CHAPTER – II
REVIEW OF RELATED LITERATURE

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“A familiarity with literature in any problem area helps the students to discover what is already known what others have attempted to find out, what methods of attack have been promising and disappointing and what problems remain to be solved”.

(Best & Kahn, 1993)

Review of related literature in the concerned field is of greater significance in locating the research problem. Hence, it plays the pivotal role at the crucial juncture of planning of the study. Review of related literature is an intellectual pursuit, essential to the development of the problem and to find out an effective approach to its solution.

Practically all human knowledge can be found in books and libraries, unlike other animals that must start with each generation. Man builds upon the accumulated and recorded knowledge of the past.

The phrase ‘Review of Literature’ consists of two words:-

a) **Review**: The terms ‘review’ means to organize the knowledge of the specific area of research to evolve and edifice knowledge to show that the proposed study would be an addition to this field.

b) **Literature**: In research methodology, the term ‘literature’ refers to knowledge of a particular area of investigation of any discipline which includes theoretical, practical and its research studies.
“The literature in any field forms the foundation upon which all further work will be built. If we fail to build the foundation of knowledge provided by the review of literature, our work is likely to be shallow and native and will often duplicate work that has already been done better by someone else”.

(W.R Borg, 1979)

2.1 PURPOSE OF THE REVIEW OF LITERATURE

The importance of related literature cannot be denied in any research. It works as guidepost not only with regard to the quantum of work done in the field but also enables us to perceive the gaps and lacuna in the concerned field of research. The similar or related studies carried out by researchers at various levels are called review of related literature. The various sources of it are the research reviews and survey books, journals, newspapers, records, documents, indexes, abstracts, dissertations, online references and others information directly or indirectly connected with the problem of investigation. Importance of related literature can be presented as below:

I. It is crucial to minimize the risk of dead ends, rejected topics, rejected studies, wasted efforts, trial and error activity oriented towards approaches already discovered by previous investigations and even more important erroneous findings on a faulty research design.

II. It makes study comparative and critical.

III. It provides ideas, theories, explanations or hypotheses in formulating, solving the problem and interpreting the findings.

IV. It also suggests method of suitable research to the problem.

V. Thorough and comprehensive evaluation and synthesis of the sources are the qualities of related literature.

From the above discussion, it is clear that for any worthwhile investigation, a review of related literature in the field of investigation is of great help to the investigator. The investigator tapped the various sources of available literature pertaining to the problem of present study. In the present study, a comprehensive review of related studies conducted in India and abroad is classified year wise under
the following heads:

- Studies related to Use of ICT.
- Studies related to Teachers’ Morale.
- Studies related to Attitude towards ICT.
- Studies related to Technology Competence.

2.2 STUDIES RELATED TO USE OF ICT

Abas (1995) suggests that access to computer in different locations may help to create a computer using culture among teachers. Because she found that while computers were supplied for students’ use, almost none were available specifically for teachers’ use. Pelgrum (2001) also found computer unavailability/insufficiency as a main obstacle to computer use by teachers examined from 26 different countries.

Evans-Andris (1995) reported that teachers whose schools had possessed computers for at least 5 years revealed that teachers shape their interaction with computers through their style of computing. Three styles were shown to include almost all the participating teachers. These were avoidance (60%), integration (28%), and technical specialization (8%). However, Russell (1995) presented stages of technology adoption. According to research, adults learning new technology pass through six stages on their way to becoming confident technology users. These learners may begin at any point and progress through at their own rates. The stages include (a) awareness, (b) learning the process, (c) understanding and application of the process, (d) familiarity and confidence, (e) adaptation to other contexts, and (f) creative applications to new contexts.

A study relating to effectiveness of computer software conducted by Joshi & Mahapatra (1995) found that students taught through software package significantly did better than those taught through conventional method. Similarly, Bhangoo & Sidhu(1997) studied the impact of selected audio-visual aids on food hygiene knowledge of secondary school students. They found that students of experimental group taught through visual materials performed better than those of the controlled group.
Research into pedagogy and ICT in the UK was carried out by Moseley & Higgins (1999). It focused upon the teaching of numeracy and literacy in primary schools using ICT. The research drew upon school improvement methodologies and made use of a model of teaching and learning. An important factor determining teachers’ behaviours, according to the model, is Pedagogical Content Knowledge, which is defined as ‘the blending of content and pedagogy into an understanding of how particular topics, problems, or issues are organised, represented and adapted to the diverse interests and abilities of learners, and presented for instruction’. The researchers studied the attitudes of a small sample of teachers. They found that teachers who successfully made use of ICT had the following characteristics: A positive rather than negative attitude towards ICT. Teachers who have positive attitudes towards ICT will be positively disposed towards using it in the classroom.

Alessi & Trollip (2001) who asserted that computer based instruction in classroom learning environment with ICT could motivate and stimulate students to work at their own pace, while offering students the opportunity to learn more by themselves. Therefore, the use of ICT was considered to be an effective way of nurturing meaningful communication between teachers and their students, and fostering creative learning and problem solving (Ramsay, 2001).

Use of ICT can make contributions to the promotion of independent learning was the finding of the study made by Goodison (2002), who investigated the UK primary school children’s awareness of the linkage between ICT and the way they learn within the context of a school. Pupils were interviewed by their teacher and extracts from the dialogue, identified examples of good practices.

A study ‘The impact of ICTs on pupil learning and attainment’ conducted by Harrison, et al. (2002) showed that pupils, teachers and parents considered that ICT has a positive impact on pupils’ learning, there has been an improvement in their pupils’ subject-related performance and their basic skills (calculation, reading and writing). In addition, teachers also considered that academically strong students benefit more from ICT use. Knezek & Christensen (2002) also found that teachers’ access to technology tools has a major impact on the quality of computer use on the part of the teachers. The researchers’ conclusion has been widely supported by
studies on the use of computers in education (e.g., Isleem, 2003; Blankenship, 1998).

Effects of national culture on students’ use of the Internet and the differences between Chinese and British students in terms of use of the Internet were explored by Li (2002). The researcher found that there were differences in Internet experience, attitudes, usage, and competence between Chinese and British students. Most of these differences were related to students’ national culture. In Taiwan Liang & Chao (2002) conducted a study “Investigating into the Internet literacy of elementary and junior high school teachers” on Taiwans’ younger teachers and findings showed that they were more literate on Internet. Sherry & Gibson (2002) claim that technological, individual, organizational, and institutional factors should be considered when examining ICT adoption and integration.

In context of distance education, a study on ICT adoptability in developing countries was conducted by Rajesh (2003) (as cited in Cohen), who found the lack of appropriate infrastructure for enabling the use of ICT for Distance Education a serious bottleneck and the perceptions and attitudes of a political system greatly affect the acceptance and growth of technology in any society. The same holds true for all the ICTs relevant to Distance Education.

‘Innovation in Learning, Organisation and Technology’ was a study conducted by ITU and the University of Oslo (2004) in Norway. In this study 52% of the students asserted that ICT increased their performance in school subjects, a figure confirmed by the overwhelming majority of teachers (83%). This study showed that both reading and writing levels were higher than what was typical for students who did not use computers and observations verified that students use ICT more frequently and in a more advanced manner – away from entertainment sites and toward educational resources. The qualitative analysis also showed that text production increased, leading to increased competence in writing, argumentation and reflection skills.

The most comprehensive and accessible national ICT survey was conducted by Toots, et al. (2004) (as cited in Plomp,2009) within the Central and Eastern European context named ‘Tiger in Focus Study from Estonia’, a longitudinal survey
on ICT in Estonian schools (2000-2004). The study looked the progress that had been made with ICT in Estonian schools. It focused on the use of ICT as a tool for learning within a specific subject domain, assessed students’ and teachers’ ICT skills and self perceived competences. The study analyzed the impact of ICT developments on the teaching process and pedagogy in Estonian schools. It identified two types of teacher: the “classical type” and the “constructivist type”. They differ most significantly in performance assessment and spatial organisation of learning. Constructivists allow pupils to visit the library and the computer class to do their study tasks, arrange work stations and keep all learning tools including PCs freely accessible for students. They also encourage student involvement in the assessment process. The study concluded that there is a potential for pedagogic innovation in schools but the process is still beginning with the majority of teachers stressing the importance of information searching, word processing and analysis. Constructivists are willing to implement a more individual approach to learning based on student’s interest and pace of learning. Only a few are prepared to involve students in the planning of the learning process, select topics or set deadlines for tests.

Bauer & Kenton (2005) stated in their study that although teachers were having sufficient skills, were innovative and easily overcame obstacles, they did not integrate technology consistently both as a teaching and learning tool. Reynolds, Treharne & Tripp (2003) also underlined continuing problems in the adoption of ICT by teachers and stated the need for further research on how ICT can improve education.

A research on teacher perspectives on integrating ICT into subject teaching was conducted by Hennessy, Ruthven and Brindley (2005) which described the integration of ICT into mainstream classroom practice in English subject by secondary school teachers. Teachers emphasized both the use of ICT to enhance and extend existing classroom practices and change in terms of emerging constraints.

Higgins et al. (2005) carried out a study entitled ‘Embedding ICT in the Literacy and Numeracy Strategies.’ Results showed that one year after the introduction of interactive whiteboards, pupils’ performance improved more in
literacy, mathematics and science tests compared to pupils in other schools. Yet, this small though statistically important gain was not sustained into the second year of implementation. There was also some evidence that the use of interactive whiteboards improved the performance of low-achieving pupils in English and the overall impact was greatest on writing.

In Netherlands, school inspectorate named *ICT Monitor (2005)* conducted a study ‘Eight years of ICT in schools’ to find out developments in the field of ICT in schools in past eight years (since 1997) on the basis of yearly ICT monitors. Objectives included analysis of ICT in the teaching and learning process; ICT infrastructure and facilities; Policy and ICT; skills and notions; ICT in management and education support processes; developments of pressure points following the introduction of ICT. Findings revealed that teachers are becoming more and more convinced that the educational achievements of pupils improve through the use of ICT. Around 60-70% of teachers in primary and secondary education believed this in 2003-2004, as opposed to only 22% in 1997-98. The sharpest increase was seen in 2000-2001 with already 51 % of teachers being convinced.

A project named ‘ITMF- ICT Media and Primary & Lower Secondary Education Schools’, was done by *Ramboll Management Denmark (2005)*. The project ran from 2001 to 2004 with the aim to strengthen the pedagogical use of ICT and to make ICT an active incentive in the everyday life of schools via development and best practice projects and other media in education. The outcomes of the evaluation showed that most of the goals were principally achieved by the project. However, the idea behind the Project to support the use of ICT and media consciously as a tool for learning basic skills (reading, writing, arithmetic and language skills), only penetrated with regard to a minority of the teachers. For instance, only 31 % of teachers believed that the aim of ICT use is to support the pupils’ writing skills, in spite of the fact that word-processing is used in education by 72% of teachers.

To study the relationship between ICT and variables like awareness, use and need, *Shah (2005)* conducted a research on secondary and higher secondary teachers. A scale was constructed to collect the data regarding ICT awareness, use
and need of a teacher with respect to different components of ICT, like, computer, Internet, OHP, LCD Projector, Radio, TV. There was found a low degree of ICT awareness, use and need of secondary and higher secondary teachers. The variables related to ICT awareness of teachers were teaching experience, age and total salary. The variables related with the ICT use of teachers were total salary and computer training. The variable related with the ICT need of teachers was the degree program which they attended at the university level.

In continuation with the use of ICT and its applications, Underwood et al. (2005) conducted a study ‘Impact of Broadband in schools’. They underlined the crucial importance and impact of broadband connections, and clearly demonstrated the benefits and advantages that this investment can bring to schools. More specifically, in the year immediately following the installation of broadband, significant improvements took place in pupils’ performance on national tests taken at age 16.

Jegede (2006) conducted a study ‘A study of the predictors of teacher educators’ behaviour towards ICT in furtherance’ and observed that 80% of almost 500 teacher educators who participated in a related study use ICT to teach. In another study based on e-learning Nordic (2006) suggested that more frequent ICT users Perceived a greater positive impact of ICT in general and did not see it as a waste of time once they got over a certain threshold. The study provided strong evidence that ICT has enabled teachers to cooperate more and share curriculum plans with colleagues and managers, which saves time in the preparation of lessons.

The results were presented in a paper based on study conducted by Jamieson-Proctor, Watson & Burnett (2006) from a teacher survey that measures the quantity and quality of student use of ICT. Results from 929 teachers across all year levels and from 38 Queensland state schools indicate that female teachers (73% of the full time teachers in Queensland state schools in 2005) are significantly less confident than their male counterparts in using ICT with students for teaching and learning, and there is evidence of significant resistance to using ICT to align curriculum with new times and new technologies. The level of information and communication technology use by university teachers was found satisfactory in a study conducted by Khan (2007).
Markauskaite (2006) investigated gender differences in self reported ICT experience and ICT literacy among first year graduate trainee teachers. The study revealed significant differences between males and females in technical ICT capabilities and situational and longitudinal sustainability.

Balanskat, Blamire & Kefalla (2007) identified the factors as teacher-level, school-level and system-level. Teachers’ integration of ICT into teaching is also influenced by organizational factors, attitudes towards technology and other factors (Lim & Chai, 2008).

Gulbahar (2007) claimed that huge educational investment has produced little evidence of ICT adoption and use in teaching and learning especially in Turkey. Evidence suggests that education sector is investing heavily on ICT but ICT adoption in education sector lagged behind the business sector (Leidner & Jarvenpaa, 1995). Several surveys are carried out to investigate the factors that are related to the use of computer technology in teaching and learning processes by teachers (Baek, Jung & Kim, 2008).

The relevance of ICT in education was explored by Khirwadkar (2008) with a special focus on teachers’ training Multimedia Package for laboratory method in teaching of chemistry at pre-service level developed by the researcher and tried on sample of 18 B.Ed. students of the year 2005-06 batch offering teaching of chemistry as a method. The results revealed effectiveness of the developed multimedia package in learning the concept of management of chemistry laboratory over the conventional approach.

Mouzakis (2008) conducted a study on teachers’ perceptions of the effectiveness of a blended learning approach for ICT teacher training. The findings indicated that the teachers were satisfied with both their participation to the course and the knowledge they acquired from the training.

Philip (2009) conducted a study on ICT attitude, competence, and use pattern of teacher educators and effect of age of educators on time used in interacting with ICT in Nigeria. Findings revealed that age does not significantly affect attitude of teacher educators towards computer, age is not significantly related to computer use pattern, no significant difference between age and time spent by
teacher educators on the computer and no significant difference between age and computer competence of teacher educators.

**Yukselturk & Bulut (2009)** reported that gender gap has reduced over the past years, presently, a greater number of females than males have used internet and web 2.0 technologies.

The focus of the study conducted by **Mumcu & Usluel (2010)** is to determine the teachers’ usage of Information and Communication Technologies (*ICT*) in vocational and technical schools in Turkey according to their age, level of education, opportunity of access to computers and ways of learning to use computers. Study group of the research was four hundred and sixteen teachers from vocational and technical schools in Turkey. Data were obtained through a questionnaire which was designed by the researchers. One-way analysis of variance (ANOVA) was used to analyze the data. The results of the analysis reveal that teachers use *ICT* most frequently for managerial purposes, and the least for instructional purposes and there is a significant difference in teachers’ usage of *ICT* based on their ages, level of education, opportunity of access to computers, ways of learning to use computers. Level of education appears as the variable which has the greatest effect on teachers’ purposes of using *ICT*.

**Abbas Zare-ee (2011)** conducted a study to explore the views about the instructional benefits of *ICTs* in higher education. The analyses of data showed that Iranian university teachers strongly agreed with the educational benefits of *ICTs* in higher education. In spite of this, they reported infrequent uses of *ICTs* for research and instruction. Limited resources and facilities, insufficient skills, lack of time for initial preparations, and policy-makers’ little support and encouragement were reported as the most serious problems facing university teachers in the use of *ICTs*.

**King & Dow Su (2011)** conducted a study to design information communication technology (*ICT*) courses related to experimental chemistry for junior college freshmen (aged from 16 to 18), entitled ‘*ICT*-integrated environmental learning’, and to assess the learning performance of these students after completing the courses. The result analysis verified that *ICT*-integrated environmental learning has a more significant effect on the students’ learning
performance. It was recommended to design an effective approach for upgrading students’ cognizance and learning attitudes. The results obtained from ICT-integrated environmental learning when compared with other chemical experimental results show the same positive and scientific perspective for academic research.

Neyland (2011) reported that factors such as institutional support as well as micro factors such as teacher capability influence the use of online learning in high schools in Sydney.

Study to examine facilities of ICT in the improvement of a school has been conducted by Tosun & Baris (2011). Results indicated that the use of ICT not only encourages the students and teachers in terms of education but also they motivate students in a positive direction. In the restoration and development of education, use of ICT which is actively integrated with www (World Wide Web) is a significant catalyst. For the active integration of ICT with education, firstly a good hardware platform must be presented and better training of teachers is required. Finding technical support staff for solving problems which may arise during education is also important. As the use of ICT gets widespread in schools, students will have equal opportunities to access ICT.

A research on teacher perceptions of the challenges related to implementing Information and Communication Technology (ICT) was conducted by Plessis & Webb (2012). Results suggested that, despite the fact that schools were provided with computers and teacher training, several first and second order barriers still exist. Examples of these barriers are insufficient ICT resources for the large classes that have to be taught, lack of project leadership within the schools, and a need for ongoing training and support. These barriers appear to have not allowed the teachers and schools to go beyond an initial integration phase.

Yang (2012) explored the use of computers by Taiwanese teachers and examined teachers’ actions, beliefs, and the contexts they teach in so as to illuminate issues related to the implementation of computers for instructional purposes. Major findings in terms of beliefs indicate that teachers consider technology to have a dehumanizing impact on English language learning (ELL) and teaching. They also consider that technology is useful for efficient classroom management. Further,
while teachers believe that technology motivates students, it can also be distracting to students and encourage off-task behavior. They also believe that technology implementation requires more time than it is worth. In terms of context, this study revealed that when technology is used, teacher centeredness and control remains.

**Bozdogan & Ozen (2014)** conducted a study to identify both level and frequency of ICT technology use and factors affecting perceived self efficacy levels of pre-service English Language Teaching (ELT) teachers’ ICT self-efficacy. The responses were analyzed in frequency and percentages using descriptive statistics within the framework of Technology Acceptance Model (TAM) based on Social Cognitive Theory and the content analysis technique. It could be concluded that majority of the pre-service ELT teachers find themselves self-efficacious in the use of ICT. Results further suggest that the perceived use of computers, experience and confidence play significant role while lack of knowledge and skills, technical problems and lack of confidence negatively influence ICT self efficacy.

Study to examine teachers’ motivation as a great mediator for teachers’ readiness in applying ICT in their teaching and learning was conducted by **Copriady (2014)**. This was a quantitative study using a survey method, involving a total of 874 high school teachers in Indonesia, including 446 science teachers and 428 social science teachers. Data was analysed using path analysis (path analysis/ SEM) with AMOS software version 18. The results indicated that motivation is a significant variable as a mediator between the variables of readiness with ICT application in teaching and learning science and social science. Analysis of structural equation path model (SEM) shows that the data used in this study has a reasonable suitability for the proposed regression model. Thus, it is proved that the two independent variables are linked directly and indirectly to the dependent variable of the study which is the application of ICT in teaching and learning. The implication of this study is that the governments and ministry of educations take into account teachers attitudes and motivations in terms of ICT application and address this issue by providing sufficient infrastructure, equipments, facilities, and training for teachers to develop positive attitudes towards ICT use in education.

Effective use of ICT in the classroom is challenging because it requires complex application of technological, pedagogical and content knowledge this was
concluded by Gill, Barney & Lauren (2014). With major findings: 1. The lack of sophistication of pre-service teachers’ planned use of ICTs in their teaching, early in their development suggests that the ICT skills they bring from their prior studies or from their social and private lives don’t necessarily translate into awareness of use for teaching. 2. Observing ICT use for learning and teaching ultimately provided students with the opportunity to become critical about the work of others however students exhibited a tendency early in their development to adopt strategies modeled without questioning their applicability across context. This was particularly problematic in cases where students expressed the intention to apply strategies in primary school classrooms, such as the use of PowerPoint for presenting content, in ways that they had seen modelled in university lectures. 3. The fact that students’ placement experiences varied greatly with some students experiencing noticeable development as a result of placement opportunities and others being provided with limited opportunities to use ICTs on placement due to discouragement by their mentor, highlights the importance of teacher mentors on placement having a level of experience and understanding of the use of ICTs for teaching and learning. 4. The significant progression in some students’ development as a result of university assessment tasks requiring them to design, evaluate and reflect upon an application of ICTs for learning and teaching on placement, suggests that despite the barriers to doing so, there is substantial value in aligning university assessment and placement expectations in relation to ICTs. 5. The learning benefits experienced by some students through participating in the research, specifically as a result of the explicit opportunities for reflection that the interviews provided highlights the importance of deliberate opportunities for critical reflection on ICTs for learning and teaching within a course.

Albugami & Ahmed (2015) explored the factors affecting the successful implementation of ICT in schools, the study was primarily concerned with qualitative data, collected in semi-structured interviews with two ICT directors, four headmasters, four teachers and four students, in Saudi secondary schools. The results showed that ICT was perceived as an important tool in improving performance, collaboration, learning experience and learning outcomes. However, some challenges that affect the application of ICT in Saudi schools were, for
example, the lack of space, resources, maintenance, a lack of ICT skills among school along with a lack in ICT training and a lack of clear ICT policies. However, the overcoming of these obstacles could turn these barriers into positive factors to aid in the success of ICT implementation.

Chandra (2015) reported in her study that how the salary and work conditions of contract teachers in India as well as the lack of adequate training negatively impacts teachers’ motivation, morale and long-term commitment to teaching, with potentially serious implications for education quality.

Elżbieta Gajek (2015) reported that the main ICT-related factors influencing regular use of ICT by teachers were: comfortable access to technology, confidence in own ICT skills and perseverance in dealing with technical problems, willingness to use the Internet as a professional development tool and strong appreciation of the motivational role of international communication and collaboration of teenagers via ICT in order to make sense of learning.

The aim of research conducted by Lim (2015) was to understand and develop theory concerning how teachers deal with information and communication technology (ICT) integration, utilising grounded theory methods. Findings revealed that teachers tended not to make radical changes to their teaching methods when responding to the challenges of integration. Instead, they went through a selective process of deliberative adaptation which involved the major categories of acknowledging, adapting, appraising and keeping pace.

2.3 STUDIES RELATED TO TEACHERS’ MORALE

In an article “Factors Affecting Teacher Morale” Ellenburg (1972) presented major conclusions of several studies of teacher morale and pointed out the implications for school administration. He compared student achievement with the morale of teachers in 12 secondary public schools in Dearborn, Michigan, and found that student achievement increased under teachers with high morale and decreased under teachers with low morale. High morale simply helped create a more conducive, inviting, and stable learning environment.

Outlining of five critical components of teacher morale was given by Cook (1974) i.e. administrative leadership, administrative concern, personnel interaction,
opportunity for input and professional growth. For each component, the author lists behavioural symptoms of a morale problem and ways the administrator can diagnose the difficulty and prescribe a solution.

**Pillai (1974)** conducted a study on ‘Organisational Climate -Teacher Morale and School Quality’ to determine the extent to which the organisational climate of the schools and faculty morale in the schools were related to the quality of schools. The sample consisted of 190 secondary schools, selected from Tamil Nadu state. The tools administered were: The Organisational Climate Description Questionnaire of Horpin & croft; The Bantley & Rempell’s Prude Teacher Opinionnaire; An Inventory prepared by the investigator to assess the innovative ability of the school and a questionnaire for demographic data and pupil performance data. Pearson product-moment correlation was used to analyse the data. The major findings of the study were as follows: Performance of pupils was significantly better in open and autonomous climate schools than in schools of other climate type. Performance of pupils in high morale schools was superior to that of the average morale schools, which in turn was better than the low morale schools. The ability of school to introduce innovation in educational practices was higher in high morale schools than the average or low morale schools. Higher the faculty morale, quicker and better was the school introducing newer practices. Both climate and morale were positively and highly related to both criteria, namely pupil performance and innovative ability of schools. Curricular issues, school facilities & services, community support of education, rapport among teachers, teacher salary, satisfaction with teaching, teacher support with principal, community pressures, teacher status and teacher load were found to contribute to pupil performance in schools. The innovative ability of the school was significantly related to the three climates viz. esprit, thrust and disengagement. The four morale dimensions namely, school facilities & services, curricular issues, teacher salary and community pressure were found to influence the innovative ability of the schools. There was high correlation found between climate and morale.

A study ‘Certain social psychological variables relating to teachers’ morale at secondary and college levels’ was undertaken by **Chnabra (1975)** with the
following objectives in view: 1. To make a comparison survey of sample of secondary and college teachers of Meerut district relating to variables like morale, teachers adjustment, study habits and values. 2. To explain differences on the said variables relating to gender, length of teaching experience and level of academic attainment. Some of the major findings were: 1. Female teachers possessed higher morale than male teachers. 2. Level of academic attainment had no bearing on teacher’s morale. 3. There was a positive and significant correlation between morale & study habits and morale & adjustment. 4. There was a negative relationship between morale and economic values of male teachers. 5. As far as morale and political values are concerned, the relationship was positive with respect to male teachers and it was absent in case of female teachers. 6. Positive relationship existed between morale and study habits. 7. The teachers’ adjustment had no relationship with their professional experience. 8. Length of teaching experience did not show significant relationship with study habits. 9. Male teachers placed prime importance to aesthetic values and social values, whereas female teachers gave this place to religious values. 10. It was found that Principal’s interest in teachers and their problems, lack of co-operation among teachers, interdepartmental and intradepartmental conflicts, contacts with students, salary policy, regularity of payment, feeling of economic security, prestige and status given to teaching profession and teacher-taught ratio were some of the factors affecting teacher morale.

**Sharma & Qurashi (1975)** conducted a study on teacher morale and organizational climate of selected secondary schools from Baroda. The study explains that teacher morale was comparatively high in case of open and familiar climate type of schools. It is because teachers’ high social need satisfaction in open and familiar climate whereas in closed, controlled and paternal climate teachers do not enjoy a high degree of social need satisfaction and the result is that morale scores were found to be comparatively low in the schools belonging to these climates.

**Laird & Joseph (1976)** related teacher morale to the leadership behaviour of the principal in a study on vocational technical teachers at 14 vocational centres in
Maryland. The results indicated that teacher morale was significantly related to the principals’ system orientation as well as his personal orientation. Teacher morale has a direct reflection on the operation of the school, reported Washington & Wastson (1976). Yet, the authors state, teacher morale is too often placed at the bottom of the list of administrative priorities.

Dekhtanwale (1977) conducted a study ‘Teacher morale in secondary schools, of Gujarat’. The important objectives of the study were: 1. To construct and standardize a teacher morale inventory to measure morale of secondary school teachers of Gujarat state; 2. To study the morale of teachers in schools of Gujarat in relation to various regions, area, types of schools, size and achievement of schools; 3. To subject the result of the developed inventory to factor analysis. The teacher morale inventory was standardized. The sample comprised of 1,220 secondary school teachers. Means, Standard Deviations and ‘t’ values were found out. The Major findings of the study were: 1. Teachers of south Gujarat region possessed highest morale whereas Kutch-Saurashtra manifested lowest morale. 2. There was significant relationship between teacher morale and achievement of students, but no significant relationship was found in relation to size of the schools, types of the schools and area of the schools. 3. No significant relationship was found between teachers’ morale and teachers’ experience. 4. Through factor analysis, thirteen factors were extracted. These were teacher characteristics and leadership behaviour, teacher feelings towards teaching profession, teacher cheerfulness, group cohesiveness, rationality & efficiency towards the teaching profession, leadership behaviour & teaching profession, leadership behaviour & teaching efficiency, satisfaction with the school climate, school climate & teacher work load, feelings towards the institution, community support, teacher zeal and extra effort, satisfaction towards the job and attitude towards the job.

Chisson & Stanford (1979) explored the morale patterns of a group of 123 student teachers over the course of a 14 week period. High and low morale patterns varied between groups of pre-service teachers depending on their projected grade level specification. Early childhood, elementary, and secondary levels of education were considered.
The relationship between the teachers’ attitudes towards profession and their morale and classrooms behaviour patterns of teachers was investigated by Jain (1982). The sample of the study consisted of 100 trained graduate teachers teaching mathematics in class VII of government higher secondary schools of Delhi. Some of the findings were as: Sex was not significantly related to any dimension of the teacher’s morale, Pupils interacted more in the classes of teachers who enjoyed rapport with the principal. The interference of the community in educational programme was not favoured by teachers.

Bruno (1983) explored the low level of teacher morale at inner city school. The findings of the study show that “ethical” stressors such as racial tension among faculty, falsifying of school records, and sexual harassment by school officials are the major factors contributing to teacher exit and absenteeism.

The ‘professional factors influencing Teacher Morale’ were studied by Saxena (1987). The findings of this study were: 1. Teachers’ rapport with principal leads to high morale. 2. Teachers’ rapport with other teachers does not affect teacher’s morale. 3. Teachers’ personal satisfaction with teaching does not affect teachers’ morale. 4. Teachers’ morale is affected by their states. 5. Teachers’ work-load affects teachers’ morale.

An extensive study about factors influencing teacher morale was conducted by Lunsden (1988). The findings indicated that Administrative support and leadership, good student behaviour, a positive school atmosphere, and teacher autonomy are working conditions associated with higher teacher satisfaction. The study also revealed that parental support and teacher’s perceptions of students and student learning are some of the important factors influencing teacher morale.

The purpose of the study by Nidish and Nidish (1988) was to determine factors contributing to teacher morale using a wide range of administrator/teacher and teacher/teacher and organisational climate variables. Findings indicate that the ability of teachers to agree on the priority of goals is the main predictor of teacher morale.

Young (1988) in a study examined school-level factors associated with improved teacher morale as one measure of effective high schools. The sample
included 212 teachers from 28 rural and urban high schools in Western Australia. Data analysis using the Multilevel Linear model focused on teacher responses to the School Level Environment Questionnaire (SLEQ), which includes eight subscales measuring relationship, personal, and self-concept and academic self-concept (teacher efficacy), and the teacher morale scale of the school organizational Health Questionnaire. Teacher morale varied both within and between schools. Teacher morale appeared to be a useful indicator of healthy and effective schools, with a reasonable correlation with SLEQ scales. Six SLEQ scales explained differences in teacher morale, both across and within schools: teacher affliction, professional interest, mission consensus, empowerment, innovation, and work pressure. Teacher self-concept, both general and academic, had little effect on teacher morale, suggesting that morale was influenced by outside factors.

Interschool visitation as a method of improving teacher morale and instructional effectiveness is discussed in the study conducted by Campbell (1990). The study was specially intended for school principals. The principal’s role is crucial, and several steps that he/she should consider when planning and implementing a visitation are suggested. These include determining the need, choosing participants, and coordinating logistics of the visit. Advantages of interschool visitation include improved teacher self-esteem and increased learning of teaching techniques and materials, which in turn contribute to more effective teaching and more productive student learning.

About Atlanta (Georgia) public school teachers’ morale, Fraser (1990) conducted a study. Nearly 40 percent of the teaching staff (1,520 teachers) voluntarily completed a 91-item questionnaire that contained subsets of questions from the Moslach Burnout Inventory and three subscales of emotional exhaustion, departmentalization, and personal accomplishment. Results indicate the following findings: 1. Fifty five teachers were in some stage of burnouts; 2. overall school climate affected teachers’ attitudes; 3. A total of 61 percent frequently or continuously received tangible rewards from teaching that made them enthusiastic about their goals; 4. only 21 percent indicated that they never felt that if they had it to do over again that they would be teachers; 5. seven percent never felt they had
adequate supplies and materials; 6. teachers indicated that they believe; they had higher expectations for student performance than 2 years ago, and they believed students have increased their belief in their ability to learn; 7. Twenty two percent felt they were encouraged by opportunities for advancement; 8. while on the job, 61 percent of the teachers often helped students with non-academic problems and received support and encouragement from their principals.

The most common stressors for teachers which influence their morale are identified by Rogers (1992). Researcher explained both internal and external factors as influencing morale, highlighting ‘pace of bureaucratic change; discipline and management concerns; staff and staff relations; time and workload pressures’.

Savadanuthu (1994) Studied the “Teacher morale and student Morale of secondary level” in Dindigul Anna District of Tamil Nadu. He believed that the functional aspect of educational environment was determined by the morale of teachers and students. He formulated certain hypotheses and selected normative survey as his research strategy. He collected data from 200 teachers and 1200 students. He developed two tools one - to measure the teacher Morale and another to measure student morale. The findings of the study were: 1. The level of morale of teachers is high. 2. The morale of women teachers is higher than that of men teachers. 3. The Morale of rural school teachers is higher than that of urban school teachers. 4. The morale of Government and private school teachers was the same. 5. There is no significant relationship between the teaching experience of the teachers and their morale. 6. There is no significant association between the qualification of the teachers and their morale. 7. There is significant relationship between the morale of teachers and that of their students.

Linda (1997) Examined teacher morale and job satisfaction using data from interviews, surveys, and observations of teachers at an English primary school. Responses were diverse, with levels being low among some, high among others, and in between for most. Though teachers’ perceptions of events and circumstances were similar, responses varied according to professionalism, relative, prospective and realistic expectations.
The morale levels of the colleagues were investigated by Anderson (2000) in his study on elementary and secondary teachers' morale levels and their perceptions. Between April, 1998 and April, 1999, participating teachers completed the Teacher Outlook and Perceptions Survey, which contained 47 items reflecting their work experiences and what they see in the future for their jobs. Data analysis indicated that the morale defined by the group was an inaccurate assessment of teachers' individual morale levels. The elements within the building did not predict individual morale and colleagues’ morale in the same way. The similar ratios of individual morale compared to colleagues’ morale indicated that peer assessment was not the best way to ascertain the morale in a building. The results indicate that teacher morale is primarily independent of the morale exhibited by colleagues. Although individual morale and the morale exhibited by colleagues are correlated, school factors influence the two in varying magnitudes. The results suggest that student behaviour and learning have a much greater impact on teacher morale than does administrative behaviour.

Cooper (2001) undertook a study to determine if there was a significant relationship between the morale of junior college instructors and their teaching effectiveness as perceived by students. Study subjects were 129 junior college instructors and their students enrolled in college transfer programs. A modified version of the Purdue Teacher Opinionnaire was used to identify teacher morale variables. Teaching effectiveness as perceived by students was determined using the Hinds (Mississippi) Junior College Faculty Evaluation Scale. A statistically significant relationship was found for the measures of satisfaction with teaching, community support of education, and total job satisfaction with the teaching effectiveness rating by students. It was concluded that instructors' perception of satisfaction with teaching was positively related to their teaching effectiveness, instructors' perception of community support of education had a negative relationship to teaching effectiveness, and total job satisfaction was positively related to teaching effectiveness. Other identified measures of teacher morale were not significant predictors of teaching effectiveness. These results may indicate that the most effective teachers are those with the greatest morale and job satisfaction.
The impact of different factors related to school technology (planning, leadership, technology use, teacher openess to change, and teacher non-school computer use) on dependent measures in the areas of teacher skills (technology competency and technology integration), teacher morale, and perceived student learning was examined by Baylor & Ritchie (2002). One of the results showed that as the teachers incorporate the technologies, their own level of technical competence increases, as does their morale.

Blackbourn & Wilkes (2003) made an attempt to develop prediction equation for teacher morale. The study was conducted on 236 teachers in a large school system in Mississippi. The Supervisory Conference Rating (SCR) was used to measure teachers' perceptions of the supervisory conference following observation by the principal. The Zones of Indifference of these teachers were measured with the Zones of Indifference Instrument, and the Purdue Teacher Opinionnaire was used as a measure of teacher morale. All correlation coefficients except SCR 1 and total SCR were significant. Higher morale scores were reported by: (1) younger teachers; (2) teachers with wider zones of indifference; (3) teachers receiving the supervisor conference more positively; (4) those who teach at lower levels; (5) teachers with fewer years of experience; (6) teachers with shorter tenure at their present school; and (7) female teachers.

The level of teacher morale was measured using the Purdue Teacher Opinionnaire by Eggers (2012) in their study ‘Teacher Morale in Rural Northeast Tennessee’. Data associated with the Tennessee Value-Added Assessment System (TVAAS) teacher effect score, grade level taught, years of service, gender, and level of education were gathered. The morale score and the teacher effect score were then examined to ascertain if there was a relationship with the other factors. The sample for this study consisted of 209 licensed teachers who were employed in rural northeast Tennessee during the 2011-2012 school year. The findings revealed that the overall level of teacher morale was significantly positive. There was not a significant relationship found between teacher morale levels and the TVAAS teacher effect scores. There was no significant difference in teacher effect scores by years of experience nor by level of education. A significant relationship was found between
TVAAS teacher effect scores and the grade level taught. It appears individuals who teach at the secondary level had significantly lower TVAAS teacher effect scores than teachers who teach at the elementary and middle levels. There was not a significant relationship found between teacher morale level and the teachers' levels of education and gender. However, there was a significantly negative relationship between teacher morale level and teachers' years of experience. A significantly negative difference was also found in the relationship between teacher morale level and grade level taught.

Moore (2012) examined the relationship between five teacher perceived leadership practices of high school principals and the morale levels of the teachers in their schools. Two high schools (grades 10-12) and 112 high school teachers were surveyed using the Leadership Practices Inventory to collect information about five teacher perceived principal leadership practices, and the Purdue Teacher Opinionnaire to collect information about teacher morale levels. The statistical analysis provided a basis to support the assertion that the four teacher perceived leadership practices (i.e., challenge the process, enable others to act, encourage the heart, and inspire a shared vision) were related to teacher morale to a significant degree. However, the four teacher perceived leadership practices collectively accounted for only a modest portion of the variance in teacher morale levels. None of the four individual leadership practices were a statistically significant predictor of teacher morale when all other variables were controlled. The results imply that principals' leadership practices make a difference in teacher morale.

Royal (2012) investigated the effect of the implementation of a School Wide Positive Behavior Support (SWPBS) Program on teacher morale. The Perdue Teacher Opinionnaire (PTO) was used to survey the faculties, implemented the SWPBS program. The study examined the changes in the opinions of the faculties for each of seven factors, rapport with the principal, satisfaction with teaching, salary, teaching load, curriculum issues, teacher status, and community support. and deduced that the teachers' opinions on their curriculum issues and status were affected by the implementation of the SWPBS.
Study was conducted to determine if a statistically significant correlation exists between teacher morale and job satisfaction in the state of New Jersey by Bagolie (2012) and whether the proposed reforms to pension, benefits, and tenure have contributed to these factors. The researcher constructed, piloted, and validated the instrument. Descriptive statistics and inferential statistics were used to test and analyse hypotheses. The results of the study revealed that a significant negative correlation exits among teachers in the state of New Jersey with regard to morale/job satisfaction and attitudes towards reforms. Similarly Ramsey (2013) examined relationship between principal leadership styles, faculty morale, and faculty job satisfaction. The Leadership Practices Inventory (LPI) provided data that identified the perceived leadership styles of the school principals. The Purdue Teacher Opinionnaire (PTO) provided data that identified faculty morale and faculty job satisfaction. The results of the study indicated that there were no significant relationships between the perceived principal leadership styles, faculty morale, and faculty job satisfaction at the selected elementary schools. According to Sherwood (2013) there were five common themes principals and teachers believed to have a negative impact on teacher morale including negativity, lack of support, change or new initiatives, valuing teachers and common core curriculum. The findings were intended to change the leadership approach of principals in order to increase teacher morale and student achievement and decrease teacher attrition.

Almanzar (2014) examined teacher morale using Staff Morale Questionnaire (Smith, 1971), and the Hipp and Huffman (2010) Professional Learning Communities Assessment-Revised to identify their work-site morale and Professional Learning Communities perceptions. Forty-two teachers volunteered to complete both instruments. The completed instruments were then collected and the data was analysed. Results of the study showed that when teachers are given the opportunity and time to work together to develop their professional learning activities and share best practices, their morale increases.

Saiti & Papadopoulos (2015) in their study while investigating primary school teachers' perceptions regarding their job satisfaction and whether or not the personal characteristics of primary school educators (such as gender, age, family
status, educational level, and the total years of service in public primary education) have any impact on their job satisfaction. They reported factors that influence morale. Teachers are more satisfied with three aspects (subpects) of job satisfaction, namely, ‘administration’, ‘colleagues’ and ‘nature of work’ and less satisfied with ‘salary’, ‘benefits’ and ‘potential rewards’. Age correlates with the levels of satisfaction with reference to administration, potential rewards, colleagues and the nature of work. The overall satisfaction positively correlates with all nine aspects of job satisfaction (subpects) and gender affects the aspects of "promotion" and "colleagues."

2.4 STUDIES RELATED TO ‘ATTITUDE TOWARDS ICT’

Woodrow (1992) asserts that any successful transformation in educational practice requires the development of positive user attitude toward the new technology. People’s attitudes toward a new technology are a key element in its diffusion, suggests Rogers (1995). Since Rogers uses the terms innovation and technology interchangeably, the diffusion of innovation framework seems particularly suited for the study of the diffusion of ICT. Rogers’ Innovation Decision Process theory states that an innovation diffusion is a process that occurs over time through five stages: Knowledge, Persuasion, Decision, Implementation and Confirmation. Accordingly, ‘the innovation-decision process is the process through which an individual (or other decision-making unit) passes (1) from first knowledge of an innovation, (2) to forming an attitude toward the innovation, (3) to a decision to adopt or reject, (4) to implementation of the new idea, and (5) to confirmation of this decision’. An individual’s educational level affects his/her adoption of an innovation as suggested by Rogers may entail more positive attitude towards ICT. This hypothesis has been supported in the studies of Na (1993) and Francis (1998).

In his study of Korean teachers, Na (1993) found a positive correlation between teachers’ attitudes toward computers and computer ownership, accessibility to school computers, the level of accessibility to school computers, and number of computer locations in the school. Na concluded that there was a significant relationship between the proximity of computers and the number of access resources (home and school) on the one hand, and, on the other, teachers’ attitudes toward
computers. Similar results were shown by Studies of Marsshall & Ruohonon, 1998; Pelgrum, 2001 who reported that there is a significant correlation between computer access and attitudes toward computers. It was further reported that computer inavailability/insufficiency was the main obstacle to computer use by teachers from 26 different countries.

Francis, 1994 and Jones, 1998 are the researchers who found a significant relationship between gender and attitudes toward computers. For instance, Francis (1994) found that males are more enthusiastic and more confident using computers than females. However, no difference in attitude towards computers between male and female teachers was found by Roza (1994); even when male teachers had greater computer literacy scores and experience with computers than female teachers. In contrast to this, the study of Shah and Agarwal (1994) evaluated teachers’ attitudes towards computer education as well as Computer Assisted Instruction (CAI). It showed positive attitude in all the groups, though female teachers showed more positive attitude towards Computer Assisted Instruction (CAI).

Attitude towards computers affects teachers’ use of computers in the classroom and the likelihood of their benefiting training is suggested by Kluever, Lam & Hoffman (1994).

Use of new technologies in instructional setting can be predicted by teachers’ attitudes. Abbas (1995), Blankenship (1998), Almusalam (2001), Isleem (2003), Lawlon & Creschner (1982) also supported this by saying that the successful use of the technology depends to the large extent on the teachers’ attitude towards their tools. Teachers’ attitude towards computer experiences and also the experiences of the students are effected by teachers’ attitude was stated by Cristensen (1998).

Moseley & Higgins (1999) further found that teachers who successfully use technology in the classroom have positive attitudes to ICT and focus on pupil choice and individual study rather than teacher direction. School assistance in terms of support, finance, training and facilities are further factors on the road to computer integration. However, teachers vary in their perceptions and experiences of ICT, and so their uptake depends on a range of combining factors.
A study ‘Integrating ICT in professional practices: an analysis of teachers’ needs based on a survey of primary and secondary teachers in Scottish schools’ was conducted by William et. al (2000). The findings show that there is no attitudinal difference across age groups. Another relation with age group was reflected in studies of Hernes, Hestman & Haeland (2001) who observed that the share of teachers, who state that they have a good command of the use of the Internet, is negatively correlated with age. About 77% of the teachers who were 25 years or younger stated that they had a good command of the use of Internet, compared to 25% of the teachers who were 56 years or older. Also around 63% of the teachers who are 25 years or younger versus only 32% of the teachers who were 56 years or older had a positive attitude towards the use of the Internet in their own teaching.

Rouquia (2001) (as cited in Nasrin, 2013 paper) carried out a study on attitude of prospective teachers towards contribution of information technology with special reference to school education. One hundred prospective teachers from Department of Education, AMU, Aligarh were selected for the study. No significant difference was found between the attitude of prospective male and female teachers towards the role of information technology for progress and development. Similarly, Sharma (2002) stated that, there is no significant difference between the attitude of male and female teachers towards the role of information technology. Later on, similar results were also shown by Khan (2007) (as cited in Nasrin, 2013 paper). The finding was that there is no significant difference in the attitude of male and female university teachers towards information and communication technology.

A study on ‘Computer Assisted Instruction: Attitude of Teachers and Correlates’ was conducted by Joy & Manickam (2002). The objectives of the study were (i) to assess the knowledge in computer, attitude to computer Assisted Instruction and teacher competency of Science teachers and (ii) to assess the effect of training on these variables. The findings of the study were (i) There was no significant difference on the teacher competency in the pre and post scores or between the experimental and control group. But, teacher competency was positively related to post knowledge in CAI of the experimental group. (ii) There was a significant difference between the groups in their attitude towards computer
education. As a result of training in Computer Assisted Instruction (CAI), the attitude of the experimental group became more favourable towards computer education. (iii) There was correlation between age and attitude towards use of computer. (iv) There was significant difference in the pre and post test scores of the experimental group on knowledge in CAI and attitude towards use of computer.

Analyses of several major cross-cultural studies completed during the 1990s and related to ICT in education was done by Knezek & Christensen (2002), who suggest that teachers advance in technology integration through a set of well defined stages, which sometimes require changes in attitude more than skills.

A positive relationship between teachers and the relative advantage of using computers has been endorsed by Sooknanan (2002). In his study, he found that “relative advantage” was the second most significant innovative characteristic in relation to teachers’ attitudes. Teachers reported that computers are reliable and accurate and meet their information need. The researcher found their compatibility was the most significant innovative attribute in relation to computer attitudes in teachers. In his study, teachers had positive perception of the compatibility of computers to their curriculum goals.

Suggestion to plan lessons more efficiently with ICT was given by Becta (2003), who conducted a study and revealed that teachers with their own laptop computer had increased positive attitudes and confidence in using 'hands-on' experience with ICT for education and confirmed that teachers can use ICT to plan lessons more efficiently.

Das (2003) conducted a study entitled on ‘Computer Education in the Secondary Schools of Assam’. The objectives of the study were: (i) To assess the attitude of students and teachers towards computer education, infrastructural facilities in the schools and gender disparities in computer science, if any, in both Government and private secondary schools of Assam. (ii) To assess the knowledge of the students in computer science, experiences with computers and also the teachers’ educational background and their experiences with computer and (iii) To find out the differences, if any, between the Assamese medium and English medium students of both the Government and private schools in computer education. The
findings of the study highlighted that students had a positive attitude and outlook towards computer education received in their respective schools. Some students suggested a revamping of the traditional modes of teaching by introducing computers in teaching which they thought will make their education more exciting and interesting. Teachers were confident about their knowledge of the subject; they were not found to be devoid of anxiety. The English medium students were found to display higher level of confidence, a sense of competence in their approach to and use of computers than the Assamese medium students. In spite of funding and all other infrastructural facilities provided by the North Eastern council in a collaborative venture with the Board of Secondary Education, Assam, nothing fruitful or lasting evolved from the course of computer education imparted to the students of government schools. Girls were found to have a positive attitude towards computer as being more user friendly and expressed less anxiety about the use of computers.

Demetriadis et al. (2003) conducted a study ‘Cultures in negotiation’: Teachers’ acceptance/resistance attitudes considering the infusion of technology into schools’ and presented observations regarding Greek secondary school teachers’ attitudes towards the introduction of ICT in the curriculum. Findings showed that teachers are interested in using ICT to attain a better professional profile only to take advantage of any possible learning benefits offered by ICT, but, always within the context of the school culture. The authors argued that introducing ICT into schools is seen as initiating a “negotiation” process where lower level goals may be altered to preserve what are perceived as goals of higher order. Teachers were found to have positive attitude to adapt ICT mode of use which is supported by research evidence that emphasize the situational character of knowledge and expertise.

In their study Kersaint, Horton, Stohl & Garofalo (2003) found that teachers having positive attitudes toward technology feel more comfortable with using it and usually incorporate it into their teaching. Similarly, Bullock (2004) found that teachers’ attitudes are a major enabling/disabling factor in the adoption of technology.
Regina, Regina, Grozman & Tilzon (2004) conducted a survey on 498 teachers to determine the incidence of technophobia and the attitude of teachers towards online learning and teaching technologies. The study revealed that public school teachers are generally more afraid of computers than their peers working in private schools. Older teachers were more afraid of technology than the younger ones. But, on the whole the teachers had a positive attitude towards online teaching and learning technologies.

In a study, Saari, Luan & Roslan (2005) suggested that teachers had positive attitude towards using computers. More than 55% teachers believed that computers are valuable tools that can be used to improve the quality of education.

Annaraja & Joseph (2006) conducted a study on teacher trainees’ attitude towards ICT and the findings indicated that 54% of male teacher trainees and 78% of female teacher trainees possess positive attitude towards ICT. No significant difference between male and female teacher trainees was found in their attitude towards ICT. Some studies revealed that gender variable was not a predictor of ICT integration into teaching (Norris, Sullivan, Poirot & Soloway, 2003). In a research conducted by Kay (2006), male teachers were found to have relatively higher levels of computer attitude and ability before computer implementation, but there was no difference between males and females regarding computer attitude and ability after the implementation of the technology. The researcher claimed that quality preparation on technology can help lessen gender inequalities.

Hew & Brush (2007) stated that among the factors that influence successful integration of ICT into teaching are teachers’ attitudes and beliefs towards technology.

In a study ‘Teacher’s attitude towards computer use: Implications for emerging technology implementation in educational institutions’ Mehra (2007) determined the attitudes of school teachers in Chandigarh towards use of computer technology for instructional purpose. The objectives of the study were to study the attitudes of high school teachers towards computer use and to study the perceptions of school teachers with respect to computer attributes, level of computer competence and their access to computers. The findings of the study revealed that the teachers
possessed fairly positive attitude towards computer use but majority of the teachers
needed to be provided with training for using computers in instructional settings.

Teachers showed the attitude for media utilization like television and radio in
the classroom for teaching in the study conducted by Newa (2007), who interpreted
teachers’ effectiveness in relation to work satisfaction, media utilization and attitude
towards the use of information and communication technology among secondary
school teachers of Nepal and revealed that teachers found the use of ICT as an
effective teaching tool.

Swami Naidu (2007) conducted another study entitled, ‘Integration of
computer education in secondary schools in Visakhapatnam- Attitudes of teachers
and students’. The main objectives of the study were 1) To find out the extent of
integration of computer education in secondary schools of Visakhapatnam as viewed
by teachers and students, 2) To find out the attitude of students towards learning
computers in schools, 3) To correlate the extent of integration of computer education
in schools and the attitude of students towards learning computers, 4) To find out the
facilities available and the provisions of integrating computer education in schools
and 5) To compare the opinions and attitudes of students and teachers within the
light of various background variables of sex, medium of instruction, type of
management, community group, religion, educational qualification of father and
mother, stage of schooling, etc. It was found that students and teachers are under the
strong opinion that computer education is provided in the schools in the true spirit of
Integration of computer education in school curriculum. As far as integration of
computer education was considered, significant difference was observed in some
categories and there was no significant difference between some categories. Data
had been collected in terms of students’ social status, religion, and parents’
educational qualification. No significant difference was found in the attitudes of
students on integration of computer education in secondary schools based on their
social status i.e. their caste, religion, and also their parents’ educational qualification
from illiterate to graduate & above. In the context of attitudes of students learning
computers, a significant difference was found between Telugu and English medium
students, among government, private, aided and private un-aided school students,
between rural and urban area students, based on their parents’ educational qualification. No significant difference was found between boys and girls, as per the social status i.e. caste, religion, and availability of computers at home. In terms of attitudes of teachers towards integration of computer education in schools, it is observed that there is significant difference between the teachers working in schools offering computer education in their school or not, between rural and urban area teachers, whether received training in computers or not, use of computers in teaching, having computer lab in school and the number of computers in lab. There is no significant difference among the students studying under various managements that is government, private, aided and private un-aided schools, possession of a computer at home, number of computers available in the school, commencement of instruction at various classes, having a computer lab in schools and the number of computers in their lab, availability of internet connection like dial up of broadband to the school availability of qualified and trained computer teacher and the method of instruction and evaluation in their computer room and the lab, extent of integration of computers in their schools, use of computers in their classrooms, and in offices and span of using the computer. Torok (2007) conducted a research on the process of ICT integration in schools where he found teachers having positive attitude towards ICT.

Drent & Meelissen (2008) conducted a study about factors which influence the innovative use of ICT by teacher educators in the Netherlands. A sample of 210 teachers was used for the study. Their study revealed that student-oriented pedagogical approach, positive attitude towards computers, computer experience, and personal entrepreneurship of the teacher educator have a direct positive influence on the innovative use of ICT by the teacher. Similarly Keengwe & Onchwari (2008) concluded if teachers’ attitudes are positive toward the use of educational technology, then, they can easily provide useful insight about the adoption and integration of ICT into teaching and learning processes.

Teo (2008) conducted a study on Singapore pre-service teachers. Findings revealed that no significant difference was found between age and attitude of pre-service teachers. In addition, researcher obtained no significant difference between
age and each of attitudinal construct of perceived usefulness, perceived behaviour, perceived control and defense component.

Cavas, Cavas, Karaoglan & Kisla (2009) explored the relationship between teachers’ attitudes and factors which are related to teachers’ personal characteristics (gender, age, computer ownership at home, and computer experience). The results indicated that science teachers have positive attitudes toward ICT and although teachers’ attitudes toward ICT do not differ regarding gender, it differs regarding age, computer ownership at home and computer experience.

Demici (2009) conducted a study on teachers’ attitudes towards the use of Geographic Information systems (GIS) in Turkey. The study used questionnaire to collect data from 79 Geography teachers teaching in 55 different high schools. The study revealed that though barriers such as lack of hardware and software existed, teachers’ positive attitude towards GIS was an important determinant to the successful integration of GIS into Geography lessons.

Jegede (2009) conducted a study on ICT attitude, competence, and use pattern of teacher educators and effect of age of educators on time used in interacting with ICT in Nigeria. Findings revealed that age does not significantly affect attitude of teacher educators towards computer; age is not significantly related to computer use pattern, no significant difference between age and time spent by teacher educators on the computer and no significant difference between age and computer competence of teacher educators.

Arthur (2010) studied the relationship between students’ attitudes toward ICT and their achievement in ICT. Findings revealed that with regards to Students’ attitudes toward ICT both postgraduates and undergraduate students showed positive attitudes towards ICT. Also, the relationship between attitudes and achievement, there is a moderate correlation between undergraduate students’ attitudes to ICT and their achievement in ICT whereas among the postgraduate students there was a weak correlation between postgraduate students’ attitudes to ICT and their achievement in ICT. Results of the study recommended that students should be encouraged to develop positive attitudes towards ICT which may improve their achievement in ICT examinations.
Ageel (2012) presented his views that the adoption of ICT-enabled teaching in contemporary schools has largely lagged behind despite its obvious and many benefits, mainly because teachers still hold ignorant, misinformed and highly negative attitudes towards ICT-enabled teaching. Article aimed at investigating the effect of Virtual Learning Environments (VLE) on university teachers’ attitudes towards using ICT in their teaching, and to further develop a best practice model for use by stakeholders currently interested in promoting the use of ICT in education. VLE experience can positively shape teachers’ attitudes towards using ICT, which would in turn increase the adoption of ICT-aided teaching in contemporary schools. The article argues that when university teachers participate regularly in VLEs, their attitudes towards the use of ICT improves. It is thus recommended that learning institutions and universities should invest in creating productive, regular and readily accessible VLEs for their teaching staff, as an important support incentive to any ICT program deployment.

One hundred twenty-four prospective EFL teachers participated in the study conducted by Hismanoglu (2012). Results indicated that the prospective teachers having five ICT-related courses displayed better attitudes in comparison to those not completing this training period by reflecting that the success of technology integration into education varies from curriculum to curriculum, depending on the ways in which it is applied.

To understand the relationship between teaching staff age and their attitude toward ICT Elsaadani (2013) implemented survey methodology facilitated through the use of the questionnaires. The population for this study was 500 full-time Faculty staff, and only 412 returned and completed questionnaires are considered as the study sample. The results showed that there is a moderate and positive relationship between the age of participants and their attitude towards ICT; thus, when considering attitude towards ICT by teaching staff members, age is a significant factor.

Hue & Jalil (2013) conducted a study on lecturers’ attitudes towards ICT integration into the curriculum and its use in the classroom. A population of 109 lecturers at a public university in Vietnam participated in this survey. The results of
the correlation analysis identified a slightly moderate positive relationship between lecturers’ attitudes towards ICT integration into the curriculum and their ICT use in the classroom. Although ICT was not highly used, lecturers recognized the benefits of ICT that they had chosen to incorporate into their teaching.

Varol (2013) conducted a study to identify the relationship between elementary school teachers’ ICT engagement with their attitudes towards technology. To this end, one hundred elementary school teachers were asked to fill out questionnaires related to their ICT knowledge, usage, and attitude towards technology. The results show that teachers’ ICT knowledge and usage is very low. Also, teachers’ attitude toward technology is at medium level. Teachers’ ICT engagement predicts their attitude towards technology and self-confidence for teaching with technology.

To know the attitude towards ICT of user and non-user teachers of ICT Lal (2014) conducted a study entitled ‘Attitudinal study of user and non-user teachers’ towards ICT in relation to their school teaching subjects’. The data were collected from 40 (20 male and 20 Female) user and non-user of ICT secondary school teachers. Data were treated by Mean, SD and t-test. The findings of study revealed that the ICT user teachers’ attitude towards ICT is highly positive in comparison to ICT non-user teachers but they have also positive attitude towards ICT in relation to their school teaching subjects. It is clear that vast majority of secondary school teachers have positive attitude towards ICT in relation to their school teaching subjects for many reasons.

Exploring the process of integrating ICT into teaching-learning practices and its emerging challenges Birhanu Moges Alemu (2015) reported that both the instructors and students have positive attitudes towards ICT and considerable knowledge and positive understanding of ICT and its potential in teaching and learning. However, the university fails to provide appropriate ICT-training courses for instructors to develop their technical ICT skills. Having said this, there are crucial examples of horizontal integration; that is, the instructors provide opportunities for the students to use ICT in meaningful contexts. The finding revealed that there is a relationship between the practitioners’ stages of concern and
stages of adoption, which can be described as follows: the personal level of concern moves from the "self-concerns" to "ask and impact-concerns", the personal adoption level is also likely to move from entry to invention. Although the finding revealed some crucial factors that has prevented the instructors and students from using ICT in teaching and learning, among these the institutional ones such as lack of proper access to ICT resources, overcrowded-classrooms, lack of technical and pedagogical support are more influential on the integration process.

2.5 STUDIES RELATED TO TECHNOLOGY COMPETENCE

Less technology capable teachers are often encouraged by positive attitude to learn the skills necessary for the implementation of technologies based activities in the classrooms for increasing the computer skills. It is necessary to change the individuals’ negative attitude, which is concluded by Harrison & Rainers (1992) on the bases that participants with negative computer attitudes are less skill in computer use and are there for less likely to accept and adapt to technology than those with positive attitude.

Authors who contended that reducing uncertainty is just the first step to become confident and competent users of technology are Beasley & Sutton (1993). In their study, they found that at least 30 hours of instruction and practice were required just to reduce anxiety about technology. However, Gardner, Discenza & Dukes (1993) in their study determined that computer anxiety is a major cause of resistance to using computers. This and other research indicate that increased computer experience reduces computer anxiety in many student teachers. However, it may depend on the type of computer experience.

“The teacher factors that involved beliefs about the way the subject should be taught and skills associated with competence in managing classroom activities and computer-handling technical skills were the most influential in teachers’ use of computers” were the views of Veen (1993), who showed that teacher factors far outweighed the institutional or school factors. Despite essential technical support provided by the school and a positive attitude to IT from the school principal, personal level factors influence teachers’ take-up of ICT.
A large number of studies showed that teachers’ computer competence is a significant predictor of their attitudes toward computer, one of them is Pelton & Pelton (1996) who maintained, “Although many teachers believe computers are an important component of a student’s education, their lack of knowledge and experience lead to a lack of confidence to attempt to introduce them into their instruction”. In this study, computer competence was operationalized to mean “Syrian EFL teachers’ perceptions about their computer knowledge and computer skills as measured by the instrument developed for this study”.

Sakamoto et al. (1996) reported that teachers are the main gatekeepers in allowing educational innovations to diffuse into the classrooms. Therefore, one of the key factors for effecting an integration of computers in the school curriculum is adequate training of teachers in handling and managing these new tools in their daily practices they found that the "degree of classroom computers was closely tied to extent of training in integration techniques". Assessing teachers' stages of adoption of technology allows the teacher educator to adapt the instruction to fit the learner's needs.

Significant enhancement of the ICT skills of the majority of teachers took place, was reported by Selinger (1996) in a study of the effect of the loan of computers on 1000 students studying at a distance on a part-time initial teacher education course at the UK Open University. It may be important to note that the study did not report any significant correlation with teachers’ use of ICT in the classroom.

Zhang & Espinosa (1997) studied and revealed that attitude predicts the need for learning computing skills which will in turn enhance ICT or computing skills.

Views of students and teachers toward computer-assisted class discussion were compared by Jaeglin (1998) in his study who found that while students were positive about the use of computers as an effective learning tool, teachers were uncomfortable using computers in class activities. One of the main reasons that teachers gave for their relative discomfort about the use of computers was their technical discomfort with using these tools. Most of them were unfamiliar with the
functionality of the software they were using and about the optimal way to integrate it in class activities.

Youngman & Harrison (1998) carried out a study that sought to develop teacher competence and confidence in the use of ICT with portable computers. Approximately, 1150 teachers in 575 primary and secondary schools were provided with a multimedia portable computer together with two Internet subscriptions, core software and a number of CDROM titles. The evaluation of the project made use of three sources of data: the databases which held records on the teachers and their schools, including self-ratings of initial self-confidence and competence with ICT; a detailed questionnaire administered at two points, 3 months and 8 months into the academic year; and case study data. It was found that a very high proportion of teachers (98%) made effective use of their computer; a very high proportion made use of desktop publishing software; over 94% of teachers attempted to use the CD-ROM, and 91% were successful. The use of e-mail (62%) and the Internet (76%) was high. The degree of computer literacy of many teachers increased to the extent that even relatively inexperienced teachers were quickly able to use their computer’s power to evaluate a variety of software packages, and to filter, import and export information in order to better suit their own curriculum purposes. Teachers’ confidence and competence changed for the better; they felt that their knowledge of IT had increased ‘substantially’, teachers changed their ways of working and their enthusiasm for their work increased. The most significant benefit to pupils was indirect, through the teachers’ more expert use of tools for creating high-quality classroom materials and improved access to resources. The study showed that four conditions contributed to the success of the project: 1. Initial and immediate success with the technology through the hands-on demonstration and the provision of user-friendly hardware and software. 2. Personal ownership and exclusive use of a machine over an extended period. 3. The portability of the equipment so it could be moved between work areas and between home and school. 4. Formal and informal support – the combination of the ownership and portability provided teachers with a greater variety of support from peers and other sources.

Schools can only encourage ICT use; actual take-up depends largely on teachers’ personal feelings, skills and attitudes to IT in general. The researchers Cox et al, (1999) show that teachers who have a high value for ICT and perceive it
to be useful completely transform their teaching. Similarly, those teachers who are motivated and have strong commitments to their pupils’ learning and their own professional development will evidently integrate computers more easily within their teaching (Becker & Riel, 2000; Becker, 1994; Hadley & Sheingold, 1993; Sheingold & Hadley, 1990).

Meredith et al. (1999) concluded from their study that teacher characteristics, such as gender, computer ownership, computer experience, and school education level, as well beliefs about teaching and learning with computers, perception of their technological skills had all significant influences on the ICT classroom environment.

Brosnan (2001) identifies that the attitude, motivation, computer anxiety, and computer self-efficacy are factors affecting teachers’ use of computers in their lessons. Teacher resistance and lack of enthusiasm to use ICT in education may also be another limitation. Furthermore, many teachers may not have the required IT skills and feel uncomfortable, nor do they have trainings needed to use the technology in their teaching. Unless teachers develop some basic skills and willingness to experiment with students, ICT use in education is in a disadvantage. On the other hand, the limitation of ICT use in education is related to student behaviour. Appropriate use of computer and the internet by students have significant positive effects on students’ attitude and their achievement. Nonetheless, it is very common to observe limitations related to student behaviour. Students tend to misuse the technology for leisure time activities and have less time to learn and study.

Teachers should have adequate training programs to develop their knowledge and skills is the recommendation given by Al-Uteawi (2002) on the basis of his study’s finding that most of the teachers who show negative attitude towards the use of ICT in education they lack in knowledge and skill about computers. Similarly, Knezek & Christense (2002); Isleem (2003) found that teachers’ competence with computer technology is the principal determinant of effective classroom use by students and computer expertise (competence) was the stronger predictor of computer use by Ohioan technology education teachers. Deaney, Ruthven & Hennessy (2003) also considered three major points for using ICT: the
need for wider skills for effective use of tools, the need to focus on the power of technology and the need to shift familiar patterns of classroom interaction by introducing technology.

The most comprehensive and accessible national ICT survey was conducted by Toots, et al (2004) within the central and Eastern European context named “Tiger in Focus Study” from Estonia: a longitudinal survey on ICT in Estonian schools 2000-2004. The study looked the progress that had been made with ICT in Estonian schools. It focused on the use of ICT as a tool for learning within a specific subject domain, assessed students’ and teachers’ ICT skills and self perceived competences, analysed the impact of ICT developments on the teaching process and pedagogy in Estonian schools. It identified two types of teacher: the “classical type” and the “constructivist type”. They differ most significantly in performance assessment and spatial organisation of learning. Constructivists allow pupils to visit the library and the computer class to do their study tasks, arrange work stations and keep all learning tools including PCs freely accessible for students. They also encourage student involvement in the assessment process. The study concluded that there is a potential for pedagogic innovation in schools but the process is still beginning with the majority of teachers stressing the importance of information searching, word processing and analysis. Constructivists are willing to implement a more individual approach to learning based on student’s interest and pace of learning. Only a few are prepared to involve students in the planning of the learning process, select topics or set deadlines for tests.

Both infrastructure and teacher competencies were critical for successful implementation of ICT in a school. This was concluded by Venezky (2004) after bringing together different cases in various schools. Furthermore, Rosenfeld & Martinez-Pons (2005) found in their study that “… competence in the use of technology in the classroom proved to be a direct function of the degree of technology utilization”.

The application of information and communication technology in teacher education was investigated by Subbaiah (2005) with reference to certain selected variables and to identify the information and communication technology needs,
knowledge and skills among the teacher educators. The sample was taken from 29 District Institutes of Education and Training from Tamil Nadu, 71 English teacher educators and 200 teacher trainees, using probability sampling method for the study. Questionnaire, Attitude scale, Interviews, Diary analysis were used as data collection tools. It revealed that the focus of computer equipment problem had both quantity problem (not enough computers) as well as quality problem.

Although access to ICT is not a problem, teachers felt that they lacked the necessary skills to integrate ICT into their classroom teaching was one of the finding of the study conducted by Ngah & Masood (2006), in their pilot research to identify the ICT-skills needed by teachers with the ultimate aim of creating learning objects to be made available online in Malaysia. Survey questionnaire was developed and used as a data gathering tool which comprised of several components: (a) demography; (b) experience in using ICT as a teaching and learning tool; (c) attitude toward computers; (d) usage of school resource centre; (e) areas that need further training; (g) issues in innovation and diffusion; and (h) reflections on use of technology with respect to their career, teaching and learning and personal life.

Ololube (2006) concluded that there are significant differences in effectiveness between professionally trained teachers and untrained teachers in their ICT instructional material utilization competencies. To achieve the purpose of this study, several sets of statistical analysis were conducted using SPSS version 11.5 of a computer programme: Mean and Standard Deviation, ANOVA, t-test of significance and cross tabulation (N=300).

Accessibility of PowerPoint presentations among the high and higher secondary school teachers in classroom teaching was studied by Shankar & Subasri (2006) in selected schools of Pondicherry state. The total sample size of the study was 80 teachers, with different age groups, gender, educational qualifications, specializations, computer knowledge and viability area and school. The study was done at random in selected government and private schools in Pondicherry state. For data collection, a questionnaire was provided to all respondents. Findings of the study revealed high significant relationship between the fundamental knowledge of computers among the teachers and PowerPoint accessibility in classroom teaching.
There was no significant difference between the high school and higher secondary school teachers in using the PowerPoint presentations in classroom teaching.

According to Peralta & Costa (2007), teachers with more experience with computers have greater confidence in their ability to use them effectively. To conclude, Jones (2004) also reported that teachers competence relates directly to confidence.

Demiralay & Karadeniz (2010) investigated and evaluated elementary student teachers’ perceived information literacy self-efficacy in terms of the use of information and communication technologies (ICT). The findings of the research revealed that most of the elementary student teachers use ICT frequently, at least at intermediate level and access ICT from multiple locations. Furthermore, elementary student teachers’ computer experience; skills and frequency of computer and internet use, access opportunities to computer and internet has significant effect on their perceived information literacy self-efficacy.

Starcic (2010) in the study presented and evaluated the development of an educational technology curriculum aimed at pre-service, primary education and undergraduates; the focus was on the incorporation of ICT competences for inclusive education. Within an educational technology curriculum, a competence framework was developed for fostering the use of ICT in the teaching of, and learning by, special needs pupils. This was achieved against the backcloth of the baseline learning objectives of autonomy, inquiry, creativity and innovation. In pre-service teacher education in educational technology, the focus is on inquiry based learning, and on planning and incorporating the innovative use of ICT into teaching; the emphasis is also on enhancing the student teachers’ competences for his/her own professional development. In focusing more specifically on the use of ICT for special needs pupils, the aim is to carry into effect the principles of equality, diversity and inclusive education. The research was designed to evaluate the candidate students’ learning and to consider the alignment of learning objectives and activities with learning outcomes in the new curriculum. Results concluded that digital literacy is considered as one of main enablers for the participation in the knowledge society and has to be provided based on the principal of equal
opportunity. The educational technology has an important role in facilitating digital literacy of students and teachers. Within the renewal of the Educational technology curriculum, the ICT competences had been recognised as important in the process of the formation of teachers’ professionalism which is based on autonomy, inquiry, creativity and innovation. Educational technology curriculum has to incorporate the ICT competences, in conjunction with competences of cooperation, management, organization, and of other generic and subject-specific competences. Similarly Istenic Starcic (2007) said ICT competences are developed as inter-subject result, as interface of generic and subject-specific knowledge among key teachers’ competences ICT competences and competences for inclusive education had been recognised as weak (Istenic Starcic, 2009). The educational curriculum course has to prepare future teachers for recognising ICT as enabler of own professional learning and development and as one of main drivers for change of pedagogical practice for student centered teaching in an inclusive classroom. E-learning environment in the inclusive classroom assists classroom management and facilitates the individual and collaborative engagement and activities in the process of development of abilities, experiences and interests of every individual student.

The results were presented in a paper based on the study conducted by Afshari, Bakar, Luan & Siraj (2012) from responses of 320 principals. Study analysed that transformational leadership role of principals in ICT implementation in schools is influenced by the computer competence, level of computer use, and professional development activities of principals. Results reported that computer use and professional development activities (on the dimension of ICT and leadership) influence the transformational leadership role of principals in implementing ICT in schools. In addition, the study results showed that computer competence has a positive relationship with the level of computer use by secondary school principals and it indirectly influences the transformational leadership role of principals in implementing ICT in schools.

A study to investigated the relationships and to measure the levels of the correlation among three variables i.e. teachers’ ICT competency, teachers’ confidence level in using ICT, and teachers’ satisfaction on ICT training
programmes was conducted by Tasir, Abour, Halim & Harun (2012). A total of 184 questionnaires have been collected and analysed. Research findings revealed that teachers had a high level of ICT competency, confidence level in using ICT, and satisfaction towards ICT training programmes. The findings also showed that the correlation coefficient between teachers’ ICT competency and teachers’ confidence level in using ICT was high. However, both correlation coefficients between teachers’ ICT competency and teachers’ confidence level in using ICT with teachers’ satisfaction toward ICT training programmes were moderate.

Nagar & Peled (2013) investigated whether there are differences in the level of computer literacy, the amount of implementation of ICT in teaching and learning-assessment processes and the attitudes of teachers from computerized schools in comparison to teachers in non-computerized schools. A quantitative research methodology was used. The research sample included 811 elementary school teachers from the Jewish sector of whom 402 teachers were from the computerized school sample and 409 were teachers from the non-computerized school sample. The research findings show that teachers from the computerized school sample are more familiar with ICT, tend to use ICT more and have a more positive attitude towards ICT than teachers in the non-computerized school sample. The main conclusion which can be drawn from this research is that positive attitudes of teachers towards ICT are not sufficient for the integration of technology to occur. Future emphasis on new teaching skills of collective Technological Pedagogical Content Knowledge is necessary to promote the implementation of optimal pedagogy in innovative environments.

Ritzhaupt, Liu, Dawson & Barron (2013) examined the students’ information and communication technology (ICT) literacy and its relationships to a student’s socio-economic status (SES), gender, and ethnicity of middle school students. Data was collected through Student Tool for Technology Literacy (ST2L), a performance-based assessment of ICT literacy skills based on the 2008 National Educational Technology Standards for Students (NETS·S). Results concluded that there was a digital divide between low and high SES, white and non-white, and female and male students on all measures of the ST2L. Specifically, high-SES, white, and female students outperformed their counterparts.
Stephanie, K., Ruben, Braak & Johan (2015) conducted a study ‘Role of ICT in early childhood education’ considering two types of ICT use are distinguished in early childhood education, "ICT use supporting basic ICT skills and attitudes", and "ICT use supporting contents and individual learning needs". They analysed that "ICT use supporting basic ICT skills and attitudes" occurs more frequently and is related to the grade of the preschoolers, teachers' self-perceived ICT competences and the number of years of experience with ICT at school. "ICT use supporting contents and individual learning needs" is strongly related to the grade of the preschoolers, teachers' self-perceived ICT competences, ICT professional development and teachers' attitudes towards the possibilities of ICT for teachers in early childhood education. This indicates that professional development is a crucial factor in stimulating ICT use that transcends teaching basic ICT skills and attitudes.

2.6 CONCLUSION

While going through the studies given in the chapter, it is clear that teachers’ use of ICT is influenced by many variables like gender, age, locality, teaching experience, nature of job, educational qualification, type of management and organisational set up of the institution.

Review of the studies of earlier years related with teacher morale give stress to find out the factors contributing to and related with teachers’ morale. In later years it can be seen that many of the morale studies were conducted to find out its relationship with variables like attitude, amount of salary, job satisfaction, professional skills, student perception of teacher effectiveness etc. The variables teachers’ attitude towards ICT and their technology competence are explored vastly and independently in some studies. The investigator feels that there is a need to further explore the influence of these variables in order to improve teaching learning process. The review of related literature presents a glut of researches presently being conducted in field of variables like use of ICT, Teachers’ morale, their attitude towards ICT and technology competence. Based on the research studies, the researcher felt that there is a need to explore the use of ICT by teachers in relation to their morale, attitude towards ICT and technology competence in secondary schools.
of selected districts of Haryana state that it will help to adjudged the extent of all the variables related to teachers and suggest measures to overcome the problems of teachers in the application of \textit{ICT} in teaching learning Process. With this background, the next chapter follows the research methodology.