the researcher for making new grounds and for the proper designing of the study. Review of related literature further helps in avoiding the duplication of the work that has already been done in the area.
Review of related literature is a valuable guide in defining the problem, expressing its significance, selecting data gathering devices, creating appropriate study designs, finding source of data and making suitable analysis of data. It enables the researcher to identify the research gaps if any, in order to develop new area of research. So a review of previous studies in relevant area of the present study is attempted and presented in this chapter.

2.2. CLASSIFICATION OF REVIEW OF RELATED STUDIES

The aim of education is to provide purposeful learning to students. Learning is the final outcome which is achieved after crossing physiological and psychological factors in a multidimensional way. Achievement of a student is caused promoted and affected by various variables, the investigator after careful survey of different variables from different educational surveys such as Dissertation International Abstracts”, ERIC, etc identified Metacognition, Motivation, Competency in Teaching Science which are found to be relevant for the study. So the investigator made his review variable wise and classified under the following heads.

a. Studies on metacognition

b. Studies on Motivation

c. Studies on Teaching Competency

d. Studies on Teaching Competency in Science.
2.3 STUDIES ON METACOGNITION

Metacognitive Strategies

Dolak, Grace-Anne Teresa, (2000) Studied the use of metacognitive strategies in college teaching: An instrumental multiple case study to explore how the University Professors used metacognitive strategies while teaching. Professors teach as they have learned and include specific metacognitive strategies that assisted them in their learning as they teach.

Dressers, Rocia, (2000) Studied the strategies that highly qualified bilingual teachers employ in teaching metacognitive skills to English language learners, and to arrive at an understanding of how these skills enable students to achieve academic competence in learning complex subject matter. Nine different strategies emerged from the participants experience were found to be successful. 1. Planning for learning 2. Determining purpose for reading 3. Working with others 4. Previewing the textbook 5. Developing vocabulary 6. Reading complex text 7. Assessing how well one has met the stated objectives 8. Modeling and 9. Planning remedial action when needed.

Eidson, Carokine, (2000) Studied and analysed the metacognitive development of young gifted children and to identify patterns in this development. 12 participants in this study were selected from the kinder garden, grade one and grade two classes at Peabody school for
intellectually advanced children. Young gifted children are better able to describe and monitor their thinking in response to mathematical problems than that of verbal.

Wolf, Sara Elizabeth, (2000) studied as to determine whether the Big six information skills model as an effective metacognitive scaffold for students solving information based problems. The sample contained 35 eighth grade students in private middle schools. Results of the study indicate that the Big six Information skills might prove to be effective metacognitive scaffold for students solving information based problems.

Leapad, Barbara Bennett, (2000) The study addressed the problem of pre-service elementary mathematical teaching preparation. It analysis the effects of an emerging scholars program utilizing the Treisman model. Result indicates an increase in metacognitive skills, measured both qualitatively and quantitatively and a decrease in mathematics anxiety levels measured qualitatively. Effects of the program on conceptual understanding are inconclusive. However a significant increase in the pre-service teacher’s level of self-confidence in teaching is noted.

Cline, Richard W., (2000) studied the teaching ability and utilization of a metacognitive strategy in distance learning classroom. Based on the results of this study concluded that an instructor can teach
distance learners the mechanics of using a metacognitive strategy with the intention of proving them with a technique in aiding them to learn. However even though distance learners may know how to use a metacognitive strategy, this doesn’t mean that they will necessarily utilize it in distance learning.

**Ktiernan, Denise Rose, (2001)** The study investigated the effectiveness of metacognitive strategies implemented in training performances support systems. Results from the study showed a significant difference in test scores between the control and experimental groups. In addition responses from the experimental group regarding how they felt about the metacognitive strategies were overwhelming positive.

**Schakel, Sharon Kreun, (2001)** The study examined the role of reflective paragraphs as a routine activity to provide metacognitive opportunities for college composition students to identify writing weaknesses set goals and make plans to improve writing. The results imply teachers must not assume college students automatically gain writing knowledge and transfer it to other writing situation. Teachers must give students experiences in critical thinking to aid progress in their cognitive levels.

**Ferguson, Jean Clarkem, (2001)** studied the effect of metacognitive strategy reading instruction on six grade students content
reading comprehension. The finding suggests that metacognitive strategy instruction including the value, purpose, and self-monitoring of the summarizing strategy is more effective in increasing reading comprehension than the summarizing strategy alone.

**Gill Barbara J., (2001)** The purpose of the study was to define and describe student's conceptions of goals and how those conceptions affect their self-regulation and ultimately their achievement within the context of a classroom. The research was a case study of five students who were enrolled in one of three sixth grade geography classes taught by the same teacher. Three of the students were identified by the teacher as highly self-regulated, and two were identified as less self-regulated. Model explains student goals and self-regulation as being influenced by factors with in the individual student and by factors in the environment.

**Schechter, Lynn Rence, (2001)** An investigation of the cognitive process underlying the metacognitive monitoring of the text. The study found that the cognitive processes contributed in different ways to comprehension monitoring.

**Mukerheide, Paul R., (2001)** studied changes in elementary Pre-service teachers through reflective intervention. Eight pre-service teachers as part of a college methods course were videotaped in three teaching sessions. The teaching styles exhibited on tape were rated using a
conceptual framework of standards like pedagogy. Four of the eight teachers participated in reflective intervention after the first two teaching sessions, the other four received no intervention. The research revealed that all eight pre-service teachers displayed ineffective standards like pedagogy in their first teaching experience. Teachers involved in reflective intervention moved to a more effective standard like pedagogy by the final session. Teachers not involved in the intervention continued to display ineffective standards like pedagogy.

Massa, Nicholas M., (2003), this study examined the relationship between metacognitive ability and other individual and environmental characteristics that differentiate persisters from non-persisters. Overall, the results highlighted that while a learner's decision to persist or withdraw from a web-based course is personal one and is related to individual learner characteristics, educators can work to provide a learning environment that helps learners develop personal qualities that are likely to result in a decision that favors persistence over attrition.

Baxt, Susan V., (2003) Metacognition gets personality: A developmental study of the personality correlates of metacognitive functioning. It was concluded that metacognition is probably related to state rather than trait characteristics.

Shin, Seung-Ryul, (2002) studied effects of a metacognitive art criticism teaching strategy that incorporates computer technology on critical thinking skill and art critiquing ability. These data showed that metacognitive art criticism knowledge and strategies were easy and useful when critiquing, writing, and revising critical essays about works of art.

Kenton, Jeffrey Michael.(2002) studied the reflective thinking strategies to help novice weather forecasters adopt effective forecasting strategies. The journaling activities, interviews and other metacognitive thinking prompts probably contributed to improvements of metacognitive processes.

Grant, Anthony Maurice, (2002) studied the impact of coaching on metacognition, mental health and goal attainment. Three studies then explored the effects of cognitive only, behavioral only, combined cognitive and behavioral coaching, on trainee accountants' grade point average, study skills, self-regulation, mental health, private self-consciousness and self-concept. The cognitive only program increased deep and achieving approaches to learning, academic self-concepts,
reduced test anxiety and non-study-related anxiety and depression. Academic performance declined relative to controls. The behavioral only coaching program decreased test anxiety and increased academic performance. The combined cognitive and behavioral program increased academic performance, deep and achieving approaches to learning, academic self-concepts, and reduced test anxiety.

Carberry, David John, (2003) explored the effects of cross-age tutoring in reading on tutees, tutor and metacognitively trained tutors. Results of several qualitative measures showed some benefits. However, based on the evidence from this study, practitioners should carefully consider the required expenditures in time and effort of setting up and running a cross-age tutoring intervention when it is replacing classroom reading instruction.

Bailey, Jennifer Page-Mitchell, (2003) observed a case study of two first-grade students using the Accelerated Literacy Learning Program. Each student for this study was chosen using purposeful sampling. The classroom teacher chose two students who were struggling with reading. The researcher found that there was quite a difference between how each girl progressed through the program. One girl was very successful in the program and the other was not. At the end of the four-month period the
researcher concluded that many factors contribute to a student's success or failure in the program.

Martens, Lynn R., (2004) studied the development of students' metacognition and self-regulated learning in the classroom by monitoring learning strategies and response-certitude on assessments. This study investigated the development of student metacognition and self-regulated learning through the use of self-monitoring study schedules, with analysis of Response Certitude (RC) on test items as related to student selection of learning strategies. Results indicated that students in the control group used a greater variety of strategies, but achieved lower means of test scores than the experimental group; indicating that the experimental group was more selective with strategy types and more effective in those methods applied. Statistical analysis revealed a significant increase in test scores in relation to RC accuracy, but did not establish significance in the application of self-monitoring schedules. There was no significant support for the hypotheses addressing self-monitoring schedules to student selection of types of strategies. In addition, there was no statistical significance in student RC ratings to student selection of specific types of learning strategies.

Victor, Andrea Marie 2004 studied the effects of metacognitive instruction on the planning and academic achievement of first and second
grade children. The current study conducted metacognitive and didactic interventions using a mathematics training task with children from first and second grades and compared the outcomes of the interventions while considering cognitive developmental level. The children were assessed on intelligence, academic achievement, and planning skills before and after the intervention sessions. The results of the current study demonstrated that the preoperational and concrete operational children benefited differently from the metacognitive and didactic interventions.

Shabaya, Judith, (2004) studied the role of pre-service teachers in developing metacognitive awareness strategies among student writers in an urban high school English classroom. This study examined the development of metacognitive awareness among a group of students in a writing class in an urban high school using a qualitative research approach. The purpose of the study was to determine the indices of metacognitive awareness skills in writing for urban high school students in a Language Arts writing class by tracking the metacognition awareness strategies of high school students as they progressed through the different stages of the writing process. Second, determine whether the active involvement of pre-service teachers with high school students in a language arts class effectively influenced the students' metacognitive awareness. Lastly, attempt to establish whether selected instructional strategies assisted students in improving their metacognition skills.
Participants were sixteen pre-service teachers enrolled in an English course on Advanced Teaching Techniques and eighteen high school students in 11th grade Language Arts class. Among other things, the study found that: (1) Students' self perceptions as writers change over the course of a semester. (2) Metacognitive awareness development occurs over a period of time. (3) Metacognitive awareness development does not occur in a uniform manner for all students, and (4) Varied teaching approaches yield effective writing instruction.

Jagitha Begum (2005) studied the effects of metacognition and Mediated learning Experiencing among DIET students. The result showed that the Mediated learning experience enhanced by the intervention of Metacognition.

2.4. STUDIES ON MOTIVATION

Motivation Strategies

Van Meter, Kurt Jay, (2000) explored phenomena and change forces influenced three educators to remain highly motivated during the latter portion of their teaching careers. Three exemplary teachers were chosen from a field of eleven energized candidates. Results showed an enhanced sense of self-efficacy; heightened self-esteem and a daily enjoyment of work with students appear to be the motivational drive.
Stevens, Tara Ann, (2000) has studied the mediating effects of mathematics self-efficacy and motivational Orientation. The purpose of study was to evaluate a model assuming that the inherent concepts of ability and personality are mediated by the affective constructs of mathematics self-efficacy and motivational orientation in the prediction of mathematics performance. 9th and 10th grade students sampled from west Texas high school and sample was split by gender and ethnicity. Results indicated that the motivational variables do play an important role in student's mathematics performance. Ability proved to be the strongest predictor of this performance.

Anton-oldenburg, Mary Felice, (2000) explored a qualitative analysis of self-evaluation, motivation and engagement in a first and second grade classroom. Teacher researcher examined, what helps one child to become engaged in the reading process, and others to read only under pressure. The researcher examined daily assessment of 19 first and second graders. Case studies revealed four different types of learning orientations they are individual, collaborative, combined individual-collaborative, and ego.

Breeden, Terri Lee, (2000) studied 1. Why many ninth graders are not successful in the high school setting 2. Why there is a failure rate of approximately 30%. 3. To prescribe policies and practices that will
decrease the failure rate of freshmen, at Hamby High Building. Findings
in this study revolved around three areas. 1. In the area of preparation
freshman who had failed previously struggle as high school freshmen,
unprepared for the rigors of high school, and freshmen lack
study/organizational skills.2. In the area of motivation freshmen have
disproportionate number of disciplinary referrals, poor attendance, poor
performance. 3. In the area of personalization the students did not exhibit
any overt problems.

Seyhan, Serpil, (2000) The purpose of this study was to identify
the impact of anxiety, self-esteem and motivation on the oral
communication of German and Japanese adult ESL students in a
university-based language school located in southern California. The
result was the importance of attitude toward American culture. Students
who demonstrated a positive attitude towards the culture demonstrated
higher motivation levels and greater efforts in their work.

Meyers, Deborali Yvette Roddey, (2000) has studied the factors
that motivate and impede computer used by teachers. Descriptive and ex
post facto research was the research designs. Questionnaires were sent to
375 elementary and middle school teachers in Orange County, California.
Two hundred forty eight teachers responded, a 66 % rate. The Kruskal-
Wallis ANOVA was the statistical test used. Six major findings of the
First teachers were motivated to use a computer when a computer was located in their classroom. Secondly, when “release time” was provided, teachers were motivated to use the computers. Thirdly, 99 percent of 244 respondents believed the ability to use a computer is an essential skill for the twenty-first century. Fourth, based on Maslow’s Hierarchy of Needs theory, teachers were motivated by higher order needs of belonging, esteem, and self-actualization. Fifth, senior teachers with over fifteen years of experience were significantly stronger in agreement that they receive help with the computer when they needed it than were the new teachers with one to eight years of teaching experience. Sixth, new teachers were significantly more motivated to share their computer knowledge with others and be recognized for using computers.

Campanella Bracken, Cheryl Marie, (2000) has studied Children and social responses to computers: praise, intrinsic motivation, and learning. Eight to ten year old subjects (N=42) used a computer. The result provided evidence that children do have social responses to computers and that such social responses can lead to increases in learning (recall, and recognition) in Younger children. Other results for children who were praised include higher perception of own ability and greater liking of the praise giver computer.)
Wudthayagron, Jirada, (2000) The purpose of the study were to 1) investigate attitudes (beliefs, affective attitudes, and behavioral attitudes) of Japanese FLES students in grades 4 to 7. 2) Examine whether the model of motivation (Tremblay & Gardener, 1995) was applicable. The results of this study provided a better understanding of attitude and motivation of the Japanese FLES students, as well as practical suggestions for pedagogy and future research.

Eastman, Scott R, 2001) The purpose of this study was 1. To determine individual differences in pre-transition levels of self determination predicted change in a number of motivationally relevant variables across the elementary to middle school transition; and 2. To determine the relative salience of students perception of the middle school environment as a predictor of change in motivation. Participants of the study were in fifth grade and then reassessed after making the transition to sixth grade. They were from primarily white, upper-middle class suburban school district in western New York. These results suggest that student’s individual differences prior to school transition may not reliably predict changes in motivational variables after school transition. Instead the meaning of the transition environment appears to influence students, motivation after a transition.
Willems, Patricia Pulido, (2000) studied the effects of situated cognition, academic efficacy, and intrinsic motivation on education students' learning of reciprocal teaching. The participants 156 undergraduate education students enrolled in required education courses were taught the reciprocal teaching instructional strategy via one of the two instructional methods, following the instruction, the participants were tested on their knowledge of the strategy using the reciprocal teaching test (RTT). Results with regards to the lecture-discussion method of instruction, found that these students had a higher mean on the factual section of the RTT. This finding indicates that reciprocal teaching knowledge for the factual items could be acquired employing either of these instructional methods, with the lecturer discussing method being better choice. However applied knowledge is best acquired using the situated cognition method. The implications for this finding is whether the intentions to measure knowledge using factual questions or applied questions. If factual information were to be tested then the lecture discussion method of instruction would be a good of method to use or even better than the situated cognition approach. However if the intention were to have students acquired information that can later be applied in a real life context, the situated cognition method of instruction would be more likely to achieve that goal. Academic efficacy proved to be a
significant predictor of student’s scores on both sections of the reciprocal teaching, where as intrinsic motivational did not score.

Hampton, Scott (2001) The purpose of this study was to examine how mid-term student rating feedback and consultation on instructional practises affects teaching, learning, motivation. 37 Teaching Assistants (TAs) for undergraduate computer science and chemistry courses were randomly assigned to either a feedback/consultation group or a control group. Final student rating results revealed significant differences in favour of the feedback consultation group on teaching practices, effectiveness, and student motivation. Significant positive relationships between Reiser and Dicks instructional activities and final exam scores were also evident. These findings suggest that both United States and international TAs can use the student ratings feedback to improve teaching practice.

Miller, Nancy Carol Sanders, (2000) The purpose of this study was to describe motivation in developmental mathematics students with a particular focus on the low achieving students, The data generation began with emerged interviews of developmental mathematics faculty members who were asked to describe the motivation of developmental mathematics students, continued with the primary data generated by student learning journals, and concluded with emergent interviews with developmental
mathematics students who were not successfully completing their courses. The primary findings connects cognition with motivation. It was found that motivation was not necessarily a precursor to understanding. Rather understanding mathematics seemed to enhance students’ motivation to learn mathematics.

_Weishaar, Bridget, (2001)_ purpose of the study was to examine the effects of various types of parental involvement on students motivation and achievement. Subjects were 410 high school students and their parents at a private school in Chicago. Results showed that parental involvement did not exhibit a great effect on student achievement. This effect frequently was in the negative direction. Parental involvement and motivation were also correlated using a multivariate backward regression analysis. Parental involvement was found to have a greater correlation with student motivation especially with knowing how to become involved in the school, having time to become involved in school activities and balancing involvement with their children’s need for independence.

_Hedrick, Maria Viego, (2001)_ This study examined the relationship between motivation and achievement in the algebra I classroom. In particular correlation between the motivational variables used in the Commitment And Necessary Effort (CANE) model of cognitive motivation and performance on a novel mathematics problem
were examined for differences related to gender, race, and grade level. Subjects for this study were 490 students enrolled in a first year algebra class at either a middle school or a high school, the research was conducted during the spring semester of 2000. Results from the data analysis showed no significant correlation between motivation and performance on the novel mathematics problem. There were significant grade level differences in motivation but no race related differences.

**Christensen, Emily Fast, (2002)** The purpose of the study was to test an intervention of choices in homework on the achievement and intrinsic motivation of seventh grade science students at a middle school. The subjects were sixteen heterogeneous classes of seventh grade students, who were divided among four teachers. Having choices in homework did not increase intrinsic motivation or achievement. However, students who did their homework did significantly better on the post tests, and students who were more intrinsically motivated did significantly better on the post test. Just doing homework was important for achievement, and intrinsic motivation was linked to achievement.

**Ripke, Marika Nicole (2001)** The primary purpose of this study was to gain Middle school children’s perceptions and motivation regarding work and their future. Children at this study were able to clearly articulate their goals for the future. The importance of good job and
financial security was a common theme in their responses. Children's perceptions of limits and opportunity desired job, predicted their confidence in attaining their occupational goals. Differences by gender and ethnic group were revealed, though the influence of ethnic group was less prominent than expected.

Kausler, Deena Amy, (2004) studied the College professors' use of motivational strategies, characteristic differences between types of institutions, changes in students' demographics, and limited research on teaching and learning strategies in higher education necessitates the need for research to explore issues of motivation in the classroom. Faculty members (N = 192) employed at three different types of institutions completed a modified version of the Seven Principles for Good Practice in Undergraduate Education Faculty Inventory (Chickering, Gamson, & Barsi, 1989). Findings included differences between faculty members' ratings of importance of using motivation strategies in the classroom, and differences between faculty members' reported use of these motivation strategies.

Chapel, Fredrick Milton (2004) studied the use of the history of science as a motivational tool in middle school science. The findings identified patterns of motivated student behavior related to lesson sequencing and classroom climate, task patterns, and patterns of student
questions during discussions. Evidence of strong student conceptual change and restructuring also emerged by way of students building and testing their theories. The incorporation of support from the HOS was connected with the indicators of motivation and conceptual change.

**Johnson, Marla J., (2004)** A case study was done on how one teacher's beliefs of his students influences his instructional practices in a middle school science classroom. From the data analysis, the following five implications emerged: (a) Teacher belief about students promotes a learning environment that fosters student motivation, student interaction and collaboration, and active inquiry; (b) Teacher belief about student learning promotes the implementation of a variety of instructional strategies; (c) Teacher interest in subject matter influences choices of content and instructional strategies; (d) Teacher belief in self-reflection and collaboration with colleagues influences instructional practices; and (e) Science education teacher educators must take an active role in teaching pre service science teachers about and providing them with hands-on learning experiences.

**McManic, Janet A., (2004)** studied the Students' perceptions of motivation in high school biology class: According to this study, in order to encourage student learning in biology, it may prove beneficial to implement suitable or applicable adaptations in the class environment.
Van Evera, William C., (2004) studied the achievement and motivation in the middle school science classroom: These students also experienced a significant increase in self-efficacy. High achievers experienced reduced performance following the feedback intervention. Survey analysis revealed no improvement in motivation-related variables for high achievers.

Wagman, Janet Campbell, (2005) studied the effects of an inquiry-Internet research project on motivation, self-efficacy, and academic autonomy in heterogeneously grouped high school Latin. The observation and performance assessment results of the study revealed that the project helped students achieve competence in an interrelated area within the Latin I curriculum. The students' motivation, self-efficacy, and academic autonomy increased because their areas of expertise were integrated into the Latin I textbook and would continue to be employed throughout the Latin I course.

Wao, Felix Ogando, (2005) has done a study of principals' motivation, commitment and satisfaction. This study explored the effects of demographic factors and motivation on commitment and satisfaction of Catholic high school principals. Using the Catholic School Leadership Framework (Cirrielo, 1987) Principals had high levels of mission and professional motivation in deciding to continue as leaders in Catholic
high schools. Finally, results indicated a strong positive relationship between principals' commitment and satisfaction.

2.5 STUDIES ON TEACHING COMPETENCY

Teaching Competencies

Gor, Kantilal Visanji, (1992) studied "A study of the effectiveness of micro-teaching strategies for developing the teaching competency of primary teacher-trainees". Micro teaching strategies significantly improved the teaching competency.

Desai, Susheela S., (1992) studied "Interactive effect of sources of feedback and student teachers personality on student teacher competence". The supervisory feedback was found to be more effective than audio feedback in facilitating student teachers acquisition of both teaching competence and individual skill competence.

Basi, Satpal Kaur, (1991) observed "A study of the teaching competency of language teachers in relation to their job satisfaction, locus of control and professional burnout". The study reveals that there is a positive correlation between measure of job satisfaction and the teaching competency, and a negative correlation between locus of control and teaching competency.

Al-Jassar, Salva A. (1991) studied "A Study of the perceived adequacy of teaching competencies included in an intermediate and
secondary teacher preparation program in the college of Education at Kuwait University”. The study revealed 54 competency statements were grouped in to five areas. Classroom management, instruction and planning, using instructional resources, human relations, and evaluation.

**Tamilmani, P (1990)** studied “Teacher competency and teacher personality in relationship to achievement of high school students in Science” The sample of this study included 450 students of IX and 50 science teachers from various Higher Secondary Schools in Madurai. This finding of this study was teaching competencies of science teachers were related to the academic achievement of high school students.

**Singh L.C., (1989)** studied “Relative effectiveness of two training strategies in developing teaching competence and attitude towards teaching among student teachers.” The sample consists of 34 B.Ed. Students of School of Education, Devi Ahilya Vishwavidyalaya, Indore, the findings were both training strategies were effective in developing teaching competence and attitude towards teaching among student teachers.

**Verma, Bhagwan Swaroop (1988)** studied “Developing teaching competency among student teachers of science group through micro-teaching”. The results of the study showed the micro teaching approach enhanced the teaching competency of the student teachers.
Prakasham D., (1988) studied “A study of teacher effectiveness as a function of school organizational Climate and teaching competency”. The sample consists of 800 teachers and 120 schools teaching classes IX, X, XI of Raipur and Bilaspur districts. The open school organizational climate positively affected both the teaching competency as well as teacher effectiveness.

Raja Meenakshi. P. K., (1988) studied the factors affecting the teaching competency of B.Ed. Trainees in teaching Physical Science. A survey was conducted on 610 students of colleges of education in Tamil Nadu under the category of physical sciences and 1500 school students. The findings were the teacher-pupil ratio, type of management at the time of admission were the factors affect the mean teaching competence of trainees.

Choudhri K., (1985) studied the teaching competencies of teacher of English at the secondary school level. The findings were teaching competencies in English consists of 12 competencies. The demographic variables of teacher sex and educational qualifications had an impact on half the number of competencies. The teacher’s intelligence and attitude were found to be associated with some competencies.

Natarajan S., (1984) investigated a “Competency based programme in teacher Education Curriculum” the study was conducted in
government colleges of education in Puddukottai and Orathanadu. 200 students were involved. The findings were there was significant relation between self esteem and acquisition of competencies, attitude towards teaching methods had a favorable correlation with acquisition of competencies. The teacher education programme could be made more effective through a competency based approach.

Das R.C., Passi B.K., Jangira N.K., Singh A., (1982) studied “Effect of different strategies of integration of teaching skills in developing general teaching competence of student-teachers” The sample was 264 student teachers and M.A. Education students from thirteen colleges of education. The integration strategies improved the teaching competencies and quality of integration of skills.

Passi B.K. and Sharma S.K., (1982) studied the teaching competency of secondary school teachers. The competencies were identified the training of student teacher through instructional materials of micro teaching, improved the cognitive competency, emotional competency, behavioral competency, and the competency for loud reading among the student teachers.

Lalitha M.S., (1981) studied “The effectiveness of the strategy of training for integrating teaching skills on teaching competence of student teachers”. Sixteen student teachers of teacher training college used in the
study, after training for integrating skills in simulated conditions followed by real classroom conditions. The experiment group was better than control group in terms of teaching competency.

Mathew R., (1980) investigated the factorial structure of teaching competencies among secondary school teachers. The study reveals factors improving the competency in teaching they are using audio-visual aids, giving assignments, illustrating with examples, pacing while introducing, logical exposition, classroom management, use of questions, initiating participation, use of black board, recognizing attending behavior, closer attention, experiments, etc,

Sharma M.L., (1979) studied the development of teacher competencies of the B.Ed. student teachers in the training colleges of Rajasthan. The sample was drawn from three teacher training colleges in Rajasthan. Five teachers' competencies were identified. Authenticity, integration, consideration, control and responsibility. The practice teaching of the five competencies in class room teaching caused changes in pupil behaviour.

Patel P.A., (1978) studied “Comparative study of effects of micro-teaching under simulated condition and micro teaching under real classroom condition upon general teaching competency and attitude towards teaching of student teachers”. The findings showed the micro
teaching under simulated conditions produced same effect in respect of
general teaching competencies.

2.6. STUDIES ON TEACHING SCIENCE

Chen, Catherine Tsou Chi, (2000) This study addresses the
theoretical and empirical challenges posed by science education reform.
The recent reform has emphasized the importance scientific discourse and
the appropriation of scientific discourses and the appropriation of
scientific practices by students. Results show that students were provided
access to 1. Science content, including ways of knowing and doing,
2. Building new science knowledge through established ways of knowing
and doing, 3. Ways of thinking about science and society through
connections beyond the classroom, and 4. Resources that promote their
future participation in science.

Ayres, Donna (2000) studied that schools of education spend
considerable effort in teaching future teachers to develop lessons, teachers
spend little time writing lesson plans on the job. This study explored pre
service teachers' lesson development processes. Qualitative analyses
suggested that personality and motivation inhibits lesson competency
development.

Austin, Barbara Anne, (2004) studied the Equity and what
secondary science teachers bring to the classroom. This study looks at the
practices of eight secondary science teachers at two schools at which 62% of the enrolled students declare their ethnicity as Hispanic. All of the teachers have at least three years of experience. This research informs the literature base for instructional systems designers by identifying what those teachers situated in culturally diverse classrooms bring to professional development programs targeted toward making secondary science teaching more equitable.

Laskey, Marcia L., (2004) studied the influence of self-efficacy, metacognition, and personality traits on at-risk college students' academic performance and persistence.

The problem under investigation in this study concerns the motivational and personality factors that both positively and negatively affect the achievement and retention of college students. At-risk students present a problem for colleges because they are difficult to retain; therefore, studying the factors that affect their academic performance is paramount in learning how to assist these students in attaining a successful college career. Upon completion of this study, the researcher's conclusions showed that self-efficacy, metacognition and the personality trait of Conscientiousness are important factors that influence at-risk college students' academic achievement and retention. Thus, colleges who admit at-risk students need to establish possible interventions and
programs that will assist them in their endeavors of achieving academic success.

Smilan, Cathy A. (2004) studied “The impact of art integration as an intervention to assist learners' visual perception and concept understanding in elementary science”. Art integration as educational reform has been the focus of recent debate. The suggestion has been made that the arts can provide unique learning opportunities in other content areas. To provide empirical evidence for this added value of the arts in learning this study investigated the efficacy of teaching science concepts and through the visual arts by implementing an art integrated lesson. The study investigated the impact of an art integration to assist elementary level learners' visual perception so they could more accurately form mental models of the science ideas. These empirical data show significant differences between the group receiving the art intervention and the group receiving traditional classroom instruction, supporting the efficacy of the art integration model. In conclusion, the study supports the literature that suggests the efficacy of art integration partnerships as alternative avenues for presenting and representing knowledge. The study additionally supports the literature establishing the need for concrete modeling of science concepts at the elementary level.
Henebry, Holly Schaefer, (2004) studied early career teachers' views of their elementary science teaching methods courses: The relationship between pre service preparation and the realities of the first years of teaching. This descriptive study presents the results of the Science Teaching Preparation Survey (STPS) completed by 106 early career elementary school teachers. When reporting confidence with ability to teach science 36.8% of the science only methods course respondent group rated themselves as confident or highly confident, while 18.9% the combined methods course respondents rated themselves at these levels. Position in the sequence of credential courses was cross tabulated with preparation and increased levels of preparation were positively related to taking a science teaching methods course in the middle or at the end of the curricular sequence. The overarching conclusion is teachers who take a science only methods course are better prepared and have higher levels of confidence than teachers receiving a combined methods course or no methods course.

Cervoni, Cleti, (2004) studied the Boys and girls 'doing science' and 'doing gender' the gender gap in achievement in science continues to plague science educators. Strategies to close this gap have defined the problem in terms of girls' lack of interest or their inability to survive in science classrooms. This study examines the gender dynamics of how unequal gender relations are negotiated, resisted and sustained in the
context of a second grade science classroom. In examining the gender dynamics between the boys and the girls in a science classroom, it is found that the boys positioned the girls as their assistants, as incompetent in science, as weak in contrast to the boys, and in need of the boys' help and protection. For the boys, masculinity is strong and powerful yet fragile and vulnerable. The girls struggle in holding multiple images of femininity. Examining gender dynamics through positioning and negotiation for power in a science classroom has implications for teaching science in elementary school.

Ebrahim Ali, (2004) studied the effects of traditional learning and a learning cycle inquiry learning strategy on students' science achievement and attitudes toward elementary science (Kuwait). The purpose of this study is to examine the impact of two instructional methods on students' academic achievement and attitudes toward elementary science in the State of Kuwait: traditional teaching method and the 4-E learning cycle inquiry teaching method. The subjects were 111 students from four intact super grade classes. The two ways MANOVA reveals that: the 4-E learning cycle instructional method produces significantly greater achievement and attitudes among fourth grade science students than the traditional teaching. In light of these findings, it is therefore suggested that students can achieve greater and have higher science attitudes when the 4-E learning cycle is used. In
addition, these findings support the notion that effective instruction in teaching science, such as the 4-E learning cycle instruction, should be proposed and implemented in elementary schools.

Tran, Lynn Uyen, (2004) studied the teaching science in museums. This study investigates two of these inquiries. The following research questions guided this investigation. How do educators teaching one-hour, one-time lessons in museums adapt their instruction to the students that they teach? How do time limitations affect instruction? How does perceived variability in entering student knowledge affect instruction? Four educators from two museums took part in this participant observation study to examine one aspect of the teaching culture in museums, that is instruction during one-time science lessons. Five major findings emerged from this analysis: Repeating lessons develop comfort and insight to compensate one-time nature of lessons, Details within science lessons can vary according to the students, A lifelong learning perspective forms the foundation for educators' choices, Refine teaching to use time efficiently, Educators designate roles to teachers and chaperones to maximize time.

McNall, Rebecca Lee, (2004) studied the Beginning secondary science teachers' instructional use of educational technology during the induction year. This study explored how 10 beginning secondary science
teachers who had completed the newly revised technology-integrated science teacher education program at the University of Virginia used educational technology in their science instruction during the induction year. Classroom observations and interview responses indicated that participants used educational technology to provide visual representations of science concepts, support authentic science explorations and inquiry, and create real-world connections to science content. Limited access to educational technology resources, unfamiliarity with the curriculum, and limited time were factors limiting their use. While participants used educational technology less than they had originally intended, they continued to believe educational technology was a potentially powerful tool for teaching science and planned to continue to explore ways of incorporating it in their science instruction.

AL. Abdulkareem, Saleh A.M., (2004) The purposes of this quantitative, descriptive study were to investigate Saudi science teachers' beliefs about science and science teaching, and to determine how do Saudi science teachers view educational reform in science and how do they view change in education. The findings of the study imply that educational reform in science education must simultaneously address all the components of an educational system and the concept of systemic reform, as well as the need for a standards-based learning system and establishing Benchmarks for science in Saudi education.
Foley, Kathleen R., (2004) studied a case study report. The students, who are now teachers, shared their perspectives on inquiry-based teaching and on the impact of the secondary science methods course their teaching. The need for teachers' in-service professional development opportunities and pre-service teacher education to move from a primary focus on curricula for bringing about improvements to science teaching to a focus on the actual teacher and the practice of teaching are also reported as key conclusions.

Upadhyay, Bhaskar Raj, (2004) Teacher thinking and interconnectedness: Teachers' thinking about students' experiences and science concepts during classroom teaching. Three factors that influence elementary school teachers' thinking and the decisions they made during science teaching emerged from the data analysis: (1) Most teachers believed that students' experiences could be used during teaching, but they disagreed about the usefulness of students' experiences in teaching science for understanding. Two teachers who perceived their students to be less intelligent did not use students' experiences during teaching. (2) All the teachers in the study asserted that students must have the knowledge of science process skills to succeed in science investigation and high-stakes tests. These teachers also believed that mastering science process skills aided in students' understanding of science concepts. (3) In an academically high-performing school, the school administrators played a less significant role in teachers' thinking and decision making than in an academically low-performing school.
2.7. SYNTHESIS ON THE STUDIES OF TEACHING COMPETENCY

The research studies are grouped in the following areas.

Academic achievement

Tamilmani. P, (1990), stated teaching competencies of science teachers were related to the academic achievement of high school students.

Methodology

Gor, Kantilal Visanji, (1992) found that Micro teaching strategies significantly improved the teaching competency. Passi B.K. and Sharma S.K., (1982) found that the training of student teachers through instructional materials in micro teaching improved the cognitive competency, emotional competency, behavioral competency, and the competency for loud reading among the student teachers. Patel P.A., (1978) showed that the micro teaching under simulated conditions produced same effect in respect of general teaching competencies. Verma, Bhagwan Swaroop, (1988) showed that the micro teaching approach enhanced the teaching competency of the student teachers.

Supervision

Desai, Susheela S., (1992) identified that supervisory feedback was found to be more effective than audio feedback in facilitating student
teachers acquisition of both teaching competence and individual skill competence.

Teacher related variables

Basi, satpal kaur, (1991) revealed that there is a positive correlation between measure of job satisfaction and the teaching competency, and a negative correlation between locus of control and teaching competency. ChoudhriK., (1985) identified that teaching competencies in English consists of 12 competencies. The demographic variables of teacher sex and educational qualifications had an impact on half the number of competencies. The teachers' intelligence and attitude were found to be associated with some competencies. Natarajan S., (1984) findings were there was significant relation between self esteem and acquisition of competencies, attitude towards teaching methods had a favorable correlation with acquisition of competencies. The teacher education programme could be made more effective through a competency based approach. Sharma M.L., (1979) identified five teacher’s competencies. They were authenticity, integration, consideration, control and responsibility. The practice of five competencies in the class room teaching caused change in pupil behaviour.
Teaching strategies

Das R.C., Passi B.K., Jangira N.K., Singh A., (1982) identified that the integration strategies improved the teaching competencies and quality of integration of skills.

Instructional Techniques

Al-Jassar, Salva A. (1991) revealed that 54 competency statements were grouped in to five areas. Classroom management, Instruction and planning, Using instructional resources, Human relations, and Evaluation. Singh L.C., (1989) found training strategies were effective in developing teaching competence and attitude towards teaching among student teachers. Mathew R., (1980) revealed that factors improving the competency in teaching are using audio-visual aids, giving assignments, illustrating with examples, pacing while introducing, logical exposition, classroom management, use of questions, initiating participation, use of black board, recognizing attending behavior closer attention, experiments, etc.

Organisational Climate

were the teacher-pupil ratio, type of management and the time of admission were the factors affecting the mean teaching competence.

2.8. SYNTHESIS ON THE STUDIES OF TEACHING SCIENCE

The areas of studies of teaching science are as follows:

Knowledge, content, resources of teaching science:

Chen, Catherine Tsou Chi, (2000) showed that students were provided access to 1. Science content, including ways of knowing and doing, 2. Building new science knowledge through established ways of knowing and doing, 3. Ways of thinking about science and society through connections beyond the classroom, and 4. Resources that promote their future participation in science, for improvement. Austin, Barbara Anne, (2004) identified the literature base for instructional systems designers by identifying what teachers situated in culturally diverse classrooms bring to professional development programs targeted toward making secondary science teaching more equitable.

Metacognition and motivation factors

Ayres, Donna (2000). suggested that personality and lack of motivation inhibits lesson competency development. Laskey, Marcia L., (2004) concluded showed that self-efficacy, metacognition and the personality trait of Conscientiousness are important factors that influence at-risk college students' academic achievement and retention.
Smilan, Cathy A. (2004) investigated the impact of an art integration to assist elementary level learners' visual perception so they could more accurately form mental models of the science ideas.

Henebry, Holly Schaefer, (2004) concluded that teachers who take a science only methods course are better prepared and have higher levels of confidence than teachers receiving a combined methods course or no methods course.

Educational Technology

McNall, Rebecca Lee, (2004), believed educational technology was a potentially powerful tool for teaching science and planned to continue to explore ways of incorporating it in their science instruction.

In-service- Training

Foley, Kathleen R., (2004) showed teachers' in-service professional development opportunities and pre-service teacher education move from a primary focus on curricula bringing about improvements in science teaching.

Science Process skills

Upadhyay, Bhaskar Raj, (2004) stated that three factors that influence elementary school teachers' thinking and the decisions they made during science teaching. They are most teachers believed that
students' experiences could be used during teaching, but they disagreed about the usefulness of students' experiences in teaching science for understanding. All the teachers in the study asserted that students must have the knowledge of science process skills to succeed in science investigation and high-stakes tests. These teachers also believed that mastering science process skills aided in students' understanding of science concepts. In an academically high-performing school, the school administrators played a less significant role in teachers' thinking and decision making than in an academically low-performing school.

Gender dynamics


Instructional techniques

Ebrahim Ali, (2004) suggested that students can achieve greater and have higher science attitudes when the 4-E learning cycle is used. Tran, Lynn Uyen, (2004) revealed repeating lessons develop comfort and insight to compensate one-time nature of lessons, details within science lessons can vary according to the students.

Henebry, Holly Schaefer, (2004) stated teachers who take a science only methods course are better prepared and have higher levels of
confidence than teachers receiving a combined methods course or no methods course.

2.9. SYNTHESIS ON THE STUDIES OF METACOGNITION

Metacognition strategies

Dolak, Grace-Anne Teresa, (2000) explored the use of metacognitive strategies in college teaching and found that Professors teach as they have learned and include specific metacognitive strategies that assisted them in their learning as they teach.

Dressers, Rocia, (2000) explored the strategies that highly qualified bilingual teachers employed in teaching metacognitive skills to English language learners, and arrived at an understanding of how these skills enabled students to achieve academic competence in learning complex subject matter. Nine different strategies stem from the participants experience were found to be successful. 1. Planning for learning. 2. Determining purpose for reading. 3. Working with others. 4. Previewing the textbook. 5. Developing vocabulary. 6. Reading complex text. 7. Assessing how well one has met the stated objectives. 8. Modeling and. 9. Planning remedial action when needed it.

Ktiernan, Denise Rose, (2001) found that the responses regarding how they felt about the metacognitive strategies were overwhelmingly positive.
Ferguson, Jean Clarkem, (2001) finding suggests that metacognitive strategy instruction including the value, purpose, and self-monitoring of the summarizing strategy is more effective in increasing reading comprehension than the summarizing strategy alone.

Shin, Seung-Ryul, (2002) showed that metacognitive art criticism knowledge and strategies were easy and useful when critiquing, writing, and revising critical essays about works of art.

Monitoring

Eidson, Carokine, (2000) observed and analysed the metacognitive development of young gifted children and to identify patterns in this development he found that Young gifted children are better able to describe and monitor their thinking in response to mathematical problems than verbal.

Information processing skills

Wolf, Sara Elizabeth, (2000) study indicate that the Information skills might prove to be effective metacognitive scaffold for students solving information based problems.

Metacognitive skills

Leapad, Barbara Bennett, (2000) indicated an increase in metacognitive skills, measured both qualitatively and quantitatively and a
decrease in mathematics anxiety levels measured qualitatively. a significant increase in the pre-service teacher’s level of self-confidence in teaching is noted.

**Critical thinking**

**Schakel, Sharon Kreun, (2001)** showed that teachers must give students experiences in critical thinking to aid progress in their cognitive levels, which on then foster writing analysis and improvement.

**Self-regulation**

**Gill Barbara J., (2001)** The study showed that student goals and self-regulation as being influenced by factors with in the individual student and by factors in the environment.

**Schreiber, Fredric Joseph., (2003)** Explored metacognition and self-regulation in an enrichment reading program and showed metacognitive self-regulation assessment and evaluation tool are effective in the area of reading.

**Martens, Lynn R., (2004)** This study investigated the development of student metacognition and self-regulated learning through the use of self-monitoring study schedules, with analysis of Response Certitude (RC) on test items as related to student selection of learning strategies. There was no significant support for the hypotheses addressing
self-monitoring schedules to student selection of types of strategies. In addition, there was no statistical significance in student RC ratings to student selection of specific types of learning strategies.

Cognitive process

Schechter, Lynn Renne, (2001) found that the cognitive processes contributed in different ways to comprehension monitoring.

Grant, Anthony Maurice, (2002) the combined cognitive and behavioral coaching program increased academic performance, deep and achieving approaches to learning, academic self-concepts, and reduced test anxiety.

Reflective Intervention

Mukerheide, Paul R., (2001) states that Teachers involved in reflective intervention moved to a more effective standard like pedagogy. Teachers not involved in the intervention continued to display ineffective standards in pedagogy.

Victor, Andrea Marie (2004) the results of his study demonstrated that the preoperational and concrete operational children benefited differently from the metacognitive and didactic interventions.
Metacognitive awareness

Shabaya, Judith, (2004) found that Students' self perceptions as writers change over the course of a semester, Metacognitive awareness development occurs over a period of time, Metacognitive awareness development does not occur in a uniform manner for all students, Varied teaching approaches yield effective writing instruction.

Massa, Nicholas M., (2003) showed that the educators can work to provide a learning environment that helps learners develop personal qualities.

Carberry, David John, (2003) studied the effects of cross-age tutoring in reading on tutees, tutor and metacognitively trained tutors. Results of several qualitative measures showed some benefits.


2.10. SYNTHESIS ON THE STUDIES OF MOTIVATION

Motivational Drives

Van Meter, Kurt Jay, (2000) showed enhanced sense of self-efficacy, heightened self-esteem and a daily enjoyment of work with students appear to be the motivational drive.
Stevens, Tara Ann, (2000) indicated that the motivational variables do play an important role in student's mathematics performance. Ability proved to be the strongest predictor of this performance.

Anton-olden burg, Mary Felice, (2000) he examined, what helps one child to become engaged in the reading process, and others to read only under pressure. He found four different types of learning orientation individual, collaborative, combined individual-collaborative, and ego.

Campanella Bracken, Cheryl Marie, (2000) provided evidence that children do have social responses to computers and that such social responses can lead to increases in learning (recall, and recognition) in Younger children. Other results for children who were praised include higher perception of own ability and greater liking of the praise giver (computer).

Miller, Nancy Carol Sanders, (2000) found that motivation was not necessarily a precursor to understanding. Rather understanding mathematics seemed to enhance students' motivation to learn mathematics.

Academic efficacy

Eastman, Scott R, (2001) Identified that the school transition environment appears to influence students, motivation after a transition.
Supervision feedback

Hampton, Scott (2001) findings suggest that Teaching Assistants can use the student ratings feedback to improve teaching practice.

Intrinsic Motivation

Christensen, Emily Fast, (2002) found that students who did their homework did significantly better on the post tests, and students who were more intrinsically motivated did significantly better on the post test. Doing homework was important for achievement, and intrinsic motivation was linked to achievement.

Perception and Motivation

Ripke, Marika Nicole (2001) identified that Middle school children's perceptions and motivation regarding work and their future. Children were able to clearly articulate their goals for the future. The importance of good job and financial security was a common theme in their responses.

Motivational Strategies

Kausrler, Deena Amy, (2004) Findings included differences between faculty members' ratings of importance of using motivation strategies in the classroom,
Seyhan, Serpil, (2000) identified that Students who demonstrated a positive attitude towards the culture demonstrated higher motivation levels and greater efforts in their work.

Chapel, Fredrick Milton (2004) found that the incorporation of support from the History of science was connected with the indicators of motivation and conceptual change.

McManic, Janet A., (2004) found that in order to encourage student learning in biology, implement suitable or applicable adaptations in the class environment.

Varity of instructional strategies

Johnson, Marla J., (2004) stated that the teacher belief promotes a learning environment that fosters student motivation, student interaction and collaboration, and active inquiry; implementation of a variety of instructional strategies; teacher interest in subject matter influences choices of content and instructional strategies. Belief in self-reflection and collaboration with colleagues influences instructional practices. Science education teacher educators must take an active role in teaching pre service science teachers about and providing them with hands-on learning experiences.
Wudthayagron, Jirada, (2000) provided a better understanding of attitude and motivation of the Japanese FLES students, as well as practical suggestions for pedagogy and future research.

Meyers, Deborali Yvette Roddey, (2000) has studied the factors that motivate and impede computer use by teacher’s. Findings of the study showed many factors involved in the motivation to use the computer by teacher.

Self efficacy

Van Evera, William C., (2004) study showed that the students also experienced a significant increase in self-efficacy. High achievers experienced reduced performance following the feedback intervention.

Wagman, Janet Campbell, (2005) his study showed that project helped students achieve competence in an interrelated area within the Latin I curriculum. The students' motivation, self-efficacy, and academic autonomy increased because their areas of expertise.

Willems, Patricia Pulido, (2000) showed that academic efficacy proved to be a significant predictor of students scores on both sections of the reciprocal teaching, where as intrinsic motivational did not.
Teachers commitment and satisfaction

Wao, Felix Ogando, (2005) showed that Principals had high levels of mission and professional motivation in deciding to continue as leaders in Catholic high schools. Finally, results indicated a strong positive relationship between principals' commitment and satisfaction.

Breeden, Terri Lee, (2000) suggested why many ninth graders are not successful in the high school setting, unprepared for the rigors of high school, and freshmen lack study organizational skills. In the area of motivation freshmen have disproportionate number of disciplinary referrals, poor attendance, and poor performance; in the area of personalization the students did not exhibit any overt problems.

Weishaar, Bridget, (2001) suggested that Parental involvement was found to have a greater correlation with student motivation especially with knowing how to become involved in the school, having time to become involved in school activities and balancing involvement with their children's need for independence.

Hedrick, Maria Viego, (2001) showed no significant correlation between motivation and performance on the novel mathematics problem. There were significant grade level differences in motivation.