CHAPTER II

2.00. REVIEW OF RELATED STUDIES

2.10 OVERVIEW

This Chapter attempts to critically review studies related to the theme of the investigator chosen for his study. It consists of six sections. The first one is the overview of the entire chapter. The second section briefly brings out the ‘why’ of this review. Third section briefly outlines a number of Indian studies related to the investigator’s theme. The fourth section outlines a number of foreign studies related to the investigator’s theme. The fifth section is a critical review of the studies cited. The final section furnishes the documentary notes for the references made in the chapter.

2.20. THE ‘WHY’ OF THE RELATED STUDIES

Review of related studies is a summary embodying the findings of other researchers in relation with the problem area. It provides comparative data to evaluate and interpret the significance of one’s findings. It also should serve to clarify the problem and give a justification for the study that will be done.

The purpose of this chapter is to record briefly the findings of few research studies carried out on various topics that are related to the problem under study. An essential aspect of a research projects is the review of the related studies. Such a review represents the third step of the scientific method outlined by Dewey and other educational philosophers and the student of research will find an exhaustive survey literature of what was already been done on his problem and indispensable step in solution.

Review of related studies is an essential step in educational research. In reflective thinking the second step is survey already available data should be considered a necessary step that would enable the research to base this rational argument for justification of the study.

Purpose of the Review of Related studies

The following are some of the purpose of such a task. Complete survey of related studies gives to the researcher necessary insight into the problem. It enables him to put forth vigorously the rationale for the study. It becomes an important of the too chapter of the basic. It helps to orient the readers with the types of research. It suggests appropriate methods to tackle the
problem under study. It helps to locate data that can be used in comparative interpretation of result.

2.30 INDIAN STUDIES

In India many investigators have studied the relationship between Knowledge competencies, Performance competency and consequence competency and other factors like attitude toward teaching science, Personal values, Personality factors etc. The investigator also focuses his attention on the same issue. Here some of the studies are presented.

Sharma et al\(^1\) (1980) conducted a Comparative Study of the Effect of the Summative Model of Integrating the Skills upon Teaching Competence of Student Teachers. The objective of the study was to compare the effectiveness of integrating the five teaching skills through the 'summative model' upon scores on the Indore Teaching Competence Scale (ITCS) and the General Teaching Competence Scale (GTCS). The hypothesis was that there would be no significant difference in the mean scores on ITCS and GTCS groups trained for integration of skills through the 'summative model' and the control group. In all, 20 student teachers (for the academic year 1979) were selected from one training college in Shillong. They were divided into two equal groups (experimental and control). The groups were equated in terms of sex, age, qualifications, teaching subjects (method subjects), experience and Ahluwaliah’s Teacher Attitude Inventory Scores. Five teaching skills (probing questions, reinforcement, stimulus variation, explaining and illustrating with examples) were selected and the experimental group of trainees was imparted adequate training in integrating the five selected teaching skills through the 'summative model'. A pretest-posttest parallel group design was followed. Pretreatment and post-treatment observations were made for both experimental and control groups by using GTCS and ITCS. The significance of difference between the means of gain scores of both the groups was found out by applying the t-test. The study revealed that the experimental group did significantly better than the control group, since t-values in all the cases were significant. The hypothesis was rejected. The significant educational implication is that the 'summative model' of integrating teaching skills might be used as a training technique in the teacher training colleges.
Lalitha² (1981) studied the Effectiveness of a Strategy of Training for Integrating Teaching Skills on Teaching Competence of Student Teachers. The main objective of the study was to compare the effectiveness of the experimental strategy (experimental treatment) with no specific strategy (control treatment) for training in integration of teaching skills in terms of teaching competence of student teachers. The study employed a pretest, post-test control group design with pretest scores and teachers' attitudes as covariates. Sixteen student teachers of a teacher training college constituted the sample for the study. The covariates, namely, teacher attitudes and classroom performance in terms of teaching competence were measured prior to the experiment for all the student-teachers included in the study. The treatments were given in simulated situations followed by real school situations. The teaching competence was measured employing, (i) a General Teaching Competence Scale (GTCS) which measured teaching competence in the use of various specific teaching skills, and (ii) the Indore Teaching Competence Scale (ITCS) which measured teaching competence in integrating various teaching skills. The following were the major findings: 1. There was no significant difference between the two treatment-groups after training for integration of teaching skills in simulated conditions in terms of teaching competence measured on both GTCS and ITCS adjusted for initial differences in teacher attitudes and pre-performance on GTCS and ITCS. 2. After training for integration of teaching skills in simulated conditions followed by real school conditions, the experimental group was better than the control group in terms of teaching competence measured on GTCS adjusted for initial differences in teacher attitudes and pre-performance on GTCS. There was no such difference between the groups in terms of teaching competence measured on ITCS adjusted for initial differences in teacher attitudes and pre-performance on ITCS. 3. After training for integration of teaching skills in simulated conditions, the experimental group had made greater mean gains (significant at 0.05 level) than the other group on teaching competence measured on GTCS adjusted for initial differences in terms of teaching competence measured on ITCS. The same results were obtained even after the entire training for integration of teaching skills (in simulated followed by real school conditions). But the difference in GTCS gains between the groups was still more distinct (significant at 0.01 level).
Sharma et al\textsuperscript{3} (1982) conducted a study titled ‘Comparative Study of the Effect of the Additive Model of Integrating the Skills upon Teaching Competence of Student Teachers’. The objective of the study was to compare the effectiveness of integrating five teaching skills through the ‘additive model’ and that of the control group upon scores on the Indore Teaching Competence Scale (ITCS) and the General Teaching Competence Scale (GTCS). The hypothesis was: There is no significant difference in the mean scores on ITCS and GTCS between groups trained for integration of skills through the ‘additive model’ and the control group. Twenty student-teachers (1981-82) of one training college in Shillong were selected and divided into two equal groups, which were equated in terms of sex, age, qualifications, teaching subjects (method subjects), experience and Ahluwaliah’s Teacher Attitude Inventory Scores. Five teaching skills (probing questions, reinforcement, stimulus variation, explaining and illustrating with examples) were selected, and the experimental group trainees were given adequate training in integrating five selected teaching skills by adopting the ‘additive model’. A pretest-post-test parallel group design was followed. Pre-post-simulated and post-treatment observations were made for both experimental and control groups by using GTCS and ITCS. The significance of difference between means of gain scores of both the groups was found out by employing t-test. The study revealed that when mean gain scores were compared the experimental group gained significantly more than the control group at all the stages. The null hypothesis was rejected.

Gupta\textsuperscript{4} (1983) conducted an Experimental Study of the Correlates of Teacher Performance in Simulated Teaching at Secondary Level. The objectives were (i) to analyze teacher performance in the simulated group and control group, (ii) to analyze the relationship between correlates and teacher performance, (iii) to ascertain the modification of behaviour, in terms of the interaction variable through simulated technique, (iv) to evaluate the effect of training in simulation technique, and (v) to examine the change of teaching performance of science and mathematics student-teachers through training in simulation technique. The sample consisted of 120 student-teachers, both male and female, comprising 60 of the experimental group and 60 of the control group, with science and mathematics as their teaching subjects in two academic years (1980-81 and 1981-82) from different institutions affiliated to Meerut University. The
Teaching Aptitude Test by K.P. Pandey, The Minnesota Teaching Attitude Inventory, the Maudsley Personality Inventory, the Classroom Evaluation Form and Flanders’ Interaction Analysis Categories (FIAC) were used. A Taxonomical Performance Evaluation Form developed by the investigator was also used. The data were analysed with the help of analysis of variance and analysis of covariance. The findings were: 1. Training in simulation technique resulted in significant gain in taxonomical performance and classroom performance rating of secondary science and mathematics student-teachers. 2. When student-teachers were exposed to simulated teaching they gained in Indirect Teacher Talk, and lost in their Pupil-Initiative Ratio (PIR). 3. Student-teachers of high teaching aptitude performed significantly better through simulated teaching. 4. Student-teachers with a high positive attitude towards teaching gave better performance through simulated teaching. 5. Student-teachers of high academic ability showed the desired effect on their teaching behaviour or teaching performance through simulated teaching. 6. The personality dimension did not play any role in simulated teaching.

Bailkeri (1983) conducted a study titled ‘Effect of Self-Instructional Remedial Microteaching Course on the Instructional Competence of In-service Secondary School Mathematics Teachers’. The objectives of the study were (i) to prepare a mathematics instructional competence scale, (ii) to diagnose the weak instructional skills of in-service mathematics teachers (iii) to prepare remedial self-instructional microteaching course (RSIMC) materials to strengthen the weak skills, (iv) to provide in-service training to the teachers through RSIMC, (v) to evaluate the effectiveness of the RSIMC in improving mathematics instructional competence, and (vi) to study the reactions of participant teachers to the SIMC. It was hypothesized that: (1) RSIMC is effective in improving the mathematics general instructional competence of in-service teachers in terms of the following instructional skills taken together: a skill of explaining, b. skill of asking initial question, c. skill of asking probing questions, d. skill of fluency in questioning, e. skill of concretizing abstract ideas with examples, and f. skill of using blackboard. (2) In-service teachers sustain mathematics general instructional competence in terms of the six skills taken together and each skill independently (excepting the last one), strengthened by the RSIMC even two months after training. Fourteen teachers who were found to be
weak in the skills of asking probing questions and of concretizing abstract ideas with examples participated in the experiment. The Dharwad Mathematics, Instructional Competence Scale (DMICS) was prepared using scientific procedure. It had 23 instructional behaviours covering six skills to be rated on a five-point scale. Its inter-rater reliability was found to be 0.77 (n=20) and concurrent validity 0.67 (n=20). A rating scale was also prepared with a view to collecting reactions of participant teachers to the SIMC. Single-group pretest and post-test design was used. The RSIMC material was prepared mainly in the form of two handbooks and audio-cassette containing model microlessons. Each participant was supplied with two handbooks and an audio-cassette. The effectiveness of the course was tested by comparing pretreatment scores with immediate post-treatment scores and immediate post- treatment scores with delayed post-treatment scores using t-test. The findings of the study were: 1. The remedial SIMC was effective in improving mathematics general instructional competence of in-service teachers of secondary schools in terms of the six instructional skills taken together and each skill independently, excepting the skill of using blackboard. 2. In-service teachers sustained mathematics general instructional competence in terms of the six skills taken together and each skill independently (excepting skill of using blackboard) strengthened by RSIMC even two months after training. 3. Participant teachers held a favourable attitude towards the SIMC.

Bawa (1984) conducted a study titled ‘Effectiveness of Micro-teaching with Planned Integration Training, Following Summative Model and Micro-teaching without Planned Integration Training on the General Teaching Competence of Teacher Trainees’. The objectives of the study were (i) to assess whether training through micro-teaching brought about substantial changes in teaching competence of the participant student-teachers, (ii) to find out the gains in teaching competence of student-teachers who taught after additional systematic instructional training subsequent to micro-teaching, (iii) to assess gains in integration of teaching skills for student-teachers who participated in integration-based instruction after micro-teaching, (iv) to ascertain gains in teaching competence over the period following the termination of micro-teaching amongst student-teachers who taught without any additional systematic instructional training, (v) to assess gains in integration of teaching skills for student-teachers who taught on
their own, without exposure to integration-based instruction, (vi) to evaluate comparatively the gains in teaching competence of student-teachers who participated in integration-oriented instruction and those who did not, (vii) to assess comparative gains in integration of teaching skills of student-teachers who participated in integration-oriented instruction and that of those who did not, and (viii) to study comparative changes in attitude towards teaching amongst student-teachers exposed to integration-oriented instruction and student-teachers not exposed to integration-oriented instruction. The study was envisaged in three stages, viz., the planning and preparation stage (development of tool and selection of sample), the implementation stage, and the evaluation stage. In the study a pretest, post-test experimental control group design was followed. A sample of 40 student-teachers was randomly selected from the B.Ed. student-teachers of the Education Department of Delhi University. All the sample subjects were observed on the General Teaching Competence Scale. The sample student teachers were later randomly divided into two groups of 20 student-teachers each. One of the groups, designated as the experimental group, was exposed to an integration-oriented programme. The other group, designated as the control group, continued teaching on its own, using a self-assessment scale as a means of self-feedback. The experimental programme comprised a mixture of instruction-cum-demonstration (by the investigator) and teaching (by the student-teachers). The tools used in the study were: (i) the General Teaching Competence Scale (GTCS), (ii) the Self Assessment Scale (SAS) for providing self-feedback, (iii) the Scale for Integration of Skills of Teaching, (iv) instructional material for various component skills of teaching under the micro-teaching programme, (v) model lessons to illustrate integration of various teaching skills for demonstration of teaching of various aspects of mathematic unit, and (vi) the Ahluwalia Teaching Attitude Inventory (ATAI). The findings of the study were: 1. Exposure to micro-teaching resulted in improvement of teaching competence for all participants. 2. Exposure to the integration-based programme after micro-teaching did not result in wholesale and uniform improvement in teaching competence, speed of presentation and maintenance of discipline were the two component skills of general teaching competence which were not much affected by participation in integration-based instruction. 3. Exposure to integration-based instruction helped teachers to increase their ability to
integrate various teaching skills effectively. 4. Teaching on one's own after micro-teaching training helped to improve their teaching competence. 5. Micro-teaching had some sort of broad effect in terms of integration of teaching skills, even when this did not form a specific theme of the microteaching programme. 6. Consolidation of already acquired teaching competence on both these counts systematic integration-based instruction appeared to have the upper hand over teaching on one's own after microteaching. 7. The integration instruction group not only consolidated its teaching competence but also improved upon it. It did so in a significantly more effective manner as compared to those who taught on their own.

Joshi (1984) conducted a study of developing Performance Criteria and Testing their Efficacy in Training Student Teachers in a Teaching Skill Cluster. The study focused on (i) the evaluation of the behavioural model of teaching skill programmes, (ii) the relationship, between a symbolic (planning) model and a behavioural (performance) model, (iii) its bearing on planning and the critique procedures of micro-teaching, and (iv) study of efficacy of the modified planning and critique procedures. The first three aspects were studied through a field study, whereas the last aspect was studied through an experiment. For the field study, the sample consisted of 53 student-teachers enrolled in the Adarsh Comprehensive College of Education and Research, Pune, during 1978-80. The transcripts of 318 recorded micro-teaching lessons were analysed with the help of Moves in Interactive Strategies of Teaching (MIST). On the basis of these, data exercises were made to fix the minimum performance criterion for each skill, to find out the relationships between planning and performance, to determine the bearings of performance criteria on planning and to evolve a modified planning critique procedure. The planning critique procedure in modified form highlighted the following aspects: planning done in detail, after having envisioned future performance clearly, determination of the length of the lesson plan and estimation and indication of the time required for pupil and teacher behaviour, analysis of the lesson plan prepared, guidance of the trainees in planning the minimum number of skill-relevant behaviours essential for attainment of a minimum performance level, use of a category system like MIST, feedback based on the extent of translation of planning and specific guidance for improving both the planning and performance, etc. For studying the efficacy of the Interlinked Microteaching
Approach (IMA) in comparison to that of the Standard Microteaching Treatment (SMT), the pretest-post test design was employed. The sample of the study consisted of 34 student-teachers belonging to two teacher training colleges of Maharashtra. The subjects were divided into two groups and matched on the basis of sex, qualifications, regional background and material status. The tools used for the study were FIAC, Raven’s Standard Progressive Matrices (RSPM), and Ahluwalia’s Teacher Attitude Inventory (ATAI). Data were collected through observations and audio recordings. Statistical techniques like t-test and ANOVA were used for analysis of data.

The major findings of the study were: 1. The coefficient of stability for three forms of MIST was 0.85. 2. The rates of teachers’ steady talk and pupils’ steady talk seemed to be useful and stable for estimation of the time dimension at the time of planning. 3. The coefficients of correlation between completely translated planning, (CTP) and performance varied from 0.61 to 0.83 for the skills of Reacting, Questioning and Initiation, and Response (RQI). 4. The performance scores could be predicted from CTP scores and vice versa, using appropriate regression equations. 5. The minimum performance criteria for RQI skills were determined as 32, 56 and 90 per cent respectively. 6. The high performers in RQI skill cluster were not always significantly higher in all the components of the skill. 7. The high performers profitably used the time at their disposal, rate of interchanges, and types of helices. 8. The results of the experimental study indicated favourable results for IMA over SMI in terms of increasing the proportion of desired transitions in total transitions, occurring in teaching; in reducing the percentage of directions given by the student-teachers in teaching; and in training of RQI skill cluster as a whole. 9. The IMA did not differ significantly from SMI with regard to changing teaching behaviour of the student-teacher and changing the teacher attitude of the student-teachers.

Natarajan (1984) conducted a study titled ‘A Competency Based Programme in Teacher Education Curriculum’. The major objectives of this investigation were (i) to study the relative efficacy of competency-based teacher education in the pre-service education programme of secondary school teachers, (ii) to identify factors influencing competency achievement such as social status, economic status and level of education, and (iii) to find out the relationship between an individual’s self-esteem and competency achievement. Competencies were spelled out in behavioural
terms for the units in the elective subject, 'Institutional Planning and Administration', of the B.Ed. course of the Madras University, and these were designed to identify both knowledge and performance competencies. Knowledge competencies consisted of knowledge about concepts, knowledge about application of concepts and knowledge about specific examples about those applications. The competency list was validated by a panel of five educationists. For the experimental study, all the students of two government colleges of education at Pudukottai and Orathanad, numbering 200 were involved. They were male students in the age group 21-26. Five treatment groups with 40 student-teachers in each group were formed by random selection. The first group received instruction through the traditional lecture method with occasional dictating of notes. The second group learnt through small group discussions that were pre-planned. Source materials were supplied. The third group mastered the subject-matter through the conduct of seminars followed by discussions, the researcher or one of the student-teachers moderating the whole session. The fourth group was engaged in directed self-study, supported by a resource centre and weekly discussions led by the researcher. The last group studied by means of the self-instructional modules that were based on a competencies approach. Students were permitted to proceed at varying speeds. The actual experiment lasted for five months. Validated criterion-referenced tests were used for pretests as well as post-tests for all the groups. The criterion-referenced tests were based on identified explicit competencies. To find out the relationship between an individual's self-esteem and achievement, Rosenberg's Self-Esteem Scale was used. A check-list was utilized to find out the social and economic background of the students and their general educational level with subject specialization. At the end of the experiment, the participants' attitude to the programme was ascertained through a five-point scale. An attitude scale was also used to study the attitude of student-teachers towards the teacher-preparation programme. The major findings of the study were: 1. Competency-based instruction proved suitable for teaching selected units in Institutional Planning and Administration. 2. The seminar method seemed to be an effective method as it compared favourably with the competency-based approach. 3. The lecture method was effective as a group method. 4. Directed self-study did not compare well with other methods. 5. There was a
significant relation between self-esteem and acquisition of competencies. 6. Attitude towards teaching methods had a favourable correlation with acquisition of competencies. 7. The study proved that teacher education programmes could be made more effective through a competency-based approach.

Sharma (1985) conducted an Experimental Study into the Effect of Variation of Model Presenter on Teaching Competence of Teacher-Trainee. The objective of the study was to find out the effect of a model presenter on teaching competence of student-teachers. The null hypotheses formulated to be tested were: (1) The teaching competence of the composite group (male and female) of student-teachers, male student-teachers and female student-teachers was not significantly affected due to variation of model presenter. (2) Teaching competence of student-teachers was not significantly affected by their sex when trained by a model presenter of lower age level as well as middle age level. (3) The teaching competence of the male student-teachers trained by a model presenter of lower age level did not differ significantly from those trained by a model presenter of middle age level. (4) The teaching competence of the male student-teachers trained by a model presenter of middle age level did not differ significantly from that of the female student teachers trained by a model presenter of lower age level. A pretest-post-test single group design was employed in the present study. A sample of 22 student-teachers was divided into groups G1 and G2 equally with respect to sex and general teaching competence. G1 received the model presenter of lower age level while G2 received the model presenter of middle age level. The two groups received training in simulated conditions in the five teaching skills, viz., questioning, response management, reinforcement, explaining and illustrating with examples adopting microteaching technique. The tools used to collect data were the Baroda General Teaching Competence Rating Scale and the Rating Scale of Attitude Microteaching (Indore University). The data were analysed using Mann-Whitney's 'U' test and t-test. The major findings of the study were: 1. The model presenter of lower age level proved more effective in developing teaching competence in the trainees than the model presenter of middle age level. 2. The lower age level model presenter was more effective in developing a positive attitude towards microteaching in the female trainees. 3. All the student-teachers
retained their training effect and no significant difference between the model presenters of lower and middle age level could be found.

Singh\textsuperscript{10} (1985) conducted a Comparative Study of Teachers Trained through Integrated and Traditional Methods in terms of Attitude towards Teaching, Teaching Competence and Role Performance. The effectiveness of the different modes of graduate teacher training prevalent in India such as the four-year integrated B.Ed. and the traditional one-year B.Ed. course was sought to be compared in this investigation. The points of comparison taken up in the study were attitude, teaching competence and role performance of the teachers trained through these two modes. Null hypotheses regarding the differences in these three aspects between groups of persons trained in these two modes, and also hypotheses about relationships between each pair of these aspects were formulated. The sample consisted of 120 teachers trained in the Regional Colleges of Education at Bhopal and Ajmer and serving in schools in different places. The sample consisted of equal numbers in arts and sciences as well as equal numbers from the two modes. Ahluwalia's Teacher Attitude Scale and Passi and Lalita's Baroda General Teaching Competency Scale were used for finding out attitudes and teaching competence respectively. The test for role performance, the Role Performance Self-Rating Scale, was developed by the author with four-point items covering the roles of teachers as instructor, leader, manager, model, monitor, pupils' guide, and agent of social change. Its split-half reliability was 0.87 and its cross validity was reported as 0.83. Data were collected over a period of five months, and two lessons of each teacher were observed for assessing teaching competence. Personal data were collected by means of a personal data schedule. They were analysed using means for sub-groups formed on the basis of variables like subject background, age, marital status, educational qualification, length of experience, rural urban background, etc. The major findings of the study were: 1. while there was no difference in the attitudes of the groups under the two modes, there were differences in teaching competence and role performance, the integrated group scoring higher than the traditional group. 2. In teaching competence, those with low experience, from urban areas trained in integrated mode had higher teaching competence. 3. In role performance, the integrated course teachers who were only graduates, with low experience, from urban areas, and young teachers as also married and
female groups had higher scores. 4. From the study of inter correlations between scores on the three variables, it was concluded that the integrated method developed a positive relationship in attitude and role performance in the case of science teachers, and hence was suited more specially to science students than to arts students.

Thakkar\(^{11}\) (1985) conducted a study on ‘Effect of Different Microteaching Skills upon General Teaching Competency of Primary Teacher Trainees’. The objectives of the study were (i) to examine the effectiveness of different microteaching skills in developing general teaching competency of primary teacher trainees, (ii) to compare the effectiveness of symbolic modeling and audio-modeling upon general teaching competency of primary teacher trainees, (iii) to compare the retention of general teaching competency attained through symbolic and audio modeling, (iv) to find out the relation between IQ and achievement of general teaching competency, and (v) to find out the relation between school achievement and achievement gained in general teaching competency. The investigator decided to test the following hypotheses: (1) there is a significant positive effect of different microteaching skills upon general teaching competency of primary teacher trainees as measured by the BGTC scale. (2) There is no difference between the achievement of the two groups due to two different modes of teaching, namely, symbolic modeling and audio-modeling. (3) There is no correlation between intelligence and effect of microteaching skills upon general teaching competency (GTC). (4) There is no correlation between achievement and effect of microteaching skills upon GTC. (5) There is no difference in the loss or gain in general teaching competency between any two groups. (6) There is a positive correlation between, (a) scores of different skills and GTC score II, (b) scores of integration lessons and GTC Score II (c) scores of final integration and GTC Score II. Keeping in view the importance of the skill and the needs of the primary school classes, the investigator selected the skills—skill of fluency in questioning, skill of reinforcement, skill of illustration with examples, and skill of stimulus variation. The sample for the experiment consisted of 60 student-teachers studying in the academic years 1980-81 and 1981-82. It was decided to form three parallel groups from two different women teachers training colleges situated at Surendranagar and Wadhwan city. The investigator collected the data of IQ, achievement in the SSC and GTC score I and on the basis of these three
variables, the investigator formed three equivalent groups. The tools used in the present study were of two types. Tools selected for the study were: (i) the BGTC Scale developed at CASE, Baroda, (ii) the Desai-Bhatt Group Test of Intelligence, (iii) SSC mark sheets, and (iv) filmstrip of microteaching skills prepared by B.K. Passi. Tools developed for the present research were: (i) instructional material in the form of booklets for each of the skills selected for the study, (ii) pre-recorded cassettes for each skill as above, (iii) observation and evaluation schedules for each skill, (iv) booklets and cassettes for integration of microteaching skills, Q + R, I + S and Q + R + I + S and (v) observation and evaluation schedules, for integrated microteaching skills, QR, IS and QRIS. The statistical devices used were means, SDS, correlations, etc. The major findings were: 1. there was a significant positive effect of different microteaching skills upon the GTC of primary teacher trainees as measured by the GTC scale. 2. There was no difference between the achievement of the two groups due to two different modes of teaching, viz., the symbolic model and audiomodel. 3. There was no correlation between intelligence and effect of microteaching skills upon GTC. 4. There was no correlation between general achievement and effect of microteaching skills upon GTC. 5. There was no difference in the loss or gain in GTC between any two groups. 6. There was a positive correlation between, (a) scores of different skills and GTC score II, (b) score of integration lessons and GTC Score II, and (c) score of final integration and GTC score II.

Kalyanpurkar12 (1986) conducted a study titled ‘The Effect of Microteaching on the Teaching Competence of Inservice Teachers and its Impact on Pupils’ Attainment and Pupils’ Liking’. The objectives were (i) to study the effect of microteaching (MT) training on the development of selected skills, viz., probing questioning (PQ), reinforcement (RE), explaining with example (Ex), and stimulus variation (SV), in in-service teachers, (ii) to study the effect of MT training on the development of general teaching competence (GTC) of in-service teachers, (iii) to study the effect of MT training on the development of general teaching competence (GTC) of in-service teachers, (iii) to study the effect of MT treatment on pupil’s attainment and pupil’s retention (test-wise and educational objective wise), and (iv) to study the effect of MT treatment on pupil’s liking (SL) for their teachers. The hypotheses were: (1) there would be no significant difference
between post-test mean skill scores of the experimental and control groups when adjusted for the respective pretest skill scores. (2) There would be no significant difference between the post-test mean GTC scores of the experimental and control groups when adjusted for pretest GTC scores. (3) There would be no significant difference between the adjusted means of the attainment scores of the experimental and control groups when adjusted for DIQ, VI class scores, and SL scores while using each covariate separately. (4) There would be no significant difference between the adjusted means of retention scores of the experimental and control groups when adjusted for DIQ, VI class scores and SL scores, while using each covariate separately. (5) There would be no significant difference between the means of the post-test pupil's liking scores of the experimental and control groups when adjusted for the pretest pupil's liking scores. The sample included 36 teachers and their 720 pupils from 17 schools. The in-service teachers with a minimum of two years teaching experience in teaching general science to VII standard pupils through the Marathi medium, in Marathi-medium schools in Nagpur, and who were willing to participate in the experiment, formed the final sample. Twenty pupils of each teacher, participating in this experiment, were included in the sample. The pretest post-test control experimental group design was employed in this study. Thirty-six teachers were randomly assigned to the two groups the experimental group and the control group. Each group consisted of 18 in-service teachers. Microteaching training was the treatment. The general teaching competence was measured with the help of General Teaching Competence Scale developed by Passi and Lalitha. The inter-observer reliability coefficients ranged from 0.85 to 0.91. The factorial validity was established. Pupils' liking was measured by administering the Student Liking Scale developed by Malhotra and Passi. The test-retest reliability coefficient was 0.92 and the concurrent validity coefficient was 0.81. Raven's Standard Progressive Matrices were used to obtain a measure of pupils' mental ability score. The test-retest reliability coefficient varied from 0.83 to 0.93. The data were analysed with the help of analysis of covariance. The findings were: 1. Microteaching treatment had a positive significant effect on the development of skills, viz., PQ, RE, EX, and SV, when the post-test mean scores of the respective skills for experimental and control groups were adjusted for the pretest scores of the respective skills. 2. MT treatment had a positive
significant effect on the development of GTC, when the post-test GTC means of the two groups were adjusted for pretest GTC scores. 3. MT treatment had a positive significant impact on pupils' attainment as well as on pupils' retention in the attainment tests when the respective means were adjusted separately for the three covariates, namely, DIQ, VI class scores, and pre-SL scores. 4. MT treatment had positive significant impact on pupils' liking for their teachers when the means of the two groups were adjusted for pretest SL scores.

Dave (1987) conducted a study titled ‘Relative Effectiveness of Microteaching Having Summative Model of Integration versus Mini teaching Model in terms of General Teaching Competence, Teacher Attitude towards Teaching, Pupil Liking and Pupil Achievement’. The objective was to compare the effectiveness of the summative model of integration, mini teaching model of integration and traditional model of integration in terms of general teaching competence (GTC). The hypothesis was there is no significant difference in the mean scores of GTC of the student-teachers trained through the summative model of integration (SMI), mini teaching model of integration (MMI) and traditional model of integration (TMI) at occasion II (post-test I) and occasion III (post-test II). The sample comprised 30 student-teachers selected randomly and of 180 student-teachers admitted during the 1983-84 academic session in the Department of Education, DAVV, Indore. All pupils taught by the student-teachers formed the sample. It comprised 402 pupils. The pretest post-test parallel group design with one control group was followed. The GTC, TATT pupil achievement and pupil liking were the dependent variables. The General Teaching Competence Scale developed by Passi and Lalitha was used for measuring GTC. The inter-observer reliability coefficients of the scale ranged from 0.85 to 0.91. The data were analyzed by computing mean, SD and analysis of covariance, followed by t-test. The findings MMI was found superior to the SMI and TMI in terms of development of general teaching competence in student teachers.

Ekbote (1987) conducted a study titled ‘Development of a Strategy for Integration of Skills in Teacher Training’. The objectives of the study were (i) to develop a strategy for integrating the teaching skills acquired through microteaching practice, (ii) to determine the validity of the integration strategy in terms of content validity, student-teachers' performance in
classroom teaching and their reaction to the strategy, and (iii) to study the effectiveness of the integration strategy in relation to the following variables pertaining to the student-teachers: a. qualification, b. teaching experience, c. academic achievement, d. skill comprehension, e. availability of study time, f. attitude towards teaching, and g. attitude towards microteaching. The hypotheses of the study were: (1) there will be no significant difference between the pre-integration performance and the post-integration performance of student-teachers in classroom teaching. (2) The reaction of the student-teachers to the various components of the strategy will be equivocal. (3) There will be no relation between the improvement in the classroom teaching performance of student-teachers through the strategy and the variables pertaining to the student-teachers, viz., qualification, teaching experience, academic achievement, and skill comprehension, availability of study time, attitude towards teaching, and attitude towards microteaching. The study was conducted with a purposive sample of 13 student-teachers of a regular B.Ed. programme having science as one of their special methods and English as the medium chosen for practice teaching. The study involved a single group pretest post-test design. Before the pretest, there was a general treatment comprising simulation practice teaching through the Indian Standard Model of Microteaching for seven skills. The experimental treatment included integration practice using instructional material, instructional techniques like discussion, lecture, simulated practice, classroom practice and field work as its components. The content units of the strategy were use of questioning and explaining, use of blackboard, use of visual media, reinforcement personalization, inquiry approach, variables influencing classroom teaching, diagnostic and remedial practices and organization of co-curricular activities related to classroom teaching. The pretest and post-test were conducted by observing two lessons of each student-teacher in a real classroom using the following instruments: (i) Baroda General Teaching Competence Scale developed by Passi, et al. (ii) Teaching Effectiveness Comprehensive Scale developed by the investigator. (iii) Skill Interaction Analysis Category System developed by the investigator (inter-observer reliability 0.81). The other tools used were the Skill Comprehension Paper-Pencil Test developed by the investigator, Ahluwalia’s Teaching Attitude Inventory, and the Attitude Towards Microteaching Programme-a Rating Scale developed by Passi, et al. The
analytical technique used was mainly analysis of covariance. The major findings were: 1. The integration strategy was found effective in terms of the improvement it made in the student-teacher’s performance in classroom teaching. 2. All the seven variables pertaining to the student-teachers, viz., qualification, teaching experience, availability of study time, academic achievement, skill comprehension, attitude towards teaching and attitude towards microteaching influenced the improvement in classroom teaching performance through the strategy.

Rajameenakshi (1988) conducted a study titled ‘Factors Affecting Teaching Competency of B.Ed. Trainees in Teaching Physical Science’. The major objectives of the study were (i) to identify factors that affected the teaching competence of B.Ed. trainees, (ii) to assess the teaching competencies of B.Ed. students using appropriate tools, and (iii) to make differential and correlation studies between teaching competence and various factors. A survey was conducted on 610 students of colleges of education in Tamil Nadu under the category of physical science and 1500 school pupils. The data were obtained with the help of a questionnaire, self-evaluation scale and pupils' evaluation scale for measuring teaching competence of B.Ed. students. In order to study the effect of demonstration skill on teaching competence, 20 B.Ed. students were selected and divided into two groups of ten each. The experimental group was exposed to microteaching in the skill of demonstration and, later, the teaching competence of both the groups was measured. The effect of microteaching was also studied on a group of 50 students by using the pretest-post-test design. The student teaching marks of B.Ed. students were collected from all the colleges. The obtained data were analysed with the help of suitable statistical techniques, viz., mean, SD t-test and correlation. The major findings of the study were: 1. Pupils' evaluation scores were accumulated at the higher end of scores (80-95), self-evaluation scores were between 50 and 85, and professors' scores ranged from 45 to 65 with regard to the teaching competence of B.Ed. students. 2. It was found that training in the skill of demonstration and microteaching significantly increased teaching competence. 3. The type of management, the time of admission to the B.Ed. course and the teacher-pupil ratio were the factors that affected the mean teaching competence of B.Ed. trainees in almost all colleges of education in Tamil Nadu. 4. Female teacher trainees, teachers who taught in girls
schools, teacher trainees who got a first class in degree examinations and teacher-trainees with higher socioeconomic status scored significantly higher in teaching competency than others. In all the three methods of evaluation, the analysis revealed that there was a negative correlation between age and teaching-competence scores.

**Manjula**\(^1\)\(^6\) (2002) conducted a study titled ‘Teacher competencies and Learners’ achievement in Tribal Areas of Karnataka’. This study carried out in two taluks of Chamaraja Nagar district and in one taluk of Mysore district, examines the teacher competencies and learners’ achievement in tribal areas of Karnataka, where the tribal people are thickly populated. 261 students and 31 teachers were involved in the study. The teachers’ competency and learners’ achievement were studied in different school subjects by administering competency test to the teachers, and the achievement to the students. The teachers’ classroom practices were also observed to study their competence in subject matter as well as in the pedagogical skills. The findings revealed that the teachers do not possess required competencies either in the subjects or in the pedagogical methods, except for an average performance in language and mathematics. Similarly, the students’ achievement was found to be low except in language and mathematics which was only on the border line of average performance. From the findings, it is recommended for professional developers working with primary school teachers to promote their competence in all aspects, especially to fit into the tribal context, so that excellence in student’s achievement can be realized.

**Shabnam Sinha**\(^1\)\(^7\) (2003) conducted a study to examine the scenario of English language teaching at the primary level in the country. Against the backdrop of the NCERT preparing new instructional materials in English entitled Learning English; an attempt has been made to assess teachers perceptions about what a training package, for transacting this materialism should contain. The study represents the results of micro study undertaken on a sample of teachers from the Municipal Corporation of Delhi schools, who use the NCERT textbooks. It tries to assess the macro (the contextual and community related) and the micro (pedagogy, ELT and classroom processes related) issues that confront the teachers of English, the associated problems and solutions thereof. Based on the teacher perceptions, a training package of ten modules has been developed. The
NCERT may undertake a massive national programme for capacity building of teachers on the new generation instructional materials. The above exercise was undertaken as a preparatory activity for the country wide teacher training. The issue of utilization of various media for training like the print, audio, video and interactive one-way video and two-way audio teleconferencing was also explored and teachers’ needs and perceptions were recorded.

Deví (2005) conducted a study titled ‘Assessment of Attitude towards Teaching’. The major objectives of the study were: (i) to assess the attitude of the B Ed trainees towards teaching profession; and (ii) to find out the relationship between the attitude towards teaching and performance in the entrance examination of the B Ed. trainees. The sample of the study constituted of 76 student teachers undergoing the B Ed. Course (during the academic year 2003-04) in the Institute of Advance Studies in Education, Chennai. Attitude towards teaching of the student teachers was measured using the attitude scale developed by Ahluwalia, S.P. The major findings of the study were: (1) There was a positive and significant relationship between the attitude towards teaching and performance in the B Ed. entrance examination. (2) There was no significant difference in the attitude of the student-teachers with under-graduate and post-graduate qualifications towards teaching.

Sahu et al (2005) conducted a study on ‘Impact of Students’ Perception of their Teachers’ Attitude towards them and its Relationship with their Self-perception and Academic Achievement’. The major objectives of the study were: (i) To find out the relationship between students’ perception of their teachers’ attitude towards them and their academic achievement; (ii) to find out the relationship between students’ perception of their teachers’ attitude towards them and their self-perception; and (iii) to find out the relationship between academic achievement and self-perception of students. A sample of 160 students of class VII was selected from three government schools of Kurukshetra district in Haryana through simple random sampling. The data was statistically analysed using correlation coefficient. The major findings of the study were: (1) a significant relationship was found between students’ perception of teachers’ attitude towards them and their academic achievement. (2) A relationship was found between students’ perception of teachers’ attitude towards them and their self-perceptions. (iii) A significant
relationship was found between the academic achievement of students and their self-perception.

**Chandrasekar**\(^{20}\) (2006) conducted a study titled ‘Effect of personal and demographic variables of student teachers of DIETs on their attitude towards teaching profession’. The major objectives of the study were (i) to study the attitude of the student teachers towards teaching professions (ii) to note the variations in the attitude of the student teachers due to different personal and demographic variables. A survey was conducted on 500 student teachers of 23 DIETs situated in 23 districts in Andhra Pradesh. A tool used in the study was attitude scale developed by the investigator. The independent variables of the study were Gender, age, educational qualifications, locality, methodology in subject, family literacy index and family annual income. The dependent variable was attitude of student teachers towards teaching profession. ‘t’ test and F test were used for the study for analyzing the data. The major findings of the study were: 1. On the basis of the student teachers’ attitude towards teaching profession it has been found that the following aspects are quite disturbing: (i) Most of the student teachers are unhappy with disobedient students. (ii) Majority of the student teachers felt that the teachers are not cared for by majors sections at the village level and in some cases they are treated as low due to their poor economic status. (iii) Most of the student teachers reveal that society is responsible for unhappiness and dissatisfaction of the teachers. (iv) More than 50 percent of the student teachers expressed that teaching professions has no recognition in the society. (v) Majority of the student teachers felt that using teachers for activities other than teaching bothers them. It is true the teachers have often been found outside the school premises entrusted with the works of census collection, literacy programmes, pulse-polio, janmabhoomi, etc. 2. The variable sex has significantly influenced the attitude of the student teachers towards teaching profession.

**Shanmugaganesan**\(^{21}\) (2008) conducted a study on ‘Personality and Teaching competency of Teacher trainees’. The major objectives of the study were (i) to find out the personality type of teacher trainees (ii) to understand the level of teaching competency of Teacher trainees. A survey was conducted on 300 teacher trainees admitted to 10 colleges of education affiliated to Bharathiar University, Coimbatore in Tamil Nadu. Tools used in the study were Teaching Competency Inventory and Eysenck’s Personality
The major findings of the study were: 1. It was statistically proven that there is a significant noteworthy relationship between the personality type and teaching competency of teacher trainees. 2. Extroverts were more significant towards teaching competency than the introverts. 3. Teaching competency and performance are not related. 4. Gender has no influence on the teaching competency of Teacher trainees.

Singaravelu (2008) conducted a study titled ‘Teaching competency of D.T.Ed., trainees in internship programme’. The major objectives of the study were (i) to find out whether there is any significant difference in mean score between the students of Diploma in teacher education of male and female with respect to skill of planning, skill of presentations, skill of closure, skill of managerial and skill of evaluation (ii) to find out the significant difference among the D.T.Ed students of government schools, aided schools and unaided schools with respect to skill of presentations, skill of closure and skill of evaluation. A survey was conducted on 225 D.T.Ed students of government schools, aided schools and unaided schools in Mannargudi Tamil Nadu. A tool used in the study was General Teaching Competency Scale. It was developed and validated by B.K.Passi and M.S.Lalitha. The independent variables of the study were Gender and Type of managements. The dependent variable was skills of teaching. ‘t’ test and F test were used for the study for analyzing the data. The major findings of the study were: 1. There is significant difference in mean score between male and female in skill of planning. 2. There is significant difference between male and female in skill of presentations. 3. There is significant difference between male and female in skill of managerial. 4. There is significant difference between male and female in skill of closure. 5. There is significant difference between male and female in skill of planning. 6. There is significant difference among the students of D.T.Ed from schools of government, aided and unaided in skill of presentations. 7. There is significant difference among the students of D.T.Ed from schools of government, aided and unaided in skill of closure. 8. There is significant difference among the students of D.T.Ed from schools of government, aided and unaided in skill of evaluation.
2.40 FOREIGN STUDIES

Here the investigator reviews a number of foreign studies on the relationship between Knowledge competencies, Performance competency and consequence competency and other factors like attitude toward science teaching, Personal values, Personality factors etc. Here some of the studies are presented.

**Bolton Patricia,** [23](1984) investigated a study on “Teacher Competency Testing practices and perceptions in selected States in the Nation” The purpose of this study was to analyse the utilization of teacher competency testing in the eleven states that originally enacted legislation requiring teacher competency testing. An analysis of various programs was conducted on all data to determine whether the perceptions of the state and local superintendents were significantly different on each question. It was found that the benefits of teacher testing to state agencies, schools of education, school districts and society outweigh the disadvantages of increased budgets and larger educational bureaucracies and the possibility of teacher shortages.

**Bethive Harris,** [24](1985) undertook a study on “The mathematics achievements of students taught in traditional and Competency Based Approaches”. The purpose of the study was to compare mathematics achievement of randomly selected fifth, sixth, seventh and eighth grade students who were taught mathematics by different methods of instruction in East Texas. Objective data were collected to analyse if there was significant differences between the mathematics achievements; of students who received the competency based mathematics instruction and the mathematics achievement of students who received traditional based mathematics instruction the analysis of covariance revealed significant differences between the experimental and control groups. Significant differences between the eighth grade experimental and combined groups after four years in the program were as follows.

1) Mathematics concepts achievement, combined students and males.

2) Mathematics- computation achievement combined students and females.

**Lees Rosert Eugens** [25](1985) studied the “Vocational Teacher Competence-As it relates to teacher preparation, self actualization and selected Demographic variables”. The study focused on vocational teacher
education. Since teacher’s behaviour may be influenced by many antecedent variables, the relationship between professional preparation personality educational levels; teaching and occupational experience and teacher competence was studied. It was found that there was no significant relationship found between the following variables 1) personality and to teacher competence 2) Overall professional preparation and teacher competence and competency based teacher education than traditional. A significant relationship was found between amount of CBTE and teacher competence.

Linden Patricia Ann 26 (1985) developed a study on. “A follow-up study of the graduates of the competency based teacher Education Program in the University without walls At Loretto Heights College in Denver. Graduates evaluated their preparation for teaching highly. No less than 89% of the graduates of UWW/CBTE were satisfied or very satisfied with the various processes used in the program. They would have preferred more clarify about the program and program expectations earlier in their participation and less paper work throughout 80% of the graduates of UWW/CBTE intended to remain in the field of education.

Good Speed 27 (1986) studied on “A teacher training program to enhance regular class room teachers’ competencies for mainstreaming”. In South Africa Results indicated that there was no differences between experimental and comparison groups on the pretest measure of competency. However, following the course, the experimental group rated themselves significantly more competent. Their scores on the final examination, which measured acquisition of knowledge concerning teaching special students the law, placements, a procedure etc. was also significantly higher than the comparison group.

Basson 28 (1987) studied on “The relative effectiveness of the traditional classroom method and the competency- based training approach on behavioral change”. It was clear from the study that the traditional classroom method was more effective than the competency-based training approach. An attempt was made to determine whether moderator variables such as sex, years of service, place of birth, introversion Vs extroversion level of anxiety and mental alertness, would have a relative effect on results of the instructional methods. The results indicate however that they exercise little or no influence. Statistical tests have indicated that the
performance praisal scores in regard to the managerial dimensions show a low relation with scores awarded by the Assessment Centre.

Donald 29 (1987) undertook a study on “Some Effects of Training on the competence of beginning teachers”. This study investigated the relationship between training and 12 dimensions of teacher competence. Measures of these competencies were obtained from actual classroom observation utilizing a low-inference instrument. Teachers were observed three separate times by three different trained observers in the fall of 1985. The teachers who had teacher training scored significantly higher on two competencies: affective climate and individual differences. Teachers who had no teacher training scored significantly higher on two other competencies: accountability and questioning skill. There were no significant differences between the two groups on the other eight competencies.

Andry Kevin Michael 30 (1988) undertook a study on “The development of a competency-based approach for teaching a college level French horn techniques course in a homogeneous setting”. The purpose of this study was to develop a competency-based approach to teaching a college-level horn techniques course in a homogeneous setting”. Five students were taught horn technique using the college Horn Technique text written for the course. Students demonstrated the achievement of competency levels in three categories: cognitive, psychomotor and pedagogical competencies were defined and explained in the text. Results indicated that the text written for the course was an effective method for teaching horn technique to instrumental music education majors. Moreover, the results showed that the competency-based approach was an effective method of teaching horn techniques students were able to change their teaching skills efficiently by observing themselves via videotape and by taking data through systematic observation.

Benson 31 (1988) undertook a study on “Teacher instructional practices associated with experiences in a student competency-based education program”. The t-test was utilized to test the seven directional hypotheses. Data were analysed using a three-way analysis of variance (ANOVA) to test the main effects and interactions among the independent variable and two control variables on the seven dependent variables. Results from the three ways ANOVA indicated that high and moderate levels of knowledge of mastery learning were the best predictors of management of instructional
time, range and variety of materials and total instructional practices. In the multiple regression analysis, CBE experience accounted for the majority of the variation, about 8.1. An adequate amount of evidence was presented to partially substantiate the assertion that the CBE experiences positively influence the instructional practices of teachers.

Chol-Ae-Kyung 32 (1988) undertook a study on “The ranking of professional competencies for business teaches identified by the National Business Education Association and its implications for business teacher education in New York State”. The research developed some questions for the purpose of this study.

1. How do the currently practicing business/marketing teachers Newyork state rate the importance of the competencies identified to the National Business Education Association (NBEA).

2. For which competencies do teachers indicate a higher level of pre service preparation for the competencies do teachers indicate a lower level of pre service preparations?

The study resulted in rank ordered list of all 123 competencies among the lists of competencies within each category. Similarities and differences were reported in the rankings among the subgroups of sex and years of teaching experience. The Management’ and ‘Instruction’ categories ranked high was the Evaluation and Student Organizations’ Categories ranked as important. The respondents indicated a higher level of preservice preparation in the Evaluation and Instruction categories of lower level of preservice preparation in the ‘Guidance’ and Student Organizations’ categories.

Hall Mitchel Dean 33 (1988) studied the “Effective high school principles perceptions of the importance of the competencies and related skills in the Guidelines for the preparation of School Administrator”.

1. It was found that the guidelines were considered by both groups to be important to their success as administrators. The perception of the effective group revealed that there were very few significant differences accounted for by size of the school, racial composition of the school, location, and age of the principal or highest degree received.

2. The effective principles indicated that their greatest strength was in the competency area of school climate improvement. The
competencies of least strength included curriculum design and staff development.

3. The principles from both groups revealed that the levels of preparedness when the first became a principal who were between poorly prepared and adequately prepared. The effective principles indicated that they were best prepared in designing implementing and evaluating a school climate improvement program.

**Little Sharon** 34 (1988) undertook a study on “Fifth grade mathematics: The instructional validity on Pennsylvania’s minimum competency test” . This study examined the relationship between instructional content based in the fifth grade mathematics classes as determined by teacher on a survey and test content on Pennsylvania’s mandated minimum competency test (TELLS) as determined by student performance on individual objectives of the test. Correlation was calculated between teacher estimates and students performance using the Pearson product moment correlation efficient. Significant relationship between teacher estimates of content covered and student performance was demonstrated for seven objectives. Objectives covering subtraction using for digits and multiplication with two or three digit factors were found to have an inverse relationship between objectives not taught prior to the test and student performance was revealed. The concern of instructional validity for the TELLS test primarily rests with the areas of fractions, plane geometry and equivalent measurement. The majority of the students failing the test were from instructional groups labeled below average 94% of the students failing in the test were in classes which had not been instructed to all of the objectives prior to the test. The areas of teacher estimates of content coverage, which showed the greatest number of relationships with student performance was teacher confidence of student mastery.

**Douglasses Rebecca Suran** 35 (1990) investigated “Barriers to implementing Competency Based Vocational Educations in Illinois post secondary institutions”. The purpose of the study were

1. To what extent has CBVE be implemented in post secondary institutions in Illinois?

2. What barriers to implementing the CBVE are related to inter personal factors?
3. What barriers implementing CBVE are related to interpersonal factors?

4. What barriers to implementing CBVE are related to organizational?

The results indicated that 10.81% of the colleges had no CBVE implementation, 27.03% were separating at a minimum level, 40.54% at a minor level, 18.92% at a moderate level, and 2.70% at a substantial level. It was concluded that although CBVE implementations levels were higher than anticipated; they are still of fairly low incidence statewide. A large portion of respondents expressed no knowledge of state policy toward CBVE.

Robinson Marion Clay (1990) undertook a study on “Descriptive analysis of secondary business education teachers perceptions of support received when implementing competency-based education in South Carolina”. The purpose of the study was to determine if the financial support and administrative support received by secondary school business education teachers in South Carolina were adequate for implementing the objectives of CBVE. Data were gathered using a questionnaire designed by the researcher. The questionnaire gathered data rating the administrative support and financial support provided by the Office of Vocational Education (OVE) school districts and building principals. Frequency distributions were computed to answer the three research questions.

1. Was the financial support and administrative support received by secondary school business education teachers from the Office of Vocational Education adequate for implementing CBVE?

2. Was the financial support and administrative support received by secondary school business education teachers from school districts adequate for implementing CBVE?

3. Was the financial support and administrative support received by secondary school business education teachers from building principals adequate for implementing CBVE?

The study revealed that the business education teachers in South Carolina rated the overall administrative support and financial support provided by OVE School districts and building principals as adequate however the data suggest that more financial support is needed from the schools districts. Questions 1 and 3 yield chi-square values of 10.69 and 17.38 respectively. Thus suggesting a strong relationship between teacher’s years of teaching
experience and rating the administrative support provided in OVE and building principals.

Segal Marietts ³⁷(1991) studied on longitudinal effects of a compensatory pre-Kindergarten curriculum emphasizing representation competencies. A first grade follow-up study was conducted with 79 subjects for who complete auditory and visual pre-test scores and Stanford achievement test results were available. Eighty-nine subjects with complete auditory and visual pre-test scores and complete metropolitan achievement test data from grades two through six completed the longitudinal analysis. Research findings from the first year of the study indicated that treatment subjects recorded significant gains on 5 of the 6 subjects of the Illinois test of Psycholinguistic abilities: Auditory Association and auditory-sequential memory. These findings suggest the effectiveness of the supplemental treatment during the first year of the study. Although comparison between treatment and control groups did not demonstrate a significant difference in achievement scores during grades two through sex, both groups recorded as unusual growth pattern, which differs from the majority of long-term preschool intervention studies.

Gautheir³⁸ (1994) Studied on Attitudes toward science and science teaching as reflected in the science autobiographies of preserves elementary teachers. As part of a study of the preservice science education of elementary school teachers, data were collected from 80 prospective elementary teachers relative to their prior experiences with science both in and out of the formal setting of school. These data were obtained largely through the preservice teachers’ science autobiographies as well as through informal interviews and correspondence secured throughout the course of the study.

The study explores the relationship between preservice elementary teachers’ prior experiences with science and their expressed attitudes toward science and science teaching as they began the formal study of elementary science pedagogy. The analysis represents an effort to identify the contextual variables within the science experiences that the preservice elementary teachers shared in their science autobiographies and to determine the influence these contextual variables have had on their expressed attitudes toward science, science teaching, and their sense of efficacy in teaching science to elementary school children.
Ross (1994) studied on "The alignment of teacher classroom assessment with a state performance assessment program". A survey of 1,012 eighth grade English/language arts and mathematics teachers in 21 of the 24 school systems in Maryland examined the alignment of teacher classroom assessments with four components of the Maryland School Performance Assessment Program (MSPAP)'s eighth grade assessment. Teachers were asked how frequently they include in their own assessments at each of three ability levels (advanced, regular and remedial) the learning outcomes, processes, formats and scoring of the state assessment. Five research questions and 18 research hypothesis were posed to examine this alignment along with 5 background and 10 instructional factors which may be related to that alignment. It also examined, through teacher written comments, the extent to which important learning outcomes teachers assess are not included on the state assessments, and the extent to which important learning outcomes have been abandoned by teachers as a result of the state assessments. Teacher assessment was chosen as the proxy for instruction since students focus learning on what is tested in the classroom. Major conclusions were that: teachers assess the learning outcomes and processes of the MSPAP less often in classes of lower ability level; teachers of English/language arts align to a greater degree with the learning outcome, processes and formats of the state assessments than do mathematics teachers; the ability level respondents teach makes more of a difference in their alignment than does where they teach, their years of experience, their level or area of certification, or their membership in a professional organization; the subject, English/language arts or mathematics, makes less of a difference in teacher degree of alignment than whether the teacher has taken a college course in assessment, the extent he or she uses textbooks assessment, whether he or she has served to design/score the MSPAP, or has written local system performance assessments. Additionally, teacher comments suggest the desire to more closely align their instruction to MSPAP, frustration in preparing students for both state functional tests and state performance assessments, and the need for professional development in performance assessment.

Etelvina (2000) studied on "Pedagogic Competency of the Brazilian University Professor". The main purpose of this study is to provide argument that Pedagogic competency is amongst one of the most important
issues in Brazilian universities dealing with the quality of teaching of university professors. This kind of competency is the main problem related to the didactics and methodology used in classroom teaching. It means that good classroom practice needs more than specific academic discipline knowledge. This study was carried out at the Federal University of Viçosa, Brazil, where the researcher used the Delphi Forecasting method. The study involved diagnostic testing of the professors' difficulties in their class work and the researcher described what the professors think about themselves in relation to their preparation to teach. The results highlight the main difficulties as being the lack of public support for the university, greater importance given to research than teaching, the heterogeneous mix of students, the necessity and demand to publish a lot and the complexity of the current educational system. In relation to professor preparation, the researcher found a lack of seminars and pedagogic courses, and little interdepartmental integration and support. These difficulties and preparation problems are caused by current distortions and constraints in the Brazilian educational system.

Waldrip\textsuperscript{41} (2001), studied on “Teacher-Student Interactions and Teacher Competence in Primary Science”. The purpose of this study was to develop and validate an instrument to assess teacher-student interactions in the primary science classroom and to use it to examine associations between these interactions and teachers' perceived competence to teach primary science and explain science words. The measure of teacher-student interactions, the Questionnaire on Teacher Interaction (QTI), was used for the first time in a large number of primary classrooms in Australia. The model on which the QTI is based maps interpersonal behavior on an influence dimension and a proximity dimension. The questionnaire was administered in 121 Australian primary classrooms. Using a sample of 2,371 primary science students, the reliability of the QTI scales ranged from 0.62 to 0.83 and showed acceptable discrimination between the scales. Significant correlations existed between QTI scales and teachers' use of student outcome statements and students' attitudes.

Rutledge\textsuperscript{42} (2006) studied on “An introduction to science investigations: student teachers learning to work on process skills with children aged 4 – 11”. This study seeks to establish if previous qualifications in science impact on student teachers' confidence and ability
to manage science investigations. It also evaluates the effects of the students' college course on their confidence. The aim of the study is to identify influences on the students' investigative ability and draw lessons from these to enhance the students' learning. The study found that there was effectively no relationship between students' formal science qualifications and their performance in an assessment of their investigative ability. There was also no correlation between science qualifications and the students' performance in a subject knowledge test. It was found that taught sessions improved the students' confidence in investigative work but that this confidence then fell when the students were surveyed again after three months. There was also an indication that the students' investigative experiences had only a limited effect on their personal perception of their scientific literacy. The study opens with an interesting discussion of student attitudes to investigative work and how this relates to their understanding of broader scientific philosophy. This builds to a sound justification for the research undertaken. The methodologies used are straightforward and appropriate and the lack of correlations is thought-provoking. The author expresses reservations as to whether the results can be assumed to extend to other institutions but it is worth noting that studies undertaken as part of unpublished course development at St. Martin's College, Carlisle, showed similar results. The study's conclusions suggest that work is needed on how to engage students' understanding of scientific methodologies on a deeper, more philosophical level. It may be that, both the failings of formal qualifications, and students' difficulties with investigations, are explained by the fact that much learning in science still focuses on mastering knowledge and competencies, rather than developing an informed, reflective framework within which to employ knowledge and competencies.

Peter Hudson (2007) studied on “High-impact teaching for science”. Experiences in primary school science often impact on how science is perceived in adult life. To explore in detail what makes science classes interesting and memorable, 167 pre-service teachers were asked about their memories of primary school science education. Participants were all undertaking a Bachelor of Education degree at the same metropolitan university in Australia. Their positive experiences about science as primary students included having enthusiastic teachers, hands-on activities, group work, excursions, and taking part in useful, practical science activities.
Hands-on activities were most frequently recalled, with 74 of the respondents citing activities such as growing plants from seeds or ‘making mousetrap cars and racing them in the school’. Activities involving living creatures also rated highly, with 44 responses describing experiences of watching chicks hatch in an incubator or recording the development of tadpoles in an aquarium. Lessons where the science was relevant and useful outside the classroom, for example a simple electric circuit that ‘conceptualized the way electricity works and gave an understanding of the delivery of electricity to our home,’ were also positively remembered. Other, less influential positive experiences included the teacher’s enthusiasm for a particular topic, and excursions to planetariums, nature reserves and museums. Linking science to other areas of the curriculum was also memorable, as in one participant’s experience of making paper aeroplanes and then calculating their speed in a maths class. Negative influences included activities that were not engaging, denigration of students’ ideas and the teacher’s failure to explain an activity or the concept underlying it.

Jim Carolan (2008) studied on “Using representations for teaching and learning in science”. Research suggests that primary and secondary students learning science show more motivation and better performance if they are allowed to construct their own representations of the material. ‘Representational competence’ is a student’s ability to construct their own symbolic representations of a concept, encompassing scientific three-dimensional models, graphs and reports as well as generic classroom projects and discussions. Constructing representations is something that the better students tend to do for themselves automatically, re-representing the concepts they learn in other forms that are meaningful to them. Developing symbolic representations can also be explicitly taught. To do this, teachers need to be clear at all stages, especially the planning stage, about the key ideas that students are expected to learn. An ‘IF-SO’ framework can help to guide teachers through this process. First, they need to identify the key concepts. Then they need to focus on form and function and how these are interrelated. There must be a Sequence of representational challenges in order to show students that different types of representations reveal and highlight different aspects of a concept. Finally, there must be ongoing assessment by teachers of the student representations, as they provide a clear indication of the student’s
conceptual understanding. Rather than the teacher acting as a mediator between student and domain of study, a ‘dialogue’ should be emphasized between the student, teacher and domain that use both teachers’ and students’ symbolic representations as scaffolding for building better understandings.

Michaela (2008) studied on “Impact of teacher competencies on student emotions: A multi-method approach”. This study focuses on the impact of perceived teacher competencies on student well-being and anxiety in physics instruction. Student emotions are one important aspect of the educational process and supposed preconditions of sustainable learning processes. In the study, investigators combine both qualitative and quantitative methods using questionnaires and semi-structured interviews. In total, 431 students from 16 classes participated in this study: 24 students and eight physics teachers were participants of the qualitative study. Each teacher taught two classes, and therefore a comparison of the ratings of each teacher by students of two different classes was possible. The results of our study confirm the assumption that perceived teacher competencies have an impact on student emotions. Analysis of the qualitative data supports the quantitative results and demonstrates the importance of teacher competencies for student emotions. By comparing qualitative and quantitative results, investigators demonstrate the advantages and disadvantages of each method. Consequently, investigators suggest a combination of qualitative and quantitative methods.
2.50 SUMMARY OF THE RELATED STUDIES

The investigator reviewed the twenty-two related studies in India and twenty-three in foreign countries. The critical review of the Forty-five studies is given below. From the review of related studies, it is found that most of Indian studies were made on Teaching skills, classroom performance, Self-perception and Academic Achievement, Personality and Teaching competency. It is also found that most of foreign studies were made on Traditional Classroom Method and Competency Based Training Approach, Teacher Competency, Testing practices and perceptions, teacher classroom assessment and performance assessment, Pedagogic competency, and Attitudes toward science and science teaching as reflected in the science autobiographies.

From the review of related studies, it is observed that only a few studies were made on competency based teacher education in India. As far as the investigator’s knowledge goes, there is no study in India on “Assessment of student teachers of science - A competency based teacher education Approach”. A number of studies were made on competency based teacher education in foreign countries, especially in the United States of America. A few similar studies were made by taking different subjects like mathematics, history, adult education, vocational education, etc. Hence the investigator attempted to study the competency based teacher education approach in science in Tamil Nadu.
## Summary chart

### Indian Studies

<table>
<thead>
<tr>
<th>Sl. No</th>
<th>Investigator</th>
<th>Year</th>
<th>Level</th>
<th>Tools</th>
<th>Related Factor</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Sharma</td>
<td>1980</td>
<td>Student teacher</td>
<td>Indore Teaching competency Scale and General Teaching Competency Scale</td>
<td>Teaching skills and Teacher attitude</td>
</tr>
<tr>
<td>2</td>
<td>Lalitha</td>
<td>1981</td>
<td>Student teacher</td>
<td>General Teaching Competency Scale and Indore Teaching Competency Scale</td>
<td>Teacher attitude and classroom performance in terms of teaching competence</td>
</tr>
<tr>
<td>3</td>
<td>Sharma</td>
<td>1982</td>
<td>Student teacher</td>
<td>Indore Teaching Competency Scale and General Teaching Competency Scale</td>
<td>Teaching skills and Teacher attitude</td>
</tr>
<tr>
<td>4</td>
<td>Gupta</td>
<td>1983</td>
<td>Student teacher</td>
<td>Teaching Aptitude Test, Minnesota Teaching Attitude Inventory, Maudsley Personality Inventory, Classroom Evaluation Form and Flanders’ Interaction Analysis Categories</td>
<td>Taxonomical Performance and Classroom Performance</td>
</tr>
<tr>
<td>5</td>
<td>Bailkeri</td>
<td>1983</td>
<td>In service teacher</td>
<td>Mathematics Instructional Competence Scale, Remedial Self-Instructional Microteaching Course (RSIMC)</td>
<td>Instructional competence skill</td>
</tr>
<tr>
<td>6</td>
<td>Bawa</td>
<td>1984</td>
<td>Student teacher</td>
<td>General Teaching Competence Scale, Self Assessment Scale, Scale for Integration of Skills of Teaching, Ahluwalia Teaching Attitude Inventory.</td>
<td>Teaching competence</td>
</tr>
<tr>
<td>7</td>
<td>Joshi</td>
<td>1984</td>
<td>Student teacher</td>
<td>FIAC, Raven’s Standard Progressive Matrices (RSPM), and Ahluwalia’s Teacher Attitude Inventory (ATAI).</td>
<td>Evaluation of the behavioural model of teaching skill</td>
</tr>
<tr>
<td>8</td>
<td>Natarajan</td>
<td>1984</td>
<td>Student teacher</td>
<td>Criterion-referenced tests, Rosenberg’s Self-Esteem Scale and attitude scale.</td>
<td>Knowledge competency and performance competency</td>
</tr>
<tr>
<td>9</td>
<td>Sharma</td>
<td>1985</td>
<td>Student teacher</td>
<td>Baroda General Teaching Competence Rating Scale and Rating Scale of Attitude Microteaching</td>
<td>Teaching competence</td>
</tr>
<tr>
<td>10</td>
<td>Singh</td>
<td>1985</td>
<td>Student teacher</td>
<td>Ahluwalia’s Teacher Attitude Scale, Passi and Lalita’s Baroda General Teaching Competency Scale and Role Performance Self-Rating Scale.</td>
<td>Teaching competence, attitude towards teaching</td>
</tr>
<tr>
<td>11</td>
<td>Thakkar</td>
<td>1985</td>
<td>Student teacher</td>
<td>the BGTC Scale, Desai-Bhatt Group Test of Intelligence, instructional material, pre-recorded cassettes, observation and evaluation schedules for each skill,</td>
<td>Teaching competence</td>
</tr>
</tbody>
</table>
## Summary chart

### Indian Studies

<table>
<thead>
<tr>
<th>Sl. No</th>
<th>Investigator</th>
<th>Year</th>
<th>Level</th>
<th>Tools</th>
<th>Related Factor</th>
</tr>
</thead>
<tbody>
<tr>
<td>12</td>
<td>Kalyanpurkar</td>
<td>1986</td>
<td>In service teacher</td>
<td>General Teaching Competence Scale, Student Liking Scale, Raven’s Standard Progressive Matrices</td>
<td>Teaching competence</td>
</tr>
<tr>
<td>13</td>
<td>Dave</td>
<td>1987</td>
<td>Student teacher</td>
<td>General Teaching Competence Scale, Student Liking Scale, Student Liking Scale,</td>
<td>General Teaching Competence</td>
</tr>
<tr>
<td>14</td>
<td>Ekbote</td>
<td>1987</td>
<td>Student teacher</td>
<td>Baroda General Teaching Competence Scale, Teaching Effectiveness Comprehensive Scale, Skill Comprehension Paper-Pencil Test and Ahluwalia’s Teaching Attitude Inventory,</td>
<td>Integrating teaching skills</td>
</tr>
<tr>
<td>15</td>
<td>Rajameenakshi</td>
<td>1988</td>
<td>Student teacher</td>
<td>General Teaching Competence Scale, Student Liking Scale, Student Liking Scale,</td>
<td>General Teaching Competence</td>
</tr>
<tr>
<td>16</td>
<td>Manjula</td>
<td>2002</td>
<td>Students and teachers</td>
<td>competency test to teachers, achievement to students</td>
<td>‘Teacher competencies and Learners’ achievement</td>
</tr>
<tr>
<td>17</td>
<td>Shabnam Sinha</td>
<td>2003</td>
<td>teachers</td>
<td>instructional materials about training package</td>
<td>Teacher Perceptions</td>
</tr>
<tr>
<td>18</td>
<td>Devi</td>
<td>2005</td>
<td>Student teacher</td>
<td>Attitude scale developed by Ahluwalia, S.P.</td>
<td>Attitude towards teaching of the student teachers</td>
</tr>
<tr>
<td>19</td>
<td>Sahu</td>
<td>2005</td>
<td>Student teacher</td>
<td>Attitude scale developed, Self-perception scale</td>
<td>Attitude, Self-perception and Academic Achievement</td>
</tr>
<tr>
<td>20</td>
<td>Chandrasekar</td>
<td>2006</td>
<td>Student teacher</td>
<td>Attitude scale developed by the investigator.</td>
<td>student teachers’ attitude towards teaching profession</td>
</tr>
<tr>
<td>21</td>
<td>Shanmugaganesan</td>
<td>2008</td>
<td>Student teacher</td>
<td>Teaching Competency Inventory and Eysenck’s Personality inventory.</td>
<td>‘Personality and Teaching competency’</td>
</tr>
<tr>
<td>22</td>
<td>Singaravelu</td>
<td>2008</td>
<td>Student teacher</td>
<td>General Teaching Competency Scale developed by B.K.Passi and M.S.Lalitha.</td>
<td>Teaching competency</td>
</tr>
</tbody>
</table>
## Summary chart

### Foreign Studies

<table>
<thead>
<tr>
<th>Sl. No</th>
<th>Investigator</th>
<th>Year</th>
<th>Level</th>
<th>Tools</th>
<th>Related Factor</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Bolton Patricia</td>
<td>1984</td>
<td>Teacher</td>
<td>Teacher Competency Testing Scale</td>
<td>“Teacher Competency Testing practices and perceptions</td>
</tr>
<tr>
<td>2</td>
<td>Bethive Harris</td>
<td>1985</td>
<td>fifth, sixth, seventh and eighth grade students</td>
<td>Mathematics achievement test, competency based mathematics instruction</td>
<td>“The mathematics achievements and Competency Based Approaches</td>
</tr>
<tr>
<td>3</td>
<td>Lees Rosert Eugens</td>
<td>1985</td>
<td>Teacher</td>
<td>Vocational Teacher Competence Scale and personality</td>
<td>Vocational Teacher Competence and personality</td>
</tr>
<tr>
<td>4</td>
<td>Linden Patricia Ann</td>
<td>1985</td>
<td>Graduate teacher</td>
<td>competency based teaching Scale</td>
<td>Competency Based Teacher Education</td>
</tr>
<tr>
<td>5</td>
<td>Good Speed</td>
<td>1986</td>
<td>Regular class room teachers’</td>
<td>Pretest and post test</td>
<td>Teachers’ Competencies</td>
</tr>
<tr>
<td>6</td>
<td>Basson</td>
<td>1987</td>
<td>Teacher</td>
<td>Pretest and post test</td>
<td>Traditional Classroom Method and Competency Based Training Approach</td>
</tr>
<tr>
<td>7</td>
<td>Donald</td>
<td>1987</td>
<td>Student teacher</td>
<td>three separate times by three different trained observers</td>
<td>Training on teacher competence</td>
</tr>
<tr>
<td>8</td>
<td>Andry Kevin Michael</td>
<td>1988</td>
<td>College level</td>
<td>achievement test,</td>
<td>competency-based approach to teaching a college-level horn techniques course</td>
</tr>
<tr>
<td>9</td>
<td>Benson</td>
<td>1988</td>
<td>Teacher</td>
<td>Teacher instructional practices scale</td>
<td>Teacher instructional practices and student competency based education program</td>
</tr>
<tr>
<td>10</td>
<td>Chol-Ae-Kyung</td>
<td>1988</td>
<td>Business Teachers</td>
<td>123 competencies among the lists of competencies within each category</td>
<td>ranking of professional competencies for business teaches</td>
</tr>
<tr>
<td>11</td>
<td>Hall Mitchel Dean</td>
<td>1988</td>
<td>High school Principles</td>
<td>Principles perception scale</td>
<td>Principles perceptions of the competencies and related skills for School Administrator</td>
</tr>
<tr>
<td>12</td>
<td>Little Sharon</td>
<td>1988</td>
<td>Fifth grade students and teacher</td>
<td>competency test</td>
<td>teacher estimates of content coverage and student performance</td>
</tr>
</tbody>
</table>
### Summary chart

**Foreign Studies**

<table>
<thead>
<tr>
<th>Sl. No</th>
<th>Investigator</th>
<th>Year</th>
<th>Level</th>
<th>Tools</th>
<th>Related Factor</th>
</tr>
</thead>
<tbody>
<tr>
<td>13</td>
<td>Douglass Rebecca Suran</td>
<td>1990</td>
<td>Post Secondary Institutions</td>
<td>Competency Based Vocational Education scale</td>
<td>Competency Based Vocational Educations</td>
</tr>
<tr>
<td>14</td>
<td>Robinson Marion Clay</td>
<td>1990</td>
<td>Secondary Business Education Teachers</td>
<td>Questionnaire</td>
<td>Secondary Business Education Teachers Perceptions and Competency-Based Education</td>
</tr>
<tr>
<td>15</td>
<td>Segal Marietts</td>
<td>1991</td>
<td>Grades one to Six</td>
<td>visual pre-test scores, Stanford achievement test and metropolitan achievement test</td>
<td>compensatory pre-Kindergarten curriculum emphasizing representation competencies</td>
</tr>
<tr>
<td>16</td>
<td>Gautheir</td>
<td>1994</td>
<td>Preservice Elementary Teachers’</td>
<td>Autobiographies and Informal interviews</td>
<td>Attitudes toward science and science teaching as reflected in the science autobiographies</td>
</tr>
<tr>
<td>17</td>
<td>Ross</td>
<td>1994</td>
<td>Eighth grade English and mathematics teachers</td>
<td>state functional tests and state performance assessments</td>
<td>teacher classroom assessment and performance assessment</td>
</tr>
<tr>
<td>18</td>
<td>Etelvina</td>
<td>2000</td>
<td>University Professor</td>
<td>diagnostic testing</td>
<td>Pedagogic competency</td>
</tr>
<tr>
<td>19</td>
<td>Waldrip</td>
<td>2001</td>
<td>Primary science students</td>
<td>Questionnaire on Teacher Interaction</td>
<td>Assessment of teacher-student interactions and teachers’ perceived competence</td>
</tr>
<tr>
<td>20</td>
<td>Rutledge</td>
<td>2006</td>
<td>Student teachers</td>
<td>student teachers' confidence scale</td>
<td>student teachers learning to work on process skills with children aged 4 – 11</td>
</tr>
<tr>
<td>21</td>
<td>Peter Hudson</td>
<td>2007</td>
<td>Pre-service teachers</td>
<td>pre-service teachers’ memories of primary school science education</td>
<td>Experiences in primary school science often impact on how science is perceived in adult life</td>
</tr>
<tr>
<td>22</td>
<td>Jim Carolan</td>
<td>2008</td>
<td>Primary and secondary students</td>
<td>representations of a concept, encompassing scientific three-dimensional models, graphs and reports</td>
<td>Representational competence’</td>
</tr>
<tr>
<td>23</td>
<td>Michaela</td>
<td>2008</td>
<td>Students and eight physics teachers</td>
<td>questionnaires and semi-structured interviews</td>
<td>Impact of teacher competencies on student emotions</td>
</tr>
</tbody>
</table>
2.60 DOCUMENTATION

2. Ibid, abstract No1098, P 957.
5. Ibid, abstract No 1037, P 919.
8. Ibid, abstract No 1114, P 967.
11. Ibid, abstract No 1166, P 1000.
15. Ibid, abstract No 1132, P 978.


40. Etelvina Maria Valente dos Anjos Silva, “Pedagogic Competency of the Brazilian University Professor”, Federal University of Vicosa, Vicosa, Brazil. Visiting Fellow - Science Mathematics Education Centre, Curtin University of Technology, Perth, West Australia.


