CHAPTER 2
REVIEW OF RELATED LITERATURE

Research is very important for progress in every field. In each and every research, researcher starts with review of literature, which consists of collective body of works done by early investigators.

2.1 Importance of Review of related Literature

In every research work, it is necessary for the researcher to be familiar with the review of previous studies undertaken. Because it helps to pave the way for understanding the potentialities of the problems in hand for any research work. So it is essential to go through such reviews.

Such survey of related literature is a pre-requisite to actual planning and the execution of any research work. It also provides comparative data and basis to evaluate and interpret the significance of one’s findings.

Emphasizing the importance of survey of related literature Barr and Good (1959) and others have pointed out “Survey of related literature available solves problems adequately without further investigation and thus, may save duplication. It may contribute to the general scholarship of the investigator by providing ides, theories explanations valuable in formulating the problem and also suggest the appropriate methods of research.”

According to Best (1986), “The review of related literature for reference material is a time consuming but a fruitful phase. A familiarity with the literature of any problem area helps the student to discover what is already known, what others have attempted to find out, what methods of attack has been promising or disappointing and what problems remain to be solved”.

Keeping in view the significance of review related literature, it may be safely concluded that it serves the following purposes-
- It helps in identifying relevant variables for research.
- It may save duplication.
- The researcher may save time rather than wasting it in unfruitful and useless unfeasible problem areas.
- It determines meaning and relationship among various variables under research.
So for this study, an attempt has been made to trace and obtain relevant material through direct as well as indirect sources of information. A careful review of research journals, abstracts, books, manuals, dissertations, theses and different sites and libraries are consulted to get more insight on this problem.

In this chapter previous research studies related to ICT, teachers’ attitude towards ICT, relationship between gender and ICT, their motivation to use ICT, ICT and computer competence, ICT and has been abstracted. It has provided a background for development statement of present problem and up-to-date research in this field. For the sake of convenience, the investigator has divided the review of related studies related to different variables into sub headings.

(i) ICT (ii) TEACHERS’ ATTITUDE TOWARDS ICT (iii) GENDER AND ICT (iv) MOTIVATION AND ICT (v) COMPUTER COMPETENCE (vi) COMPUTER ANXIETY

2.2 Research Studies on ICT

Oscarson (1976) stated in his study ‘Factors associated with vocational teacher proneness toward the adoption of innovation’ that the faculty members who had been in their positions for a longer period of time tended to be less interested in adopting technology.

Chin and Hortin (1994) in their study “Teachers’ perceptions of Instructional Technology and Staff Development” reported that in school settings in developing countries, where teachers are expected to integrate ICT into their instruction effectively function as primary “change agents”.

In an attempt to achieve massive computer enlightened citizenry or netizenry efforts have been made to integrate ICT into the curriculum of many nations. Japan made first step in introducing ICT into schools in 1985 (Sokamoto, 1995).

In his study ‘The status of use of computers in education in Beirut, Lebanon Private schools, Kibbi (1995) revealed a lack of consistent implementation of computers use in the private schools. Not only was the implementation of computers is restricted to the elementary levels of schools,
the teachers lacked a unified computer curriculum that follow in teaching computer skills to students.

Romiszowski & Mason (1996) in Computer–mediated communication conclude that higher education will expand academic computing resources not only for their pedagogical benefits but also because it will be seen to be the duty of education to use such systems in order to prepare its graduates for the realities of a workplace where they will be able to use them.

Aggarwal and Prasad (1999) stated that individual differences refer to factors such as personality, situational and demographic variables that influence user’s beliefs about and use of Information technology.

Beckers (2000) in Pedagogical motivations for student computer use that lead to student engagement’ contended the point that as long as teachers didn’t get necessary computer skills and access to equipment, computer as an instructional tool would remain limited.

Pelgrum (2001) Computerization of education is a complex process where many agents play a role. Forces at micro level of education system (teachers and students) may be influential in facilitating or impeding changes that are outside the control of ministries of education.

Adams (2002) in his study ‘Educational computing concerns of postsecondary Faculty’ discovered that faculty having experience between 10 to 19 years had least integration of technology in their classrooms.


Toprakci (2002) stated in his study of ‘Obstacles at Integration of Schools into Information and Communication Technologies by taking into consideration the opinions of Teachers and Principals of Primary and Secondary Schools in Turkey’ stated that advances in Information and Communication Technologies (ICT) have also affected educational institutions. Due to its importance in society, education should be adapted to ICTs.
Soule (2003) in ‘What do you mean by ICT?’ concluded that special attention needs to be given in policy and curriculum to acknowledge the role of gender in ICTs and education.

Loveless (2004) told that a serious contradiction exists between the attempt to integrate ICT into education and real ICT integration. Part of tension was explained by relationship between teachers’ beliefs and ICT use.

A study ‘The Use of Internet among EFL teachers at the colleges of technology in Saudi Arabia’ by Al-Asmari in (2005) it was revealed that EFL teachers use Internet for personal rather than instructional purposes.

Siritongthaworn (2006) examined the e-learning technology implementation of universities in Thailand. According to the findings students used to given instructions in a give format due to traditional norms of education.

Bhatacharya & Sharma (2007) in their article ‘India is the knowledge economy: An electronic paradigm’ explained that ICT allows for the creation of digital resources like digital libraries where students, teachers and professionals can access research material and course material from anywhere at any time.

Olu & Jegede (2008) investigated the nature of relationship between information and communication technology (ICT), attitudinal constructs and use level of 467 Nigerian teachers. It was found that ICT use level of teachers is significantly related with each and combination of attitudinal constructs. The findings revealed that perceived control factor, behavioral factors and defense factors contribute mostly to prediction of ICT use level of teachers.

Sansanwal (2009) in his paper ‘Use of ICT in teaching-learning and evaluation’ viewed that ICT provides variety in presentation of content which helps learners in concentration, better understanding, and long retention of information which is not possible otherwise.

Erdrogan Tezsc (2009) in his study ‘Teachers’ effect on ICT use in education: the Turkey sample’ examined teachers’ influence in the use of Information and Communication Technologies (ICT) at schools. Various variables are examined such as years of experience, gender, the duration of
computer and Internet use, and to determine level of knowledge on and the frequency of ICT use among teachers. The study was conducted with 1540 primary school teachers using Knowledge, Use and Attitude Scales of ICT. The results show that the most commonly used and well-known ICT types among teachers are the Internet, e-mail and word processing, and teachers' attitudes towards computers and the Internet are generally positive. It was also found that their attitudes vary with their years of experience and levels of knowledge.

Abu Quadais, Al-Adhaileh & Al-Omari (2010) identified the factors affecting attitude of senior faculty members towards using technology specially in teaching activities. A purposive sample of 251 faculty members (167 male and 59 females). The seniors attitude towards the matter was clearly positive and most of them were willing to be trained to practice that. Results indicated no significant difference in senior faculty members attitude towards ICT related to their gender, college, experience, university or country.

Almadhour (2010) in his study ‘the integration of information and communication technology into secondary technology teachers’ pedagogy in new zealand’ sought to address the following research question: what are teachers' perceptions regarding integrating ICT with pedagogy in the technology classroom? The findings presented in this dissertation represent some New Zealand secondary technology teachers’ perspectives on integrating ICT. The findings show that teachers use various ICT tools to differing degrees, depending on their perspectives.

Aktaruzzaman, Shamim, Clement (2011) in the study ‘Trends and Issues to integrate ICT in Teaching Learning for the Future World of Education’ explained that in this paper efforts have been made to analyze the present situations in order to identify the constraints and possibilities in the use of ICT.

Awan (2011) investigated how the ‘level’ of information and communication technology (ICT) uptake among teachers of United Arab Emirates. He also studied that the ‘quality’ of ICT use in classroom can be promoted by changing public school teachers’ attitude towards technology
adoption. The results of the study revealed a positive shift in teachers’ attitudes toward the received ICT training and the positive attitude towards use of ICT in teaching.

Mondal & Mete (2012) in their article ‘ICT in higher education: opportunities and challenges’ explained that national level institutes can provide leadership role in enhancing technical and managerial manpower in different disciplines through ICT networks and collaborations.

Goktas (2012) examined that the attitude towards ICT among physical education and sports students, pre-service teachers and teachers with sample of 337 students. It was found that the students, pre-service teachers and teachers have positive attitude towards ICT and there were significant relationships between gender, grade, computer instruction and computer anxiety.

Leino, (2014) This study examined the use of information and communication technology (ICT) among 15-year-old Finnish students. This study was executed with the help of six subsidies, with each subsidy taking a different view of ICT use and reading literacy. These subsidies explored the purposes, frequencies and self-assessed skills of students’ ICT use, as well as students’ attitudes towards it. The results of this study showed that Finnish adolescents use computers and the Internet frequently and for varied purposes. The results indicated that those students who had self-confidence in ICT tasks performed better in the reading literacy assessment than those who did not have self-confidence. Gender differences were significant: boys were more interested in computers and they were more confident about their skills than girls. Boys also engaged more in activities that require technical knowledge, whereas girls engaged more in social activities. Both genders considered finding information as the best advantage of the Internet.

Mahat, Jamsandekar and Nalavade (2012) in his study ‘A study of teachers’ attitudes towards ICT teaching process’ This study examined the relationship between teacher’s attitude towards ICT teaching, student engagement in the class and teaching time. The participants were the experienced teachers under the 30 to 40 age group of the computer science department of Smt. Kasturbai Walchand College, Sangli. Results indicated
significant relations between the teacher’s attitudes towards ICT teaching and teaching time on the course. Information society is mainly a consequence of continuing development in new technologies and requires people who use computer technologies.

Elsaadani (2012) in his research investigated whether gender is a factor that should be considered when considering teaching staff’s attitude towards information and communication technology (ICT). The study included 500 teachers. The results cleared that there is no significant difference between being a male or female as regard to attitude towards ICT.

Wong, Ibrahim, and Ayub (2012) in his study ‘Learning Strategies as Correlates of Computer Attitudes: A Case Study among Malaysian Secondary School Students’ This study sought to explore the relationship between learning strategies and computer attitudes. Learning strategies are widely believed to be related to positive computer attitudes. Data was collected from 155 secondary school students through questionnaires. The results showed a positive correlation between computer attitudes and five types of learning strategies—motivation, time management, information processing, selecting main ideas and test strategy. The present study provides some evidence that learning strategies is associated with positive computer attitudes among students.

Mhetre and Suryavanshi (2013) in their study at Taluka distt. of Maharashtra in India focused on primary school teachers’ information and communication technology (ICT) practices and views. The study indicated further need for teacher training. The primary teachers have positive views about use of ICT. However, their level of use of ICT usage was very low. It was found that all teachers were computer literate. They confessed that they need more training to acquire higher skills.

Turel (2014) in his study ‘Teachers’ self-efficacy and their use of educational technology’ all primary, secondary and high school teachers in the small town were given the questionnaires to complete. 158 teachers (n=158) completed and returned them. The study was mostly quantitative and partly qualitative. The quantitative results were analysed with SPSS (i.e. mean, Std. Deviation, frequency, percentage, ANOVA). The qualitative data
were analysed with examining the participants’ responses gathered from the open-ended questions and focussing on the shared themes among the responses. The results revealed that the teachers think that they have good computer self-efficacy perceptions, their level in certain programs is good, and they often use computers for a wide range of purposes. There are also statistical differences between:

- their computer self-efficacy perceptions,
- frequency of computer use for certain purposes, and
- computer level in certain programs in terms of different independent variables.

2.3 **Research Studies on Teachers’ Attitude towards ICT**

Necessary & Parish (1989) in his study ‘The Relationship between Computer Usage & Computer related Attitudes and Behavior’ proved that a positive relationship exists between computer experience levels and favorite attitude toward computers.

Rogers (1995) in his theory of Diffusion of innovation concluded that adopters attitudes is indispensable to the innovation decision process.

Abbas (1995) in his study on ‘Attitude towards using computers among Malaysian teacher education students’ found that teachers’ attitudes have been found to be a major predictor of the use of new technologies in instructional settings. Spiers et al. (1997) in

Sctwyn (1997) in his study ‘Students Attitudes towards computers : Validation of a Computer attitude Scale for 16-19 education’ suggested that teachers’ attitudes toward computers are major factors related to both the initial acceptance of computer technology as well as future behavior regarding computer usage.

Watson (1998) in his study on ‘Blame the technocentric artifact : What researches tells us about problems inhibiting teacher use of IT’ found that the development of teachers’ positive attitudes towards ICT is a key factor not only for enhancing computer integration but also for avoiding teachers’ resistance to computer use.

Oju and Awuah (1998) in their study on ‘Building capacity for IT Education and Training in Schools- the case of Bostwana’ stated that
examination of individual attributes shows that respondents were more positive about the relative advantage of computers as an educational tool. However teachers’ perceptions of the compatibility of ICT with their current teaching practices were not as positive. The majority of them were uncertain about whether or not computers fit well in their curricular goals. The disparity between technological demands and the existing curricula has been often a major hindrance for technology integration.

The researchers Christensen & Knezek (2001) in their study ‘Profiles of teachers’ attitudes for progressive stages of adoption of technology: Laredo’ viewed that the teachers competence and confidence in their computer use correlate with their access of computer at home.

Baylor and Ritchie (2002) in their study on what factors facilitate teachers’ skill, teacher morale and perceived students’ learning in technology using classroom reported that regardless of the amount of technology and its sophistication, technology will not be used unless faculty members have the skills, knowledge and attitudes necessary to infuse it into the curriculum.

Cary et al.(2002) in their study ‘The impact of access on perceptions and attitudes towards computer :an international study’ found attitudes toward computers differ across geographic areas. It also stated that perceptions of usefulness of technology vary from country to country (in the study Australia, China, Ghana, Puerto Rico and USA were included). Its results also stated that increased access to computers is related to positive attitudes towards computers in these geographical regions.

Goodison (2002) reported in a survey of studies which identify a range of factors which can help or hinder the use of ICT to enhance learning and a consideration of various environmental/ contextual factors which help to convey the complex pattern of variables that can help or hinder the effective use of ICT. The factors listed are:

- Level and type of pupil and teachers’ ICT training and skill.
- Pedagogical awareness among staff.
- Staff attitude toward ICT.
- The integration into classroom practices and existing teacher interventions.
- Preschool use and planning.
- School ethos.
- Technical support, resources, management and infrastructure.
- Establishing clear learning and curriculum objectives.

Isleem (2003) conducted a study on ‘Relationship of selected factors and the level of computer use for instructional purposes by technology education teachers’ in Ohio public schools – a nation wide survey’ and found that there is a symbolic relationship between attitude towards ICT and its use in classroom.

Kersaint, Horton, Stoule and Gorofalo (2003) in their study ‘Technology beliefs and practices of mathematics educational faculty’ stated that teachers who have more positive attitudes towards technology feel more comfortable while using it and usually incorporate it in their teaching.

Kumar & Kumar (2003) reported that most teachers believe that that the amount of computer experience has a positive effect on attitude towards computer.

Bullock (2004) found that teachers’ attitudes are major enabling and disabling factors in the adoption of technology.

Albrini (2004) in his study ‘Teachers’ attitudes towards Information and Communication technologies, the case of Syrian EFL teachers’ investigated the attitudes of high school EFL teachers (in Large Syrian province) toward ICT and the relationship of teachers’ attitudes to a selected set of independent variables. Findings of this study stated that the attitudes of the participants towards ICT were positive.

Bullock (2004) in his study ‘Moving from theory to practice an examination’ examined the factors that pre-service teachers encounter as they attempt to gain experience teaching with technology during field placement experiences found that teachers attitudes are a major enabling and disabling factor in the adoption of technology.

Sam, Ekhsan, Othman, and Nordin (2005) in their study ‘Computer Self-Efficacy, Computer Anxiety and Attitudes towards the Internet: A Study among the Undergraduates in Unimas’ by taking sample of 81 female and 67 male from seven faculties found no empirical evidence of general belief “the
more, the better”. It demonstrated that undergraduates who used computer does not always have positive attitude towards Internet rather it depends on which type of computer application you are using and for what purpose.

Samak (2006) in his dissertation “An Exploration of Jordanian English Language Teachers’ Attitudes, Skills and Access as Indicator of Information and Communication Integration in Jordan” concluded that Jordanian teachers had overall positive attitude towards computers.

Albrini (2006) explored the attitudes of high school EFL teachers in Syria towards ICT. The findings suggested that the teachers have positive attitude towards ICT in Education. The results point towards teachers’ vision of technology.

2.4 MAJOR TRENDS EMERGING OUT OF REVIEW OF LITERATURE ON ICT

After reviewing related literature on ICT following trends emerged that many studies have been undertaken to measure teachers’ attitude towards ICT. Mostly teachers have positive attitude towards usage of ICT. But during these studies it was found that they need more training and competencies to use it confidently in teaching and learning processes for better outcomes.

2.4 Research Studies on Gender and ICT

In their study Howard & Smith (1986) in ‘Computer anxiety in management: Myth or Reality?’ with 111 managers revealed that gender was not a significant factor in computer anxiety. Loyd, Loyd & Gressard (1987) in ‘Gender and a computer experience as factors in the Computer Attitudes of Middle School Students’ reported that female students had less computer anxiety than male students, and female students liked working with computers than male students.

Rosen, Sears & Weil (1987) in “Computerphobia” found that gender was not related to computer anxiety, but was significantly related to computer attitudes, with women having more negative computer attitudes.

Igbaria & Parasuraman (1989) in ‘The effects of self efficacy on computer usage’ studied population of 166 managers (115 males & 51 females) and found no significant relationship between gender and computer anxiety.
Ray & Minch’s (1990) study on ‘Computer anxiety and alienation: Toward a definitive and parsimonious measure’ with 114 business professionals showed that there are no significant differences between genders pertaining to computer anxiety.

Badagliacco (1990) in ‘Gender and race differences in computing attitudes and experience’ found that controlling for computer experience, men and women have similar interest toward computers.

Ford and Miller (1996) recommended academicians and course administrators to pay more attention to the use of ICT’s resources as a major component in the classroom. Females, to a larger degree than males reported that they had access to computer off the campus.

Bradley and Russell (1997) in their study ‘Computer Experience, School Support and Computer Anxieties’ analyzed that there is existence of slight trend for females to express more anxiety than do males.

Shashaani (1997) examined some males and females about their interest in internet use and discovered that there was a great difference in the level of use between the two groups. Male respondents showed more interest in internet services than their female counterparts.

Brosnan & Lee (1998) in the ‘A Cross Cultural comparison of gender differences in computer attitudes and anxiety: the UK and Hong Kong.’ found that males were more computer anxious than females in a study at Hong Kong.


HESA (2000) Higher Education Statistics Agency in UK reported that only 17% enrolment of studying computing at universities was female.

Balka & Smith (2000) likewise in their book ‘Women, work & computerization’ reported that in the United States of America, the proportion of females studying computing was also getting less in recent years.
Lebo (2000) in his study on ‘Surveying the digital future’ stated that in UCLA Internet Report we find that men have more access and spend more time online than women.

Shaw & Giaquinta (2000) in ‘A Survey of Graduate Students as end users of Computer Technology: New Roles for faculty’ reported that their findings suggested two frequently held beliefs, that older adult students found more resistance than do younger students toward computing fo academic purposes and that males are involved with, interested and skilled in the use of computers than females are no longer accurate.

Houz and Gupta (2001) found that males and females rated themselves on their ability to use computers in significantly different ways.

In the Article ‘Gender and the internet: Women communicating, and men searching’ Jackson et al. (2001) examined gender differences in Internet use and factors responsible for these differences. A sample of 630 Anglo American completed the questionnaire through mail and web use. It was found that females used email more than males. Females reported more computer anxiety, less self efficacy and less favorable stereotypic attitudes.

Another survey conducted by Schmacher and Martin (2001) argued that females are less experienced with ICT and more likely than males to have negative attitudes towards computers.

North and Noyes (2002) in their study ‘Gender influence on children’s computer attitudes and cognition’ asserted that computing is a widely preceived “masculine activity”.In this way their research provided evidence to link gender and technophphbia.

In a study by Gross (2004) titled ‘Adolescents Internet Use : What we expect what teens report’. Gross proved the proposition that gender predicts the usage. He suggested that gender gap in overall usage reported in earlier researches have narrowed down enough to be indiscernible.

Havelka et al. in his research paper (2004) ‘A Study of Computer Anxiety Among Business Students’ with a sample of 331 students of business school (179 men,152 women ) found that his study hadn’t supported any there are any difference in computer anxiety among male and female.
In terms of gender, Gay and Blades (2005) recommend academicians and course administrator to pay more attention to the use of ICTs resources as a major component in the classroom teaching. Females to a larger degree than males reported that they had access to computer off campus.

Czaja et al. (2006) also mentioned in their study ‘Factors predicting the use of technology: Findings from the centre for research on aging and technology enhancement’ that Women have higher computer anxiety, lower computer self-efficacy and lower computer attitudes.

Adebayo & Adesope (2007) in ‘Awareness, access and usage of information and communication technologies between female researchers and extensionists’ identified that awareness of ICT among female researchers and female extensionists is high and found that respondents know how to access Internet; though they reported inadequate access to ICT.

2.6 Research Studies on Motivation and ICT

Cox (1997) in his Article ‘What motivates teachers to use ICT’ found a number of motivational aspects that enhanced commitment to the learning task. They are- enhanced enjoyment and interest, increased self-esteem and increase in independence and confidence, etc.

One factor that researchers identify as critical to fostering improved student academic achievement is the principal’s ability to motivate teachers (Rowan, Chiang, & Miller, 1997).

How well a principal supports and encourages teacher motivation may directly affect the degree of student academic achievement that occurs in the school (Weller & Weller, 2000; Williams, 2000).

The literature indicates that levels of a school’s teacher motivation can negatively or positively affect school academic outcomes. Researchers found that high levels of teacher motivation strongly and directly correlate with significant improvement in student achievement (Davis & Wilson, 2000). Motivation may affect the ability of teachers to acquire the new skills and knowledge needed to comply with educational reform guidelines (Kealey, Peterson, Gaul & Dinh, 2000).

Robyler and Edwards (2000) in their book “Integrating Educational Technology into Teaching” proposed five reasons for teachers to use
technology in education: 1) Motivation 2) distinctive instructional abilities 3) higher productivity of teachers 4) essential skills for the information age and 5) support for new technologies.

Karsenti, et al. (2001) in a recent study on ‘Motivation of future teachers to integrate ICT into their teaching practices’ showed that the presence of model instructors or participation in a course that optimized use of ICT could have a positive impact on the motivation of the future teachers to use ICT into their teaching practices.

Davis (2002) at Iowa state University, Centre for technology in learning and teaching summarized in the findings of her study there are some motivational factors relevant to the majority of teachers which are-having access to computer outside the school, using different forms of ICT for their personal use and having useful training programs etc.

Ramchandran & Pal (2005) realized that the word motivation meant different to different people. They said, “A ‘motivated’ teacher comes to school everyday, does what he is told and provides information the highe ups want.” Educationists, on the other hand, argue that a motivated teacher is one who could communicate with children. They also believe that a motivated teacher can build rapport with parents and the community.

Anjna et al. (2006) at European School Net in ‘ICT Impact Report’ reviewed the previous studies on ICT and found that ICT has a strong motivational bearing on behavior communication and process skills.

‘Benchmarking Access and Use of ICT in European Schools’ a study conducted by Emprica (2006) studied about such factors like information on ICT equipment and Internet in schools, their use in class, comparison of the situation in 2001 and 2006, attitudes on ICT use by teachers, motivation for using ICT in schools and the ICT adoption readiness of the teachers etc. The results relating to the current use of ICT in schools were that an overwhelming majority of teachers (90%) already use computers to prepare their lessons.

Sami and Pangannaiah (2006) in “Technostress” A Literature survey on the effect of Information and Communication Technologies on library users stated that if computer anxiety is combined with low confidence, low motivation or negative attitudes, individuals will strive to avoid interactions with computers.
Sang, Valcke, Barak, Zhu (2009) studied Factors associated with the integration of ICT into Chinese primary school classrooms: an interplay of teacher-related variables and found that the results show that classroom use of ICT directly depends on teachers' computer motivation and the supportive use of ICT.

Mansefield (2010) in Motivating adolescents: Goals for Australian students in secondary schools showed that show that future goals have a critical impact on students' motivation and that students pursue multiple and related goals in learning situations.

Tilery & Fishbach (2011) studied course of motivation and explored that the course of motivation in pursuing various goals.

Kori, Altin, Pedaste, Palts, & Tõnisson (2014) in what influences students to study information and communication technology? surprisingly found that a good salary in the ICT field is not a very important reason why students are interested in studying ICT. Financial situation and work experience were the main reasons why students would choose to start working while studying.

### 2.7 MAJOR TRENDS IN REVIEW OF LITERATURE ON MOTIVATION

Previous studies on ICT and found that ICT has a strong motivational bearing on behavior communication and process skills. (Ajzen & Fishbein, 1980). There are some motivational factors relevant to the majority of teachers which are having access to computer outside the school, using different forms of ICT for their personal use and having useful training programs etc. (Davis, 2002)

### 2.8 Research Studies on Computer Competence

Maier (1973) suggested that the result of training is multiplicative product of a learner’s ability, his or her motivation level, and the training environment. Huang et al. (1985) proved that limited computer experiences are related to high computer anxiety and low self confidence in computer use. Lloyd & Gressard (1986) in his study “Validation studies of new computer attitude scale” concluded that teachers' positive attitudes towards computers had positively correlated with their experience in using computers.
Mahmood & Medwitz (1989) in “Assessing the effect of computer literacy on subjects’ attitudes, values and opinions toward Information technology: An exploratory longitudinal investigation using the linear structural relations (LISEREL) model’ found that computer literacy has a negative effect upon attitudes toward Information technology. Davis & Davis (1990) first explored the effects of training techniques and personal characteristics on training end users of Information systems.

Rosen & Maguire (1990) in ‘Myths and realities of Computerphobia: A meta analysis’ stated that Computer experience alone does not eliminate computer phobias and that additional computer experience may actually exacerbate the problem.

Summers (1990) in their study on ‘New student teachers’ and computers: an investigation of experiences and feelings’ supported many previous findings. The majority of respondents reported having little or no competence in handling most of the computer functions needed by the educators.

Na (1993) in his dissertation ‘Variables associated with attitudes of teachers towards computers in Korean vocational agricultural high schools.’ conducted a study & found that teachers’ computer training, their knowledge, skills and availability is positively correlated with their attitudes towards computers.

To these “behavioral competencies” Stein, Craig and Scollary add a cognitive dimension, one that is also recognized by the Australian National Board for Employment, Education and Training (NBEET, 1995) the ability to use ICT to identify and search efficiently for specific information in order to build knowledge and develop critical and creative thinking.

Gos (1996) in his study ‘Computer Anxiety and Computer Experience: a New Look at an Old Relationship’ stated that the Quality of prior experience accounted for nearly 58% of the computer anxiety in the students.He suggested that pleasantness or unpleasantness of the prior experience may determine the degree of anxiety.

Mchmillian’s (1996) concept of computer competency is theoretically fuzzy and changing. The definition of the concept is more or less precise
depending on whether it occurs at the level of the definition of ‘operational’ abilities or at the level of political discourse.

As most of the contemporary authors do, they tend to centre definition of computer literacy on a few competencies or abilities, identifiable as open behaviors (Bradley 1996 et al.)

- The individual knows how to use Word Processing software, an email and a browser for internet navigation.
- The individual is capable of registering or downloading information diskette (or some other external saving unit) so as to reprint it.

Volman (1997) in ‘Gender –related effects of Computer and Information Literacy education’ found that negative attitudes and unfavorable perceptions of computer adversely affect computer literacy.

Bradley & Russell (1997) in their study ‘Computer Experience, School Support and Computer Anxieties’ found an inverse relationship between the quality of prior computer learning experiences and computer anxieties.

Zhang & Espinoza (1997) in their study of undergraduate students on ‘Affiliations of computer self-efficacy and attitudes with need for learning computer skills’ revealed that attitudes toward computers and reported self-efficacy were significant predictors of the perceived need to learn computer skills. The greater one’s perceived computer competency, the less perceived need for learning computer skills.

McQueen & Mill (1998) stated in ‘End user computer sophistication in a large health services organization’ that educational level had a positive effect on computer self – efficacy, so workers with greater levels of education and training had more confidence in their competencies for the use of computers and technologies.

Robertson & Stanford (1999) found in their study on ‘College students’ computer attitudes and interest in web bases distance education’ that computer attitudes were significantly related to self reported computer skill levels.

Larcose et al. (1999) in their study ‘Information and communication technologies in University teaching and in teacher education: Journey in a major Quebec University’s reality’ suggested that in general the level of
technological competence among the professors at Sherbrooke University varied according to the faculty. It was superior in the faculties of administration and applied sciences than in those of social sciences and education.

Ertmer et al. (1999) concluded that educators’ personal beliefs with regard to their computer proficiency are the main factors in determining whether or not they will use computers in teaching and learning.

Wilson et al.’s (2000) results in ‘Cross time attitudes, concept formation and achievement in college freshman phymes’ bordering on the relationship between computer attitudes and computer competence are very scanty and have yielded conflicting results.

In his study “Effects of an educational computing course on pre service and in service teachers: A discussion and analysis of attitudes and use” Yildrim (2000) found a significant correlation between prior experience, attitudes toward computer significantly. Both affect each other.

However, Hernes et al. (2001) in their study on knowledge and competence in ICT among teachers in Norway reported that attitudes do not bear strong relationship with competence.

Lin et al. (2002) studied ‘Web based peer assessment, attitude and achievement’ and suggested that empirical verification is needed regarding the relationship between computer attitude and competence.

Al Oteawa (2002) in his research on ‘The perceptions of administrators and teachers in utilizing Information Technology in instruction, administrative work, technology planning and staff development in Saudi Arabia stated that previous research has pointed to teachers’ lack of computer competence as a main barrier to their acceptance and adoption of ICT in the developing countries.

Berner (2003) in ‘A study of factors that may influence faculty in selected schools of education in the commonwealth of Virginia to adopt computers in the classroom’ reported that computer competence was significantly related to teachers’ attitudes and supports the theoretical and empirical arguments made for the importance of computer competence in determining teachers’ attitude towards ICT.
Havelka et al. in his research paper (2004) ‘A Study of Computer Anxiety Among Business Students’ with a sample of 331 students of business school (out of it 265 have more than five years experience and most of them have taken more than one computer course and also learned more than one computer application) found that more exposure to computers, computer related curses and computer applications have lesser levels of computer anxiety.

Al-Asmari in (2005) in his dissertation ‘The Use of Internet among EFL teachers at the colleges of technology in Saudi Arabia’ concluded that despite their positive perceptions of the value of Internet use as an educational tool, they demonstrated low levels of competency in computer skills.

Samak (2006) in his dissertation “An Exploration of Jordanian English Language Teachers’ Attitudes, Skills and Access as Indicator of Information and Communication Integration in Jordan” found a strong correlation between respondent attitudes and their level of computer competence.

Jegede et al. (2007) in their study ‘Relationship between ICT competence and attitude among some Nigerian territory Institution’. lecturers reported a significant relationship between attitude toward ICT and competence’. Further they found that attitudinal constructs that would predict ICT competence included perceived control factor as well as affective component.

Ogunkola (2008) investigated the effect of computer attitude of, ownership and computer literacy of teacher of Nigeria. He found that they have positive attitudes but needs get more training.

Mitra (2009) studied professionals of educayinal institutes of Delhi on their computer attitudes and its use for Education. She found that their attitude was positive, but factors like age, gender computer acess etc. showed differences.

Kumar (2010) studied rural and urban secondary school teachers’ attitude towards computer as an instructional aid. It was found that 75% of teachers were reluctant to use computers as an instructional aid.
Tamer (2011) investigated computer usage profiles and attitudes towards computers. The study was conducted in Turkey with 172 teachers. Results revealed that there is a significant difference according to the variables of level of using, computers, frequency of using computers and experience of using computers etc.

Modi (2012) investigated primary teachers' attitudes towards computer literacy with respect to gender, educational qualification and extent of experience in Mehsana distt. of Gujarat. The study did not find any difference with gender and educational qualification. But found a significant difference with their experience.

Nzuki (2014) found that most teachers neither use technology as an instructional delivery mode nor integrate technology into their curriculum.

2.9 MAJOR TRENDS IN REVIEW OF LITERATURE RELATED TO COMPUTER COMPETENCE

On the basis of review of literature it was found that mostly teachers have positive attitude towards ICT (Ognkola, 2008). But gender, age another factors doesn’t pay any role in computer attitudes (Modi, 2012, Mitra, 2009).

2.6 Research Studies on Computer anxiety

Bandura (1977) in his Social Cognitive Theory suggested that as individuals experience higher anxiety, they may report lower levels of efficacy, however as their efficacy rises individuals report corresponding decrease in anxiety.

Deloughry (1993) Researchers say “Technophobia may inflict millions of students” found that the pressure imposed by time restraints can be overwhelming and increasing anxiety. Students need to relax with and around computers. A calm, low stress atmosphere will benefit the student. The relationship between computerized mood assessment and the degree of computer anxiety has been reported by George and his colleagues (George et al., 1993). The results suggest that computer anxious individuals may be more likely to endorse negative rather than positive self-evaluative items on computerized mood measures.
Gardener et al. (1993) in their study ‘The measurement of computer attitude: An empirical comparison of available scales.’ stated that actual experience with computer play major role in reducing computer anxiety, which may help the teachers to integrate technology in classrooms. Brosnan & Davidson (1994) in their study ‘Computer phobia-is it particularly Female phenomenon?’ concluded that 25-30 % of population can be characterized to as suffering to some extent from computer anxiety or computer phobia.

Larner et al. (1995) in their study on ‘Teachers with limited computer knowledge: variables affecting use and hints to increase use at university of Virginia’ with 78 US elementary school teachers aimed to identify the most important variables in determining the degree to which teachers’ limited knowledge to use computers in the classroom. Anxiety proved to be the variable with the strongest negative correlation with computer use among teachers with limited computer knowledge. It included suggestions for increasing computer integration in teaching.

Bradley and Russell (1997) in their study ‘Computer Experience, School Support and Computer Anxieties’ has shown that computer anxiety is present in a sizeable minority of school teachers with a random sample of 350 Australian primary and secondary teachers. Some personal and school based correlates were also identified for it.

Russell et al. (1997) conducted an investigation on ‘Teachers computer anxiety implications for professional development’. Teachers’ computer anxiety was assessed through a questionnaire survey of 350 Australian primary and secondary school teachers. The survey found that although teachers were generally positive about the use of computers in education, they reported moderately low levels of computer competence and one-third of the sample found computers to be a source of anxiety.

Mahar et al. (1997) in their study on ‘The effects of computer anxiety, state anxiety and computer experience on users performance of computer of computer based tasks’ stated that empirical results have shown that computer anxiety has negative effects on computer use.

Larose et al. (1999) concluded that the application of a test reveals a significant difference between the observed means to gender with reference
to the variable anxiety about computer environment. In that case the level of
registered anxiety is higher among women than it is among men. The results
also highlighted two particularly interesting elements with regard to the
probability of teachers using computer technologies for pedagogical purposes.
On the basis of data obtained, it appeared that the level of personal anxiety
related to technological environment could be the best predictor of teachers’
expectations with regard to their students’ mastery of email. It also seems that
a more or less positive attitude towards the personal use of computers and
technology could be the best predictor of high expectations pertaining to the
necessity for students to surf on the internet. The implication of this is that the
attitudinal component that would enhance good ICT competence are freedom
from ICT anxiety and the extent to which teachers’ believe ICT assists in their
work.

Fletcher et al. (2000) in his study on ‘Computer anxiety And Other
Factors Preventing Computer Use Among United States Secondary
Agricultural Educators’ proved that the number of courses taken related to
microcomputers, use of the computer and computer training had low negative
correlations with the computer anxiety score. Data was provided by 176
teachers.

Durrndell and Haag (2002) found that researches have reported the
relationship between computer anxiety and other factors such as test anxiety,
and concluded that computer anxiety is negatively correlated with computer
self-efficacy, attitudes towards the internet and duration of Internet use.

Namlu (2003) in a study on ‘The Effect of learning strategy on
computer anxiety’ reported that computer anxiety has been related to several
personality and demographic variables.

Barbeite et al. (2004) in their study Computer self-efficacy and anxiety
scales for an internet sample-testing measurement equivalence of existing
measures and development of new scales found that computer anxiety is
another relatively new construct. In an addition to testing the psychometric
properties and factor structure of computer anxiety, studies have begun to
examine relationship between anxiety and other constructs.
Havelka, Beasley and Brome in their research paper (2004) ‘A Study of Computer Anxiety Among Business Students’ with a sample of 331 students of business school (179 men, 152 women) found that level of computer anxiety varies in various business disciplines. Results showed that accounting majors have least amount of anxiety but marketing and finance ones have higher levels of anxiety. Gender is a variable that did not make any meaningful difference for the computer anxiety, while the type of education received, grade, receiving computer education and having a computer may mean meaningful differences in terms of various sub-factors and the whole scale itself.

Sam, Ekhsan, Othman, and Nordin (2005) in their study ‘Computer Self–Efficacy, Computer Anxiety and Attitudes towards the Internet: A Study among the Undergraduates in Unimas’ by taking sample of 81 female and 67 male from seven faculties suggested that computer anxiety and computer self efficacy is influenced by factors like types of application used, purpose for using, and individual satisfaction etc.

Czaja, Fisk, Hertzog, Nair & Rogers (2006) mentioned in their study ‘Factors predicting the use of technology: Findings from the centre for research on aging and technology enhancement’ that older and middle age adults had lower self–efficacy with respect to the use of computers and had higher computer anxiety than did younger adults.

Katiyal, Director, Education Microsoft (2009) opined in ‘Supporting and fueling the growth of ICT in education’ that there is a psychological fear associated with the use of technology at the school level.

Sabapathy (2010) investigated attitude and anxiety towards computer among secondary school teachers in India. The t-ratio revealed that teachers with low computer anxiety have better attitude towards computers.

Chaudari and Halde (2011) in their study of computer self-efficacy computer anxiety of trainee teachers: issue of concern found that depending on faculty and residential address teachers exhibited significant differences in computer anxiety. Tuncer, Dogan and Tanas (2013) investigated vocational high school students computer anxiety and found that Gender is a variable that did not make any meaningful difference for the computer anxiety, while
the type of education received, grade, receiving computer education and having a computer may mean meaningful differences in terms of various sub-factors and the whole scale itself.

MAJOR TRENDS IN REVIEW OF LITERATURE RELATED TO COMPUTER ANXIETY

Trends in review of literature on computer anxiety showed that teachers with low computer anxiety have better attitude towards computers Sabapathy (2010). There is a psychological fear associated with the use of technology at the school level Katiyal, (2009)